

**OREGON  
ENVIRONMENTAL QUALITY  
COMMISSION MEETING  
MATERIALS 05/17/2000**



**State of Oregon  
Department of  
Environmental  
Quality**

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# \*\*\*Revised\*\*\* A G E N D A

## ENVIRONMENTAL QUALITY COMMISSION MEETING

May 17 and 18, 2000  
DEQ Conference Room 3A  
811 S. W. Sixth Avenue  
Portland, Oregon

Notes: Because of the uncertain length of time needed for each agenda item, the Commission may deal with any item at any time in the meeting. If a specific time is indicated for an agenda item, an effort will be made to consider that item as close to that time as possible. However, scheduled times may be modified if agreeable with participants. Anyone wishing to listen to the discussion on any item should arrive at the beginning of the meeting to avoid missing the item of interest.

**Public Forum:** The Commission will break the meeting at approximately 11:30 a.m. on Wednesday, May 17 for the Public Forum if there are people signed up to speak. The Public Forum is an opportunity for citizens to speak to the Commission on environmental issues and concerns not a part of the agenda for this meeting. The public comment period has already closed for the Rule Adoption items and, in accordance with ORS 183.335(13), no comments can be presented to the Commission on those agenda items. Individual presentations will be limited to 5 minutes. The Commission may discontinue this forum after a reasonable time if an exceptionally large number of speakers wish to appear.

### **Wednesday, May 17, 2000** **Beginning at 8:00 a.m.**

*The Oregon Environmental Quality Commission will hold an executive session at 8:00 a.m. in Room 3B. The session will be held pursuant to ORS 192.660(1)(h) to consult with legal counsel concerning the Commission's legal rights and duties with regard to potential litigation relating to tax credit applications Nos. 4570 and 4800.*

- A. Approval of Minutes
- ~~B. Approval of Tax Credit for Portland General Electric Company's Independent Spent Fuel Storage Installation at the Trojan Nuclear Power Plant site in Rainier~~  
*Postponed to a later Commission meeting*
- C. Approval of Tax Credits
- D. †Rule Adoption: Lane Regional Air Pollution Authority (LRAPA) Open Burning Rule Amendments and State Implementation Plan (SIP) Revision
- E. †Rule Adoption: Title V Permitting Program Consumer Price Index (CPI) Fee Increase
- F. †Rule Adoption: Solid Waste Rule Amendments to Waste Planning and Recycling Grants OAR 340-083-0010 to 340-083-0100



G. Informational Item: Report to the EQC Regarding Hazardous Waste-Derived Fertilizer and Related Issues

*In the afternoon the Commission will tour multiple sites in North and Northeast Portland and along the Columbia Slough.*

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**Thursday, May 18, 2000**  
**Beginning at 8:00 a.m.**

H. Informational Item: Total Maximum Daily Loads (TMDLs)--A Status Report

I. Action Item: Extension of the Tualatin River Basin TMDL Compliance Order

J. Informational Item: DEQ Budget Update

***Beginning at 9:30 a.m.***

K. Action Item: Permit Revocation Request Related to the Umatilla Chemical Agent Disposal Facility (UMCDCF)

11:30 a.m. Public Comment will be taken regarding agenda Item K

L. Commissioners' Reports

M. Director's Report

Hearings have already been held on the Rule Adoption items and the public comment period has closed. In accordance with ORS 183.335(13), no comments can be presented by any party to either the Commission or the Department on these items at any time during this meeting.

The Commission will have lunch at 1:00 p.m. on Wednesday and at 12:00 noon on Thursday. No Commission business will be discussed.

The Commission has set aside July 13-14, 2000, for their next meeting. It will be held in Tillamook, Oregon.

Copies of staff reports for individual agenda items are available by contacting the Director's Office of the Department of Environmental Quality, 811 S. W. Sixth Avenue, Portland, Oregon 97204, telephone 503-229-5301, or toll-free 1-800-452-4011. Please specify the agenda item letter when requesting.

If special physical, language or other accommodations are needed for this meeting, please advise the Director's Office, 503-229-5301 (voice)/503-229-6993 (TTY) as soon as possible but at least 48 hours in advance of the meeting.

July 25, 2000

# Environmental Quality Commission

## NWR Region Tour Itinerary

May 17, 2000

1. 12:30: Pick up EQC members downtown
  - Tour overview and introductions -- Neil Mullane: NWR Administrator
2. 12:45 p.m.: Drive to River District re-development area (Front Avenue side)
  - Description of DEQ role in re-development work at Union Station -- Mike Rosen: Voluntary Cleanup Program Manager
  - Description of River District development plans, site contamination and recommended remedy -- Dave St. Louis: Cleanup and Spills Manager
3. 1:15 p.m.: Drive to ESCO
  - Description of AQ issues at ESCO facilities and general AQ issues and activities in NW Portland -- Audrey O'Brien: Air Quality Manager
4. 1:45 p.m.: Drive to Martin Luther King Blvd.
  - Description of DEQ role in projects and partnering programs along MLK -- Mike Rosen
5. 2:00 p.m.: Drive to Columbia Boulevard Sewage Treatment Plant (City of Portland)
  - Brief tour and description of CSO elimination project; DEQ's role and requirements -- Bob Baumgartner: Water Quality Manager
6. 2:45 p.m.: Drive to Multnomah Drainage District No. 1
  - En route, discussion on Columbia Slough WQ issues; TMDL; permit process -- Bob Baumgartner
7. Stop at Drainage District Conference Room:
  - Continued overview of Slough WQ and TMDL development issues.
  - Discussion on roles and coordination between drainage district and DEQ -- Bob Baumgartner and Dave Hendricks: Drainage District representative
  - Review aerial photos and discuss Columbia Well Fields Project -- Dave St.Louis
  - Port of Portland representative to describe deicing facility
8. 3:45 p.m.: Drive along Columbia Slough traveling to Air National Guard:
  - Point out new Port deicing treatment area
  - Stop at Cornfoot & 47<sup>th</sup> and view Slough
9. 4 p.m.: Oregon Air National Guard
  - Discussion of site contamination and cleanup program involvement -- Dave St.Louis
  - Discussion of WQ issues at de-icing treatment ponds -- Bob Baumgartner

10. 4:15 p.m.: Head west on 84:

- Discussion of cleanup program involvement with Airport Light Rail project -- Mike Rosen

11. 4:30 p.m.: Drive to ICN (Holman and Airport Way):

- View site and description of work underway, including 6-phase heating remedy -- Jennifer Sutter: Cleanup Project Manager

12. Return to DEQ Headquarters. Approximate arrival time 5:15



# Willamette River Projects

Reducing Combined Sewer Overflows

April 2000 No. 1

Nearly every time it rains, Portland sewers overflow into the Willamette River and Columbia Slough. Older Portland neighborhoods have a combined sewer system, which mixes untreated sewage and stormwater runoff in a single pipe. When it rains, stormwater runoff from streets and other hard surfaces fills the sewer pipes and overflows through more than 50 outfall pipes on the river and slough. In addition to raw sewage, these combined sewer overflows (CSOs) also carry pesticides, metals, and other pollutants.



*In 1994, Portland's Environmental Services developed a plan to reduce CSOs. The plan has three parts:*

## 1 Cornerstone Projects

The cornerstone projects reduce the amount of stormwater runoff that flows into the combined sewers. Projects include installing street sumps, disconnecting residential downspouts, diverting underground streams, and building separate pipes for stormwater runoff.

## 2 Columbia Slough Projects

These projects will stop nearly all combined sewer overflows to the Columbia Slough. They include building a Big Pipe to store and transport combined sewage flows to the Columbia Boulevard

Wastewater Treatment Plant, a pump station, expanded treatment capacity, and a new pipe to carry treated wastewater to the Columbia River.

These projects are under construction and will be finished in 2000.

## 3 Willamette River Projects

These projects will control and reduce combined sewer overflows to the Willamette River. The City and a citizens task force have reviewed the original facility plan to ensure that the proposed projects are environmentally responsible and cost effective. These projects are focused along the west and east sides of the Willamette River.

### Community Enhancement

Environmental Services will work hard to minimize the impact of large construction projects on communities. We are committed to enhancing areas impacted by construction. As we design and build these projects we will ask impacted communities if there are opportunities for us to improve neighborhood livability.



ENVIRONMENTAL SERVICES  
CITY OF PORTLAND  
**CLEAN RIVER WORKS**  
Dean Marriott, Director



Over the next several years, the City will build large pipes and pump stations to carry combined sewer overflows to the treatment plant. The westside projects will be designed and completed over the next six years.

## Westside Projects

### • Westside Stream Diversions

A number of small streams on the west side of the Willamette were piped into the combined sewer system in the late 1800's and contribute to overflows. The City is now looking at removing these streams from the combined system and diverting them to ponds, wetlands and other natural systems that help filter stormwater before it flows to the river and to reduce the size of downstream CSO facilities.

### • Southwest Parallel Interceptor

This pipe will be built from SW Taylors Ferry Road to Moody Avenue near the Marquam Bridge.

### • Ankeny Pump Station

The City will rebuild this old pump station that sits under the Burnside Bridge on the west side of the river.

### • Westside CSO Tunnel

The City will bore a large tunnel to build a new pipeline from the Marquam Bridge to the northwest industrial area. This pipe will carry combined sewer overflows to the new northwest CSO pump station.

### • Northwest CSO Pump Station

A new pump station in the northwest industrial area will pump combined sewage to the treatment plant through the new northwest CSO force main.

### • Northwest CSO Force Main

The City will build a new sewerline to convey flow from the new northwest CSO pump station across the river to the existing Portsmouth Tunnel.

### • California Pump Station Upgrade

The existing California Pump station serves a large area in the California combined sewer basin between SW Virginia and the Willamette River. It pumps sanitary and combined flow into the Southwest Interceptor. The pump station needs to be enlarged to prevent CSOs.

### • Cheltenham Storage

The new Cheltenham Storage Facility will be constructed along SW Cheltenham Street and will



reduce downstream CSO facility requirements and eliminate surface flooding by storing sanitary flows during heavy periods of rain. These flows will be released slowly to the existing system. The 830 foot long storage tank will receive sanitary flows from two existing sewers.

### • Tanner Creek Stream Diversion

This project in several phases will separate Tanner Creek stormwater flows from the combined sewer system. A large amount of stormwater comes from creeks that used to flow naturally through the forested Northwest hills. In the late 1800's these creeks were diverted into the combined sewer system. About four miles of new pipe will be constructed between downtown in Northwest Portland, by the Tanner Creek outfall, and near the Sunset Highway and the Washington Park Zoo to separate stormwater from sewer system. Highway stormwater, if diverted to the pipe will be treated with Zoo stormwater by newly constructed stormwater quality treatment facilities.

## Eastside Projects

### • Southeast Consolidation Conduit

This pipe in southeast Portland will collect combined sewage from southeast neighborhoods and transport it to the eastside CSO tunnel.

### • Eastside CSO Tunnel

A new tunnel will store and carry combined sewage from southeast Portland to the new eastside CSO pump station and force main.

### • Eastside CSO Pump Station and Force Main

The City will build a new pump station and a pipeline to carry combined sewage to the new eastside CSO gravity conduit.

### • Eastside CSO Gravity Conduit

This pipe will carry combined sewage from Killingsworth to the recently constructed Big Pipe under Columbia Boulevard and then to the treatment plant.



# Combined Sewer Overflow Progress Report

Environmental Services, City of Portland ■ December 1999

## Message from Dean Marriott, Environmental Services Director

The end of the Twentieth Century marked the end of the ninth year of our combined sewer overflow (CSO) abatement program. When we started this effort back in 1991, it seemed to be a very long road ahead, with many years of effort before positive results would be noticed. As we start a new calendar, a new century, and a new millennium, the Bureau of Environmental Services is proud to report on the progress we have made on cleaning up the Willamette River and the Columbia Slough.

We began this effort in 1991. As we close out 1999, we are approaching the halfway point in controlling 96 % of the volume of CSOs. By the end of 2000, we will have completed our CSO abatement work along the Columbia Slough. This effort, along with the other measures we are taking, will push us to the 47 % level of control by the time our Year 2000 Progress Report is written.

This Progress Report will summarize what we have accomplished during the past year, and what we can expect to see in the upcoming months. Environmental Services has developed an exciting new approach to dealing with pollution problems facing the Willamette River and all of our urban watersheds. We call it the Clean River Plan and it offers a great opportunity to solve the problems facing threatened salmon populations, restore our urban streams, and address the problems caused by stormwater pollution.

Later in this Progress Report you can read more about this exciting new effort. In 2000, the City will seek public input and support for the Clean River Plan. While this review is going on, we will keep the current CSO program on schedule and on budget - just as it has been for the past nine years.

I welcome the opportunity to discuss the issues presented in this Progress Report.

*Dean Marriott*

## How We Got Here

Portland's early sewer system was simple. The City piped sewage directly to the Willamette River. In 1951, Portland built a sewage treatment plant and the system of pipes needed to carry sewage to it for treatment.

As in hundreds of other cities, these pipes carry both sewage and stormwater runoff from streets.

When it rains, these "combined" sewers fill with stormwater and overflow into the Willamette River and Columbia Slough.

When Portland built this combined sewer system, the City had much less impervious surface than it does today and there was much less stormwater runoff. CSOs were less frequent than they are today and the designers of the system reasoned that the river would dilute the sewage that did overflow and carry it away. But as Portland grew, so did the amount of impervious surface. That created more stormwater runoff and a big increase in combined sewer overflows.



*continued*



# Solutions

## Cornerstone Projects

The Cornerstone Projects are cost-effective solutions that reduce CSOs by keeping stormwater runoff out of the combined sewer system.

Since 1992, Cornerstone Projects have reduced CSO volume by 50 percent. These projects allow construction of smaller, less expensive pipes and treatment facilities, and help hold down total program costs.

The total budget for these projects is \$185 million. Environmental Services has spent \$85 million to date on four Cornerstone Project areas.

### Cornerstone Successes

- ① **Sewer Separation Program**
  - 3 of 7 Sub Basins Separated
- ② **Sump Installation Program**
  - 2,860 Sumps Installed (in the CSO areas)
- ③ **Downspout Disconnection Program**
  - 8,605 Residents (19,324 downspouts)
- ④ **Stream Diversion Projects**
  - 4 streams

#### ① Sewer Separation

In some neighborhoods, Environmental Services installs new pipes to separate stormwater from sewage and remove stormwater runoff from the combined sewer system. Sewer separation projects are complete in three of the seven areas targeted for this work.

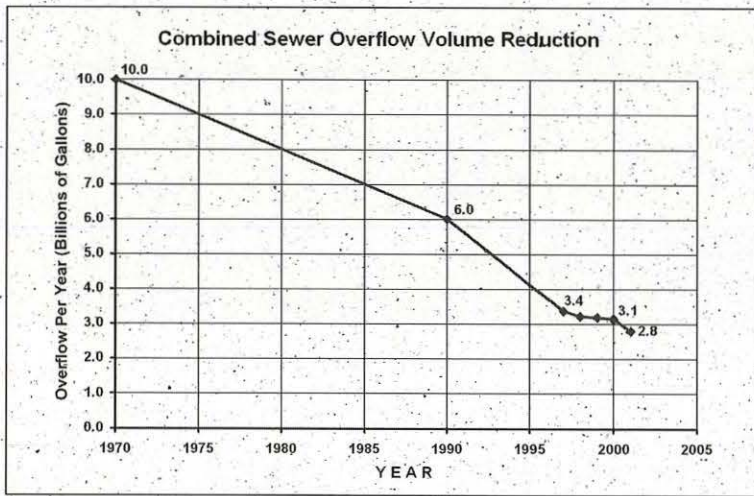
#### ② Sump Installation

Environmental Services is installing thousands of sumps throughout east Portland. Sumps collect street runoff and allow stormwater to seep into the ground, rather than flow into the combined sewer system and contribute to overflows. More than 2,860 sumps have been installed in areas served by combined sewers.

#### ③ Downspout Disconnection

The Downspout Disconnection Program gives homeowners, neighborhood associations, and community groups the chance to work as partners with Environmental Services to help reduce combined sewer overflows. Residents of selected east Portland neighborhoods disconnect their downspouts from the combined sewer system and allow their roof water to drain into their gardens and lawns.

More than 19,000 residential downspouts have been disconnected, removing more



In the 1970's, Portland took the first steps toward reducing CSOs. At its worst, the system dumped an estimated 10 billion gallons of combined sewage into the river and slough every year. We have worked aggressively to reduce this problem and we have made solid progress.

That progress is possible because of the hard work of many dedicated Environmental Services employees, volunteer citizen advisory panels, the Portland City Council, and through the dollars committed by our rate payers. We still have much work to do, but we have made a tremendous amount of progress. We will continue to work hard to protect our rivers and streams, and to give our rate payers a solid return on the money they have invested in this effort.

## The CSO Problem

About one third of Portland's neighborhoods are served by a combined sewer system built before 1960. When it rains, stormwater runoff combines with sewage in these pipes. When the system fills with stormwater it overflows into the Willamette River and Columbia Slough. More than 1,000 other cities across the country have similar systems.

In 1991, Portland and the Oregon Department of Environmental Quality (DEQ) signed a Stipulation and Final Order (SFO) directing Portland to remove 99 percent of its CSO volume by 2011.



Based on the information developed after 1991, Portland, the DEQ and the Environmental Quality Commission (EQC) reviewed the new information in 1994. The result was an Amended Stipulation and Final Order (ASFO) that requires 99% control of Columbia Slough overflows by

December 2000, and a 94% reduction of Willamette River overflows by 2011.





than 145 million gallons of stormwater from the combined sewer system.

#### ④ Stream Diversion

Environmental Services will begin construction this summer to divert Tanner Creek and smaller West Hills streams from the combined sewer system. These creeks were piped into the sewer system decades ago. Today, this relatively clean runoff contributes to combined sewer overflows.

### Columbia Slough Projects

Construction is nearing completion in north Portland on a set of projects to reduce combined sewer overflows to the Columbia Slough by more than 99 percent by 2001. The total estimated cost of the Columbia Slough projects is \$165 million. Environmental Services has spent about \$120 million to date.

#### The Big Pipe

In July 1998, Environmental Services began building the Big Pipe - a 3.5-mile, 12-foot diameter, reinforced concrete pipeline that will collect and carry combined sewage to the Columbia Boulevard Wastewater Treatment Plant. The \$80 million conduit

will remove most of the combined sewage that overflows into the Columbia Slough when it rains.

Pipeline construction was completed in the fall of 1999. Contractors are currently working on associated structures and ventilation facilities.

Project start-up is anticipated late this summer.

#### Columbia Boulevard Treatment Plant Additions

Environmental Services is expanding treatment capacity at the Columbia Boulevard Wastewater Treatment Plant to accommodate increased flow from the Big Pipe. Construction is nearing completion on a new influent pump station to transport combined sewage from the consolidation conduit to the treatment plant. New primary treatment facilities to treat the combined sewage are also under construction. A new outfall pipe has been installed to transport the treated wastewater to the Columbia River.

The water-based portion of the outfall pipe was completed in mid-November, 1999. That is more than



three months ahead of the February 28, 2000 deadline imposed by the Army Corps of Engineers to minimize the impacts of construction on migrating fish.

### Willamette River Projects

In 1994, Environmental Services completed a plan to reduce combined sewer overflows to the Willamette River. The plan includes construction of two conduits, a wet weather treatment plant, a pump station, and a storage tank.

Environmental Services is working on the Willamette River Predesign Project - a technical and policy review of the Willamette River CSO plan. The goal of the Predesign Project is to maximize improvements in water quality and minimize rate impacts. Construction and operation of the Willamette River portion of the program will cost \$471

million. Environmental Services has begun planning two major Willamette River projects.

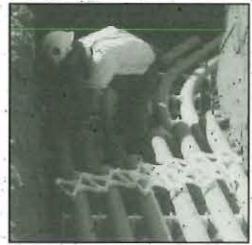
#### Westside Stream Diversion Project

A number of small streams on the west side of the Willamette were piped into the combined sewer system in the early 1900's and contribute to the overflows. Most of the stormwater runoff in natural areas collects in small streams that enter the combined sewer system through a network of inlets located in the natural streambed.

The water in these areas flows to several stormwater pipes and eventually enters the combined sewer system. When it rains, the system is overwhelmed causing CSOs. The city is now looking at removing these streams from the combined sewer system and diverting them to the river. As part of this work, stormwater systems are being evaluated including ponds, swales, wetlands and underground stormwater treatment to help us improve the quality of the stormwater entering the river.

#### Southwest Parallel Interceptor

The Southwest Parallel Interceptor will be a large pipe installed parallel to the Willamette River to collect westside CSOs. It will have the capacity to handle most combined flows and transport them





to the Columbia Boulevard Wastewater Treatment Plant. The interceptor will be constructed by 2003.

The first segment will begin near the intersection of SW Taylors Ferry Road and SW Fulton Park Road and end near the Marquam Bridge. Eventually the pipeline will run under Waterfront Park all the way to the Ankeny Pump Station by the Burnside Bridge.

## The Clean River Plan

In November 1999, Environmental Services developed a plan to integrate its water quality programs. In addition to keeping Portland's sewer system running efficiently, Environmental Services also

works to protect, enhance and restore our natural waterways. We are in charge of hundreds of projects to treat sewage, improve stormwater drainage, and protect water quality.



Instead of focusing on each program area separately, we design projects that address many water quality problems at once. This integrated approach allows Environmental Services to make better use of existing resources and maximize water quality improvements.

### *The Clean River Plan will deal with:* **Stormwater Management**

Improve city, business and residential practices to reduce lead, copper, oils, grease, pesticides, herbicides, fertilizers and other pollutants that get into stormwater.

### **The Endangered Species Act**

Improve fish habitat including the quality of the water in the river (and its tributaries) and the condition of stream banks.

### **Watershed Health**

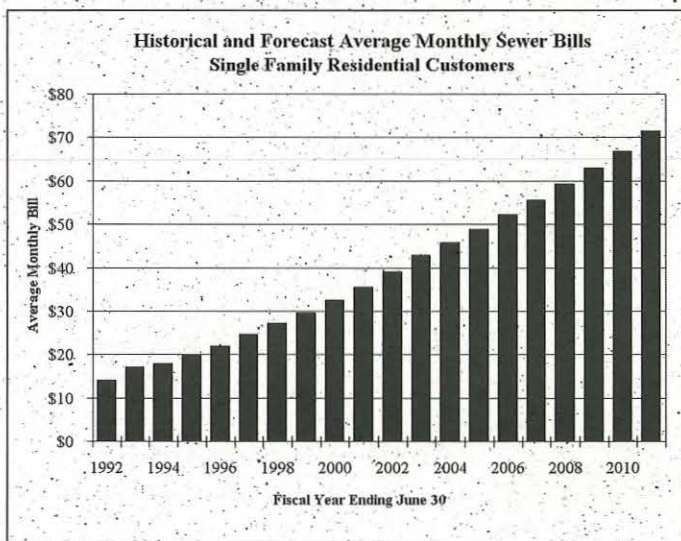
Improve the overall health of the Willamette River and its tributaries. Tributaries of concern include Johnson Creek, Tryon Creek, Columbia Slough and Balch Creek.

## Partnerships

While Portland is responsible for cleaning up its own pollution sources, it is important that the river is clean when it enters the City if we are to be cost-effective. Today it is not clean when it enters Portland.

## Paying for the Program

Revenue from sewer ratepayers funds the CSO program. The cost of dealing with our combined sewer legacy will approach \$1 billion by 2011. The cost of a typical residential sewer bill has increased from \$14 a month in 1992 to roughly \$33 a month today. The typical residential sewer bill is projected to be \$70 by 2011. (1999 dollars)



### **Dean Marriott, Director**

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ENVIRONMENTAL SERVICES  
CITY OF PORTLAND  
**CLEAN RIVER WORKS**

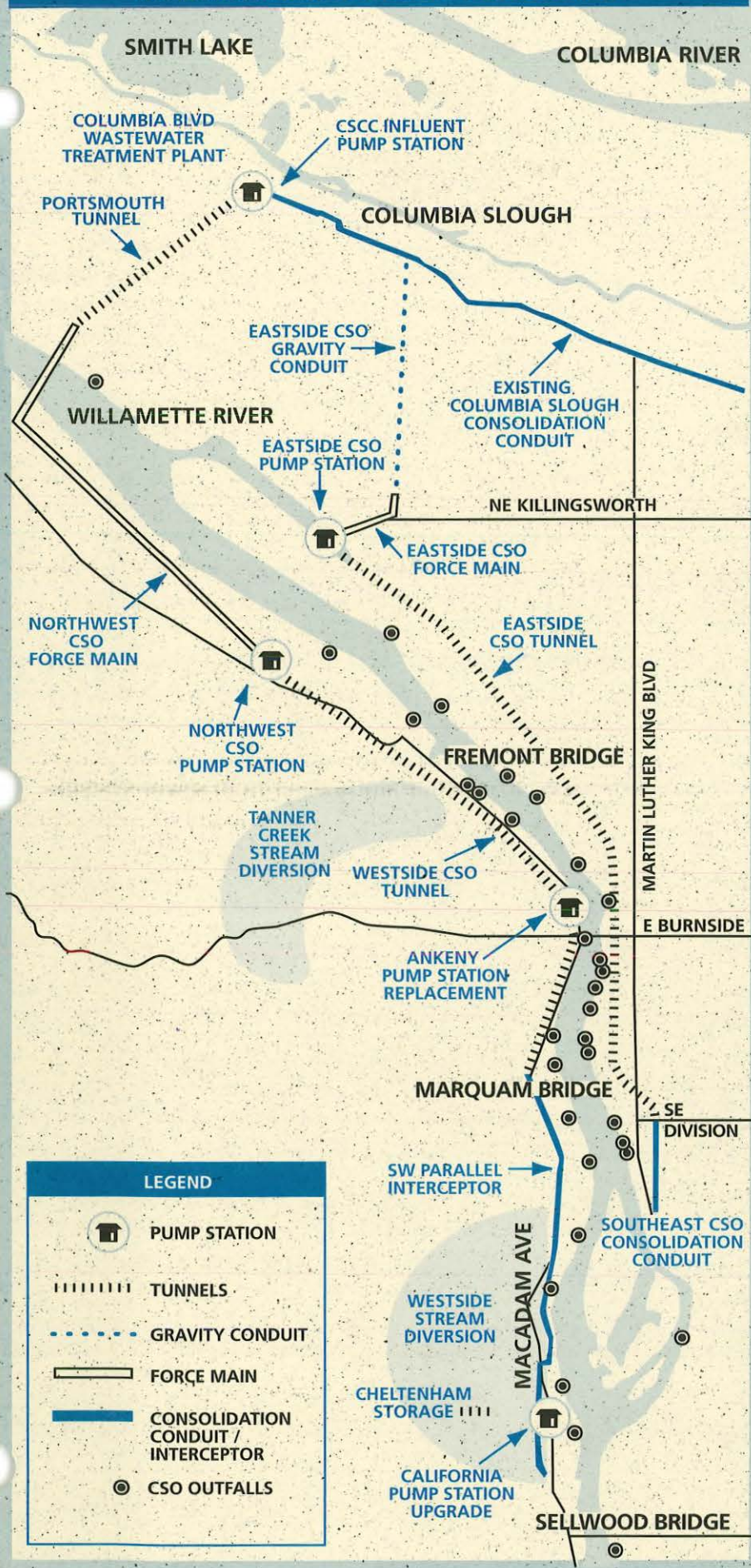
Dan Saltzman, Commissioner

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## WILLAMETTE RIVER CSO PROJECTS MAP

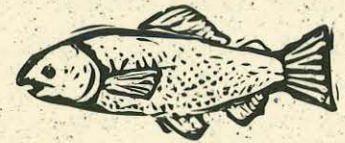


## Treatment Plant Changes

Willamette River combined sewer overflows will be treated at the Columbia Boulevard Wastewater Treatment Plant. The plant will need additional treatment capacity to accommodate Willamette River flows. Any additional expansions will also include construction of new odor control facilities.

There are several advantages to sending CSOs to the Columbia Boulevard plant.

- It improves reliability and flexibility of the system.
- It maximizes use of Portland's existing sewer infrastructure.
- With the listing of Willamette River salmon and steelhead as threatened and continuing water quality and sediment problems, getting permission to discharge treated effluent to the Willamette would be difficult.
- Consolidating treatment at Columbia Boulevard saves money on operation and maintenance.



### Questions?

For more information:

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[www.enviro.ci.portland.or.us](http://www.enviro.ci.portland.or.us)





ENVIRONMENTAL SERVICES  
CITY OF PORTLAND  
1120 SW Fifth Avenue, Room 1000  
Portland Oregon, 97204 -1912

## Willamette River Projects

March 2000 No.1



Oregon Historical Society. # 001253 - 1938 Clean Rivers demonstration



### Schedule

Westside CSO projects will be designed by 2001, construction of these projects will begin by 2003 and they will be completed and operational by 2006. The City is reviewing the current plan to see if the activities and timeline are the most suitable in light of endangered species listings and new regulatory issues.

The size and cost of these projects depend on how much stormwater the City can remove from the combined sewer system. Less stormwater in the system means smaller facilities.

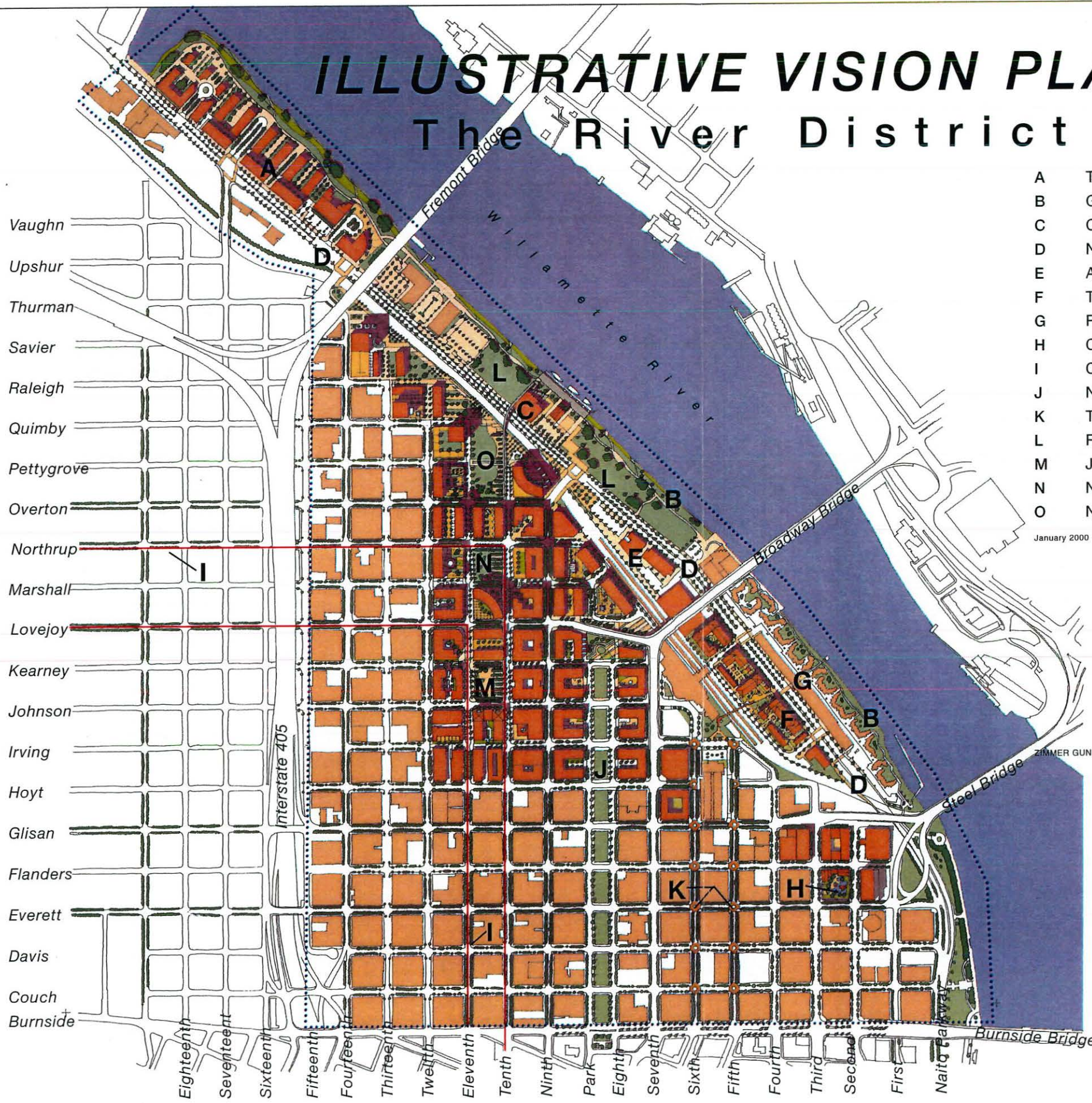
### CSO Program Accomplishments

- Portland has constructed 3.5 miles of new CSO pipe to carry Columbia Slough overflows to the Columbia Boulevard Wastewater Treatment Plant. This pipe will carry about 350 million gallons of CSO volume a year. This will reduce Columbia Slough overflows to one every five years in the winter and one every ten years in the summer.
- Portland has removed 1.8 billion gallons of stormwater and reduced the amount of metals, suspended solids and other stormwater pollutants reaching streams and the combined sewer system. Much of the stormwater flow has been directed to constructed wetlands and natural areas. To date, Portland has spent \$76 million on these stormwater removal programs.
- Portland's CSO program is on schedule and within budget. By the end of 2000, Portland will remove about 53% of the CSO overflow volume from the Willamette River and Columbia Slough and will have spent about \$300 million dollars. Portland has already controlled or eliminated 8 Willamette River CSO outfalls.



# ILLUSTRATIVE VISION PLAN

## The River District



- A Terminal One Mixed-Use Development
- B Greenway Trail
- C Centennial Mill Conversion
- D Naito Parkway Improvements
- E Agricultural Marketing Center
- F The Yards at Union Station
- G Pedestrian Connection to Waterfront
- H Classical Chinese Garden
- I Central City Streetcar
- J North Park Blocks Extension
- K Transit Mall Extension
- L River Front Park
- M Jamison Square
- N North Park Square
- O Neighborhood Park

January 2000



ZIMMER GUNSEL FRASCA

**PDC**  
 PORTLAND  
 DEVELOPMENT  
 COMMISSION



# Public Utilities—ORS 547

- Landowners own & direct
- Elected Board
- Major decisions at annual & special meetings
- Budget is \$1.75 million
- Capital program is \$9 million
- MCDD staff of 11

# Looking To The Future

## **City—District Service Agreement**



- Formalize the existing complex & effective relationship
- Best approach to service delivery
- Identify “cross-subsidies”
- Support the rate study

# Drainage Districts



- Specialized
- Capable
- Partner To The City
- Resource To All



# Drainage Districts

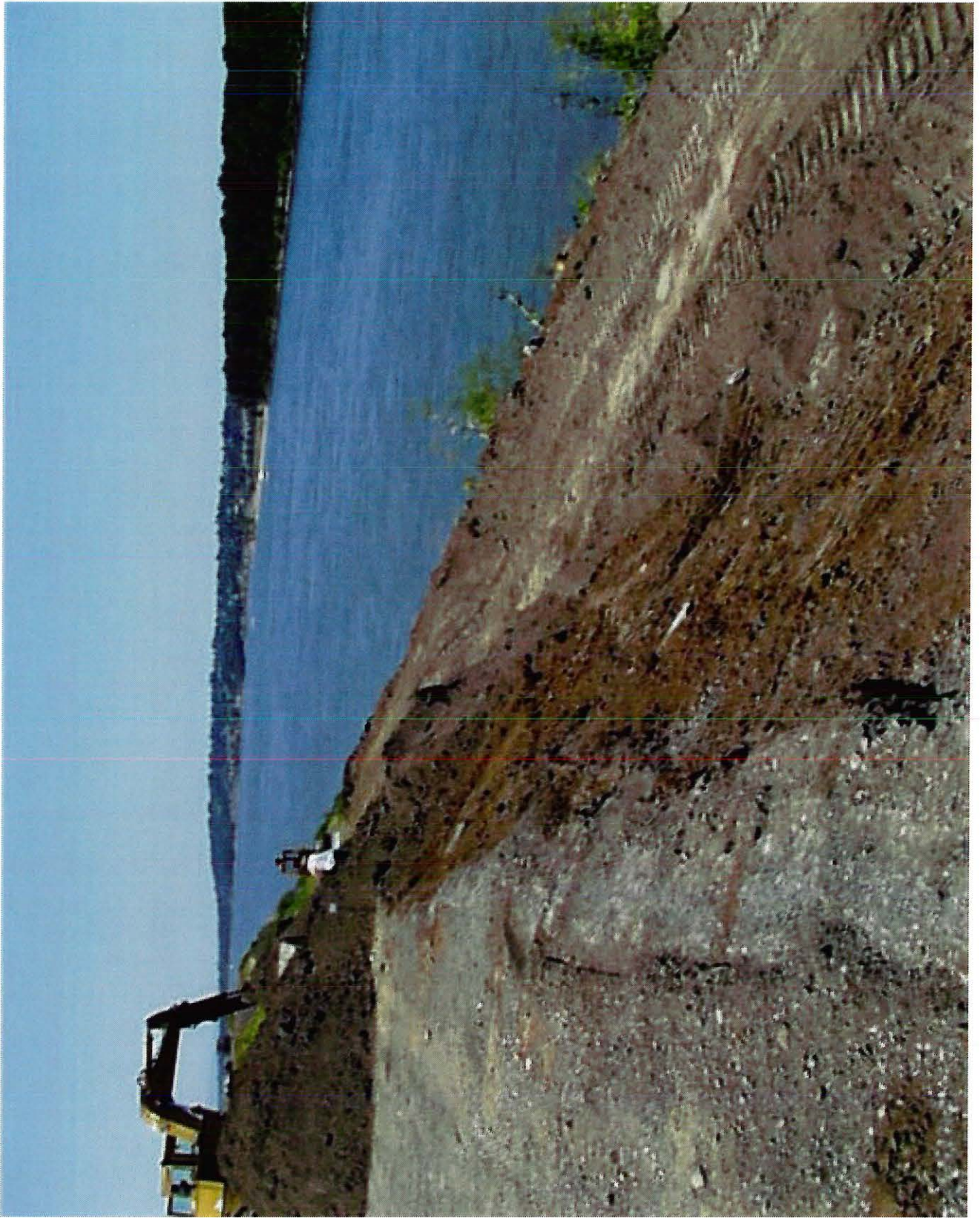


- Multnomah County Drainage District No. 1
- Peninsula Drainage District No. 1
- Peninsula Drainage District No. 2
- Sandy Drainage Improvement Company

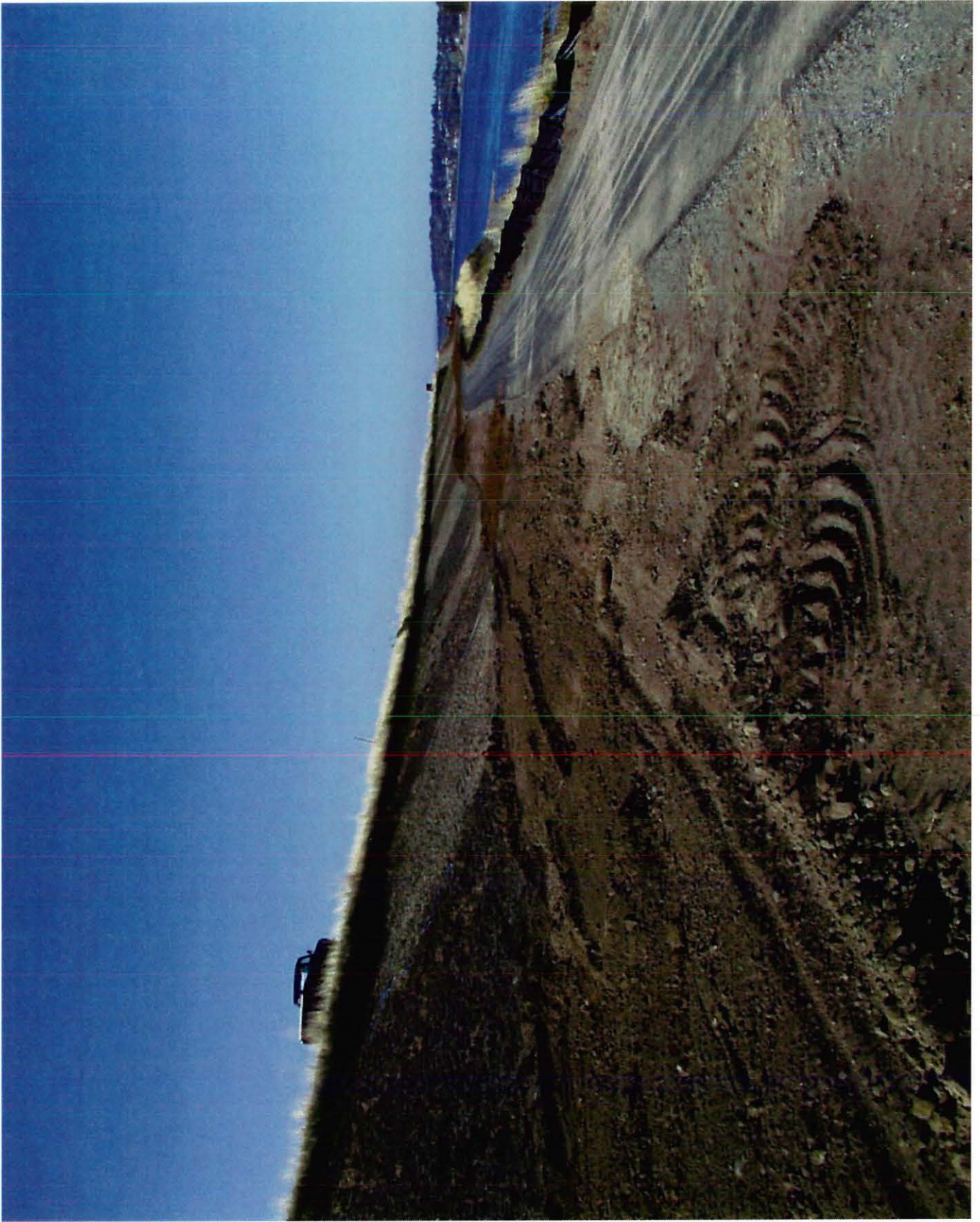


# Flood Protection

- \$ 10 Billion Property Value
- 2,100 Landowners—residential, business, government, recreational
- 25 miles of protective levee
  - COE Standards
- River—18' (avg.) & 29' (100-yr.)
- FEMA Flood Plain—5' to 14'







# Stormwater Pumping



- Every Storm, Year-Round
- Water pumped over the levee at 5 locations
- Forebay of Pump Station #1



# Stormwater Pumping

- 15 large pumps can move 998 million gallons per day
- Includes water from City streets, inside & outside Districts—plus groundwater
- Interior, Pump Sta. #1



# Stormwater Pumping



- The only area of Portland requiring pumping...
- Without pumping, properties would flood.
- Pump Station #4

# Modern & Complete Utility

- Collection & pumping system
- Link to facilities on private property
- Modern telemetry
- 60 miles of open channels, numerous control structures, 16 secondary pumps
- Large capital investments during '90s
- Replacement value over \$200 million



# Environmental Stewardship



- Water level control
- NPDES partner
- Pioneered in-water work techniques
- Design review—erosion control
- Meander channels
- Channel benching





# **EQC Tour**

**Oregon Department of Environmental Quality**

*May 17, 2000*

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**River District Re-development - Hoyt Street Railyard**

**Union Station Parcel B South**

**❖ Union Station Parcel B South attachment**

**Air Quality Activities and Issues in NW Portland**

**Air Quality Issues Involving ESCO**

**Air Quality Activities and Issues in North Portland**

**Air Quality Issues at Swan Island**

**Superfund Factsheet on Hazardous Waste Cleanup at Grant Warehouse**

**Portland Combined Sewer Overflow Management**

**Permit Protects Columbia Slough Water Quality**

**Columbia Slough Water Quality Issues and Activities**

**Oregon Air National Guard Cleanup Project**

**Port of Portland – Light Rail Extension Cleanup Project**

**ICN Pharmaceuticals Cleanup Project**

**City of Portland South Shore Well Field**

**Illustrative Vision Plan – The River District**



## River District Re-development Hoyt Street Railyard

### Overview

Historic railyard operations in Portland's River District have resulted in extensive soil and groundwater contamination by petroleum hydrocarbons, volatile organic compounds (solvents), and heavy metals. The City of Portland has approved site development plans calling for high-density, mixed commercial, residential, and parks developments.

Before the River District (about 22 city blocks) can be developed, cleanup of hot spots of contaminated soils must occur. Contamination in soils across much of the site exceed acceptable risk levels (one in one million excess cancer risk) for construction workers and for future child and adult residents due to cancer-causing compounds.

There is controversy between the developer and landowner (HGW, Inc.), and Burlington Northern/Santa Fe (BN/SF) Railroad, on who pays for the amount of soil that must be removed and disposed of to accommodate below-grade parking. BN/SF sold the property to HWG ten years ago, and leased it back for their railyard operations.

Under the revised Environmental Cleanup Law, DEQ can only require removal or treatment of hot spots (about 6,700 cubic yards) and "capping" the remainder of the site with clean soil, streets

and buildings to prevent human exposure. About 320,000 cubic yards must be removed to allow the city-approved development plan to continue, at an added cost of \$23 million. HGW recently sued BN/SF in federal court and was awarded a \$1.079-million claim against BN/SF for breach of the lease agreement.

A concurrent court action on apportionment of total costs between the two parties for the estimated \$26 million is on hold. Both parties are filing motions for summary judgment to legally clarify whether or not DEQ's proposed remedy cost establishes a ceiling for damages in a private party lawsuit.

The City of Portland also finds the remedy under the Cleanup Law troubling because the risk assessment is site-specific. No risk to City maintenance workers was found in the risk assessment; however the City feels the remedy is not protective because it does not take into account other locations across the City where maintenance workers may have had additional exposures to contamination.

About 7,600 gallons of free petroleum product is floating on the groundwater surface and seepage of petroleum reaches the Willamette River through the Tanner Creek stormwater sewer. An interim removal system has removed about 6,300 gallons since 1992.

To accommodate urgent development plans, DEQ approved a "removal action" for removal of lead contamination at the newly constructed Pearl Court Apartments, and is working with developers and the city on removal actions for the lowering of the Lovejoy ramp, and construction of the street car right-of-way.

## **DEQ Cleanup Actions**

In 1995, DEQ issued an enforcement order to BN/SF for investigation of site contamination and identification of cleanup alternatives. DEQ has provided oversight on the investigation and alternatives, and has coordinated the cleanup actions closely with the development plans.

A proposed cleanup plan, consisting of the following elements, has been prepared and is currently on a public notice requesting public comment by March 31, 2000:

- Removal and disposal of 6,700 cubic yards of "hot spot" contaminated soil

- Capping of the entire site by roads, buildings and 2 to 3 feet of clean soil in the park areas
- Continued extraction of petroleum on groundwater
- Evaluation of petroleum seepage along the Tanner Creek sewer
- Deed restrictions to protect workers if contaminated areas must be excavated during future utility maintenance

## **Future Actions**

DEQ will evaluate public comments received on the proposed remedy and prepare a "Record of Decision" for approval of the selected remedy by Director Lang Marsh. A consent order will then be negotiated with the responsible parties to implement the selected cleanup remedy.

## **For More Information**

Contact Dave St Louis, Manager, Site Response Program, (503)-229-5532  
E-mail: [STLouis.Dave@deq.state.or.us](mailto:STLouis.Dave@deq.state.or.us)



# Cleanup Project

# UNION STATION PARCEL B SOUTH

*Quarterly Report*

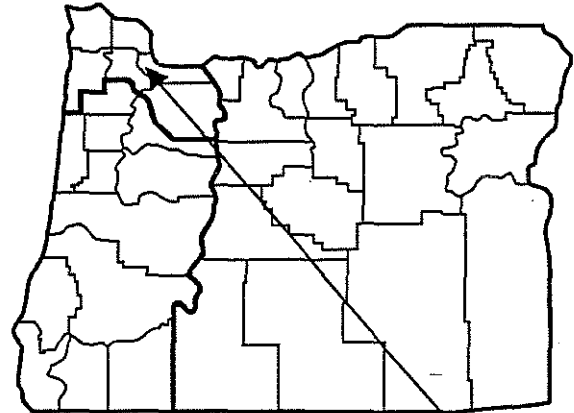
*May, 2000*

## Project Overview

Union Station-Parcel B South is an approximately 7.15 acre vacant property located immediately east of Union Station in downtown Portland. The property is currently owned by the Portland Development Commission (PDC), and is in the process of being developed, largely for multi-family residential housing. From the late 1800s to 1970s the site received long-term use as a rail yard.

The PDC signed a Letter Agreement with DEQ's Voluntary Cleanup Program (VCP) on 7/26/96 requesting oversight of investigation activities that were taking place at the site. A number of phases of soil and groundwater investigation work were subsequently completed at the site in 1996 and 1997 with DEQ oversight. Investigation showed shallow soil site-wide to be contaminated with petroleum hydrocarbons, polynuclear aromatic hydrocarbons (PAHs), lead, and arsenic. Deeper soils site-wide were found to contain elevated PAHs. A separate area of crude oil contamination was found in soils in the southern portion of the site (the B-11 Area). Site contamination appears to be attributable to long-term industrial use.

A Remedial Investigation (RI) and Feasibility Study (FS) for site soil were approved in September 1996. Notice of the proposed remedial action was published on October 1, with a public comment period extending through October. A remedial action consisting of excavation of B-11 contamination, and capping of the entire site was approved by DEQ's Director on 11/13/96. Removal of B-11 Area soil contamination was completed in 1997. Capping of the northernmost portion of the site (Lot 3) was started in Spring 1997 and complete Spring 1998 concurrent with the development of multi-family residential housing on the site. An investigation of site groundwater was completed in July 1998. It was determined that site groundwater was not significantly impacted and therefore required no further action. Capping of the remaining portions (Lots 4 and 5) of the site will be performed as part of site development; Lot 4 work was started September 1998.



**UNION STATION B SOUTH**  
Downtown Portland  
Multnomah County, Oregon  
Northwest Region

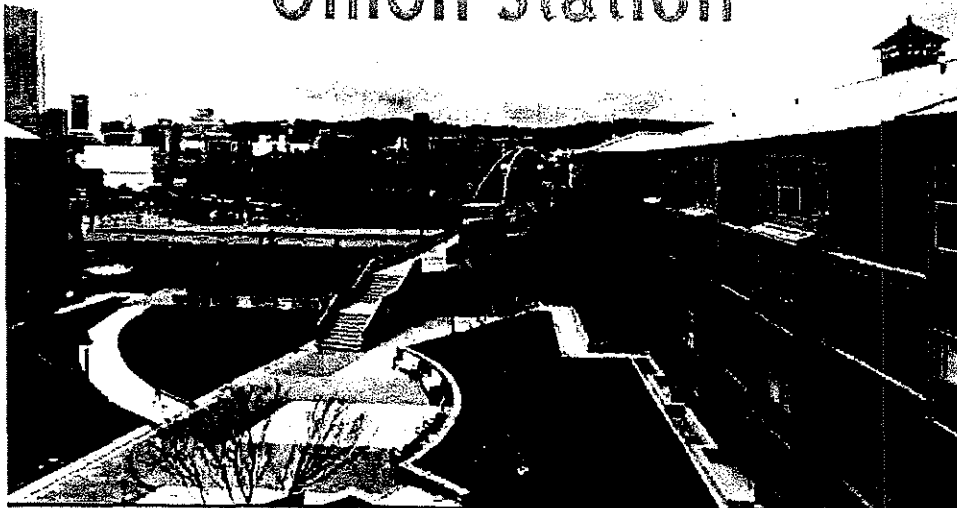
*DEQ Project Manager: Dan Hafley  
Voluntary Cleanup Program  
(503)229-5417  
e-mail hafley.dan@deq.state.or.us*

Capping of Lot 3 was completed with site development (building of Phase A of The Yards at Union Station) in 1999. Capping of Lot 4 as Phase II was recently completed, and the 320 apartments in the building are partially occupied. Vera Katz dedicated Phase B last week at a ground breaking ceremony on May 11, 2000. The last phase of the site has not been completed.

## Environmental Concerns

Shallow unsaturated soil contains elevated PAHs, petroleum hydrocarbons, lead, and arsenic. Deeper soil contains elevated PAHs. Site groundwater has not been significantly impacted. Long term exposure to hazardous substances present in site soil could pose a risk under a residential exposure scenario. Capping of site soils and long-term maintenance of the cap prevents exposure to contaminated site soil and thus removes any exposure-related risk.

# the Yards at Union Station



## *Yards at Union Station* YARDS AT UNION STATION DEVELOPMENT TEAM

Housing, Bridge, Plaza and N.W. Naito Parkway

**OWNER**  
Union Station B, LLC

**GENERAL PARTNER**  
GSL Union Investors, LLC

**LIMITED PARTNER**  
Key Community Development Corporation

**GENERAL CONTRACTOR**  
Walsh Construction Co.

**STREET IMPROVEMENTS**  
Portland Office of Transportation

**FINANCING**  
The Fannie Mae DUS Program  
GreenPark Financial through  
Norris, Beggs & Simpson  
Key Bank  
U.S. Bank  
Portland Development Commission

**ARCHITECT**  
OTAK, Inc.  
ZGF Architects

**PROPERTY MANAGEMENT**  
GSL Properties, Inc.

PLEASE JOIN MAYOR VERA KATZ AND THE YARDS AT UNION STATION DEVELOPMENT TEAM

FOR THE GRAND OPENING OF PORTLAND'S NEWEST COMMUNITY

**Thursday, May 11, 2000**

**10:00-11:00 A.M.**

**Remarks at 10:00 A.M.**

**Yards at Union Station Plaza  
945 N.W. Naito Parkway**

(Parking is available at the site, or take the bus mall to Union Station and cross the new pedestrian bridge to the plaza.)

The Yards at Union Station is a four-phase project bringing approximately 650 new units of housing to the River District. It is the largest single housing project constructed in the Central City since development in the South Auditorium and Portland State University districts in the 1960s.

This event will celebrate the opening of Phase II and includes 321 new market-rate and affordable housing units, retail space, improvements to N.W. Naito Parkway, and dedication of a new public plaza and pedestrian bridge connecting the housing and plaza over the railroad tracks to Union Station.

The event will also signal the kick off of the third phase of housing at Union Station; an additional 56 mixed-income units adjacent to the newest three buildings.

THE YARDS AT UNION STATION is a four-phase project bringing approximately 650 new housing units to the River District. All phases are being developed by GSL Properties, Inc. Phase I (158 units of affordable rental housing owned by the Housing Authority of Portland) opened in 1998. This Phase II opening features 321 new rental units in three new buildings. Approximately 130 of the units are affordable to people earning 60% or below of area median family income; the remainder will be market rate units.

Phase II also features a new, landscaped open public plaza in the center of The Yards with connections across Naito Parkway and access to the river. A new pedestrian bridge provides a safe and convenient connection from the new plaza over the train tracks to Union Station, Old Town/Chinatown, and the transit mall. The tied arch bridge resembles the arch of the Fremont Bridge and has handicapped accessible elevators at both ends. Improvements are also underway along N.W. Naito Parkway including the addition of bike lanes, wider and more pedestrian-friendly sidewalks, on-street parking and new streetlights.

The third phase of housing will bring an additional 56 units of mixed income housing and is set to begin construction this summer with completion early next year. Phase four of The Yards will occupy the last piece of land, a triangular site next to the Steel Bridge. This final phase will include more than 100 new units serving a variety of incomes.



# Air Quality Activities and Issues in Northwest Portland

Oregon Department of Environmental Quality

## Overview

Northwest Portland is one of our high priority areas because of the close proximity of different land uses. A high density, very popular residential area blends into a high density industrial area with heavy motor vehicle traffic throughout. As a result of these mixed land uses, we receive many, many complaints about air quality in northwest Portland. Complaints are usually about odors, fugitive emissions, or toxic air pollutants. A very active neighborhood association exists in northwest Portland. Our relationship with members of the neighborhood association is strained at times. They are convinced that their neighborhood has much worse air quality than others in Portland or around the state, and they think we are not moving fast enough to address their concerns.

## Permitting

Within northwest Portland, the department permits 48 sources. Seven of these sources have federal operating permits called Title V permits: Owens Corning Corporation, Gunderson, Equilon (Texaco), ESCO, GATX, Chevron Terminal and Chevron Asphalt.

There may be other sources that require permits that we do not know about. To better understand possible sources of odors, fugitive emissions or hazardous

air pollutants, we are conducting a survey of the entire area to determine if there are sources we do not know about. Then we must decide on how to address need either through permitting or other regulatory efforts. The survey results will be used to build a database to serve as an emission inventory for future complaint response. Also, after we complete development of our toxic air pollutant program, we expect to use this information to assist in preparation of a plan to reduce toxic air pollution in northwest Portland.

## Complaints

We receive many complaints about air quality in northwest Portland, 866 from 1988 to the present, about 300 of them are on ESCO. Until 1998, we had received about 40 complaints on ESCO. Starting in 1997, the neighborhood association, Northwest District Association started an odor survey. We have asked them to share their results with us so our complaints on ESCO have escalated as we incorporate the neighborhood survey results into our database. From 1999 to the present, we have received 129 complaints regarding ESCO. We also receive a lot of complaints about coffee roasters. We are evaluating if we need a regional effort to address concerns from coffee roasters.

## Monitoring

At the department's request, EPA funded a citizen bucket monitoring study in 1997. The 1997 project was a coordinated effort working with the neighborhood association to collect air samples in conjunction with odor events. Citizens used buckets to collect samples that were analyzed at a laboratory they selected. The department conducted concurrent sampling throughout the timeframe that citizens were monitoring odor events. The primary goal of the project was to identify the chemicals responsible for nuisance odors and, if possible, use this identification to determine the source(s) of odors. We also wanted to determine if specific hazardous air pollutants are unique to these odor episodes. A secondary objective of the study was to begin collecting PM2.5 data. It was a survey sampling effort to see what would be found in the bucket samplers and by DEQ samplers located at various locations throughout northwest Portland.

Twenty volatile organic compounds were identified in the bucket results. Only one compound could be traced directly to a source. Styrene was identified coming from Faulkner a small engine rewiring shop. The department worked with Faulkner to eliminate styrene from their processes. We consider this effort a partial success story: the bucket monitoring was used to identify a compound, styrene, that neighbors had been smelling and had been concerned about. The styrene was traced to a source that eventually eliminated the compound of concern from their processes. It is only a partial success because some of the adjacent neighbors are still very concerned about

Faulkner and still complain of odors and other issues.

The study was also successful, because we learned that the bucket samplers worked remarkably well for sampling volatile organic compounds. Analysis of the PM2.5 filters for two days during the study found metals that were representative of emissions from ESCO. The study recommended that metal analyses be done on samples collected in northwest Portland at the post office, which is our permanent monitoring site in the neighborhood, on a regular basis to estimate potential HAP metal exposures in the neighborhood.

In 1999, the department assisted the citizens of northwest Portland with a sampling project that involved collecting particulate deposition in glass beakers located at 10-15 homes in NW Portland. The department provided the sampling equipment and analyzed the results for two rounds of sampling. The department's laboratory analyzed each sample to determine if any of 33 different metal compounds were deposited in the beakers. The results identified lead and other metals in some of the beakers. The department has had one of our toxicologists evaluate the sample results. We also asked the Multnomah County Health Department to assist the citizens. The department considers the beaker study results as further documentation that we should analyze the PM2.5 filters collected at the Post Office in NW Portland regularly to estimate potential HAP metal exposures in the neighborhood, and if needed, to do follow up monitoring to determine sources. Because lead is of great concern to the citizens, we have asked ESCO to identify how much lead they

are emitting so we can begin to determine if lead as an air emission source may be contributing to deposition in quantities that may be high enough to be of concern.

With funding from EPA, the department is conducting a year long hazardous air pollutant monitoring study in Portland to determine where a permanent monitor will be located in Portland as part of EPA's national air toxics monitoring network. The monitors began operating in September 1999 and are collecting volatile organic hazardous air pollutants, semi-volatile hazardous air pollutants and metals. The five sites are: the post office at NW 24<sup>th</sup> & Savier, the fire station at SW Front & Oak, a residential lot at SE 58<sup>th</sup> & Lafayette, a school at N Roselawn & Vancouver and a school at SW Murray & Allen in Beaverton. Preliminary results are available. For the VOCs, the department sampled for 38 compounds and found 29. For semi-volatile compounds, DEQ sampled for 27 compounds and found 24. For aldehydes and ketones, DEQ sampled for 60 compounds and found 50. The metals analysis has not started yet. We cannot make any conclusions about the data yet. We have not started the statistical analysis on the results yet. Some of the compounds identified were above EPA's health benchmarks while others were below.

#### **Efforts to Address Concerns and Respond to Citizens**

As mentioned above, the department is surveying all businesses in NW Portland that we previously have not permitted to determine if these companies are sources of odor, fugitive dust emissions or hazardous air pollutant emissions.

Information collected will be used to address nuisance complaints, determine if regulatory action is needed for some types of sources that we have previously not regulated, and to assist in development of the HAPs geographic plan for NW Portland.

The department has a PM<sub>2.5</sub> monitor that collects samples every sixth day at the post office at NW 24<sup>th</sup> Avenue and Savior Street in NW Portland. The department is about to begin analyzing filters collected from September 1999 through July 2000. If metals on these filters are identified at concentrations above EPA's health concern thresholds, the department will start looking for potential sources of those emissions. The filters are also being analyzed as part of a year long monitoring project to determine where a permanent HAPs monitor will be located as part of EPA's national toxics monitoring network.

The department continues to respond to numerous complaints in NW Portland. The department has also begun working with several sources with recently identified air quality problems including Galvanizers and Koppers.

#### **Air Quality Efforts to Address Hazardous Air Pollutants**

1. The department adopted a rule in February that controls gasoline emissions from barge loading activities at the gasoline terminals in Portland. The rule requires 95% control of emissions year round and requires all of the terminals to have controls in place by June 2001.
2. The department is completing a 1996 toxic air pollutant emission inventory for the entire state that should be



completed by April 2000. This emission inventory will be used to make sure that the department is prioritizing available monitoring/data collection resources in Portland.

3. The department will be assisting EPA with communicating the results of the latest evaluation of the toxic air pollutant problem in the U.S. EPA has collected and developed hazardous air pollutant emissions information for calendar year 1996. Sources of these pollutants include large industry, small businesses, consumer activities, and both on and off-road motor vehicles. After review by state and local air regulatory agencies, this emissions data was used by EPA in a national-scale screening modeling study to estimate the concentrations of these pollutants in each of the counties in the U.S. When EPA makes their ambient concentration data available to the public, the Department must be ready to answer both general and specific questions about the pollutants, sources and effects likely to be caused by toxic air pollutants. We would like to provide a context for people so they can reasonably understand what their exposure to toxic air pollutants means. We will also use this information to educate citizens.
4. The department is proceeding with implementation of the recommendations from the Hazardous Air Pollutant Consensus Group that met for part of 1998 and most of 1999. The HAPs consensus group identified recommendations to create Oregon's toxic air pollutant program. The recommendations include three components:

- enhancements to DEQ's toxic air pollutant emission inventory, monitoring and modeling capabilities to improve our ability to collect scientific and other data to identify pollutants of concern and areas where toxic air pollutants are emitted at levels of concern. A science advisory panel to assist DEQ in developing health benchmarks and to evaluate DEQ's progress.
- creation of a place based program called a geographic program that identifies areas of concern, conducts studies of pollutants of concern in those areas, develops plans to reduce those toxic air emissions and carries out the plan.
- a regulatory program to address categories of sources or single sources of toxic air emissions that are significant contributors

### **Future Program Needs**

The department is carrying out the recommendations of the HAPs Consensus Group. We have several major needs that we need to address:

- funding for improved monitoring capability, data collection and data evaluation
- maintaining support for the program as rules are adopted,
- resources to implement the program once rules are adopted, and
- ensuring that concerns can be addressed in a timely fashion

For information on the department's progress in developing a hazardous air pollutant program, contact Sarah Armitage at 229-5186 or Gregg Lande at 229-6411.



## Air Quality Issues Involving the ESCO Corporation

Oregon Department of Environmental Quality

### Overview

The department has received numerous complaints about ESCO for several years. The complaints we receive on ESCO are about odors, fugitive particulate emissions and hazardous air pollutants

### Key Actions

The department issued the Title V permit to ESCO Corporation in July 1999. The Title V permit requires that ESCO complete studies to demonstrate what they are doing to comply with department regulations for fugitive emissions and odor. They must identify what they are currently doing to minimize fugitive dust and odor and what additional controls they could undertake to further reduce fugitive particulate emissions and odor emissions to comply with department rules. ESCO just completed the studies and submitted them to us last week. We are in the process of evaluating ESCO's studies to determine if ESCO is adequately complying with rules requiring minimization of odor and fugitive emissions.

Citizens expressed concern that the Title V permit was issued without including emission restrictions or requirements for reductions based upon the results of the citizens monitoring study conducted in

1997. Currently the department is evaluating ESCO's dust and odor emission controls. We may require more control of these pollutants based on studies that ESCO recently completed. However, if the department determines that additional HAP controls are needed at ESCO, the current procedures require that we write a source specific rule for ESCO. The new toxic air pollutant program under development will provide better tools for us to use to address the NW neighborhood concerns. The Title V permit program does not create new emission limitations or requirements. The basis for new requirements comes from federal and state rules and laws. If in the future, the Department identifies ESCO as a source of toxic air pollutants that are of concern to the neighborhood and determines additional emission reduction requirements, the Department will reopen ESCO's Title V permit and incorporate those requirements into the permit

### Ongoing Actions and Future Direction

The department has asked citizens in NW Portland to call ESCO and other companies directly when they smell odors. Many permits require that the company respond to each complaint by verifying the odor and taking corrective actions to reduce odors. Citizens in NW Portland conduct periodic odor surveys. We have asked citizens to make sure that

both ESCO and the department know about odor incidents so that we can verify that ESCO is responding to complaints.

The department has asked ESCO to begin to quantify actual lead emissions from their processes. We are in the initial stages of working with ESCO to determine their lead emissions. We intend to use what information ESCO

provides to determine if ESCO may be emitting lead in quantities that are considered above EPA health thresholds.

### Information Contacts

For information on ESCO's Title V permit or our efforts regulating them, please contact Randy Bailey at 229-6736 or Audrey O'Brien at 229-5572.



## Air Quality Activities and Issues in North Portland

### Overview

The department permits several sources in North Portland. We continue to follow up on complaints received in North Portland. The department has undertaken several initiatives to address air quality concerns in North Portland. The following summarizes our actions in North Portland.

### North Portland Complaints 1989 through 1999

The following numbers reflect all types of complaints.

Total - 1735  
Oregon Steel - 6  
Freightliner - 71  
Portland Airport - 6

In 1999, the department received 35 air quality complaints in North Portland including three complaints about Freightliner, one about Oregon Steel Mill, four about K&F Jacobsen and four about Ostrum Glass and Metal Works, and several about illegal backyard burning or burning materials in fireplaces.

AQ complaints are usually about odor, fugitive emissions, particulate fallout, or concern about hazardous air emissions. Many citizens would like more satisfaction from DEQ's complaint

response. The neighborhood associations in N Portland are very active and very interested in air quality issues.

### Employee Commute Options Program

There are 157 employers in North Portland subject to the Employee Commute Options program. The ECO program requires that employers with more than 50 employees at their job site make the effort to provide alternatives to drive alone commuting to their employees and aim to achieve a 10% commute trip reduction.

To date, 42 of the companies have met the trip reduction goals or have been successful in reducing their employees commute trips. About 18 companies have very low drive alone rates and another 25 companies are exempt. There are about 25 companies that we are following up with that have not met the ECO requirements.

Employers in North Portland can become members of the Columbia Corridor Association. This association has received a contract award from the department to explore the possibility of creating a Transportation Management Association which would help its business members comply with ECO. The contract award is being used in part

by the Association to map businesses so that future commute trip reduction alternatives and partnering can be pursued.

### **Air Quality Permitting Programs in North Portland**

The department requires 87 companies in North Portland to be on permits. Eleven companies have Title V permits, we have proposed the Title V permit for a twelfth and a thirteenth will receive a Title V permit by the end of this year. The Title V permit program is a federal permit program that applies to larger sources called major sources with potential emissions of 100 tons for criteria pollutants or 10 tons of a hazardous air pollutant or 25 tons of a combination of hazardous air pollutants. Fourteen companies have the potential to emit pollutants at levels that would require a Title V permit, but have opted to limit their emissions and receive different permits.

Permit actions include technical assistance, permit issuance, permit modifications, permit renewals, inspections, compliance determinations and enforcement. Some of these sources are subject to specific federal requirements, New Source Review/Prevention of Significant Deterioration, New Source Performance Standards or National Emission Standards for Hazardous Air Pollutants. The department incorporates the requirements into permits and then makes sure that companies comply with them as needed.

### **DEQ Monitoring Activity in North Portland**

- 93-94 HAPs study included a site in North Portland.
- PFO Bucket study at a citizen's home. Results did not show a particulate fallout problem.
- Current monitor siting project includes a monitoring site in North Portland. No results yet.

### **New or Emerging Environmental Issues in North Portland**

- Environmental Justice
- Citizens continue to be concerned about hazardous air pollutants and their effects
- The Swan Island Task Force and the work with the Port on the shipyard have increased citizen awareness of air quality issues.
- Citizens support development of the HAPs Consensus Group Recommendations

### **Future Program Needs**

The department is carrying out the recommendations of the HAPs Consensus Group. We have several major needs that we need to address:

- funding for improved monitoring capability, data collection and data evaluation
- maintaining support for the program as rules are adopted,
- resources to implement the program once rules are adopted, and
- ensuring that concerns can be addressed in a timely fashion



## Air Quality Issues at Swan Island

### Overview

For several years, the department has received complaints and heard concerns from citizens and neighborhood associations in North Portland about hazardous air pollutant emissions, fallout and odors coming from the Port of Portland shipyard and from the Freightliner truck assembly plants located on Swan Island.

The department currently has little regulatory authority to compel the Port or Freightliner to evaluate the risks associated with their hazardous air emissions or to reduce their emissions based on the citizen concerns. Any actions taken must be voluntary on the part of the companies. The problems and case of the shipyard and Freightliner highlight the holes in the department's regulatory structure.

The department undertook a cooperative effort with the Port first to determine if we could work cooperatively with a citizens group and industry to identify pollutants of concern, identify acceptable thresholds for those pollutants and model estimated emissions against those thresholds.

### Key Actions

In 1996, the department asked the Port and Freightliner to work with us

cooperatively to address citizen concerns by modeling their emissions. The Port agreed and completed their modeling effort in early 1997.

The Port and the department met periodically with a task force representing the North Portland neighborhood associations and concerned citizens. The results were very positive. Working with this group, the department got agreement on which pollutants to focus the modeling efforts on, the modeling protocol, and emission thresholds to model against.

This project demonstrated that citizens could participate in complicated data analysis and evaluation. As a result of the modeling exercise, the Port eliminated a paint formulation containing hexavalent chromium. Final modeling results show that the shipyard's emissions do not exceed the agreed upon emission thresholds.

### Ongoing Actions and Future Direction

We have met with Freightliner Corporation periodically to encourage them to model their emissions. Freightliner hired the same consultant that the Port used. We expected Freightliner to model their emissions and present the results to the citizen task force. Freightliner recently asked to

meet with the citizens task force before completing the modeling exercise to determine if citizens continue to have the same concerns and to explain that Freightliner will be subject to an upcoming federal emissions control standard.

If Freightliner does not complete the modeling, the department committed to the citizens task force to conduct the modeling ourselves. The department will continue to encourage Freightliner to complete the modeling.

The department considers this project to be a successful pilot project where the department worked cooperatively with the Port and with concerned citizens to complete a modeling project to evaluate the impact of the shipyard emissions. The Swan Island Task Force was supportive of the process and happy with the results from the shipyard. We believe that the citizens task force continues to be concerned about Freightliner's emissions.

Members of the Task Force have participated on a department workgroup to develop recommendations on what Oregon's hazardous air pollutant program should look like. The department will soon be completing rules that will allow the department to compel companies to evaluate emissions of concern through a geographic approach or through the safety net program.

The new program will require companies to provide the department with information on their emissions that the department then will evaluate and determine if additional controls or reductions are needed.

### **Information Contacts**

For information on the Port or Freightliner modeling projects, contact George Davis 229-5324 or Nancy Couch 229-5151

For information on the department's progress in developing a hazardous air pollutant program, contact Sarah Armitage at 229-5186.

# **SUPERFUND**

## **Fact Sheet**



U.S. ENVIRONMENTAL PROTECTION AGENCY

January 2000

In February 1999, the U.S. Environmental Protection Agency (EPA) finished hazardous waste cleanup at the Grant Warehouse site in Portland. This fact sheet describes efforts since then to recover EPA's cleanup costs and put the site into productive use in the community.

### **The Cleanup**

The Warehouse, located at 3368 NE Martin Luther King Blvd., was used for approximately 20 years to recover precious metals from waste received from other facilities. Large amounts of toxic and reactive chemicals, such as acids, cyanides, ether, and material containing heavy metals were stored in containers ranging in size from glass jars to 55 gallon drums.

Beginning in November 1998, EPA and its contractors removed and disposed of more than 1,300 cubic yards of debris. Approximately 230 (55-gallon) drums of hazardous waste were removed from the warehouse and disposed of off-site. In addition, approximately 80 cubic yards of contaminated soil from the yard area of the warehouse was also removed and disposed of off-site.

Air monitoring and soil samples collected by EPA at locations across the street and in the nearby neighborhood indicated that no contaminants were released into the neighborhood from the removal activities or accumulated in soil from past activities at the warehouse.

### **Cost Recovery**

After the removal, EPA began an enforcement effort to recover the government's cleanup costs, approximately \$1,200,000 from the federal Superfund. The Superfund is a trust fund that gets much of its money through reimbursements from EPA has been working with the Portland Brownfields Showcase Program to put the Grant

those responsible for polluting sites that have to be cleaned up. EPA negotiated with the site owner to attempt to settle the cost recovery claim and has a lien on the property in case the owner attempts to sell it. Slow progress of the negotiations led EPA to take further steps in December 1999 to perfect the lien and then obtain the property as partial payment for the removal.

EPA has honored the site owner's request for a hearing before an impartial EPA official, who has not been involved in earlier decisions about the site, to decide whether EPA has a reasonable basis to perfect its lien on the property. The impartial official will publish a decision by the middle of February, 2000. Should the neutral official decide EPA has a reasonable basis on which to perfect its lien, EPA will then request that the United States Department of Justice and the U.S. Attorney's Office for the District of Oregon foreclose on that lien.

The final decision as to whether the lien will be foreclosed on rests with the Department of Justice, not EPA, as only the Department of Justice can commit the U.S. Government to litigation. Going this route could be a long legal process. EPA continues to be willing to settle with the site owner to place the property into productive use in the community as soon as possible.

### **Brownfields Showcase**

Warehouse site into productive use in the community. Brownfields are abandoned, idled, or



under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination. Portland has more than 1,000 brownfields properties throughout the city. Since 1994, public and private partnerships have cleaned up and recycled hundreds of acres of contaminated property and created thousands of jobs, while promoting redevelopment of these properties, pollution prevention, and greenspace protection.

EPA funding for the Showcase Program supports the continuing efforts to identify any environmental concerns remaining at the Grant Warehouse site and to help involve the community in decisions about future use of this site. The US Army Corps of Engineers used EPA Brownfields money to assess the current environmental conditions at the site, providing the information needed to address any environmental problems as part of reasonable future uses of the site. Copies of the site report are available from the Showcase Program.

## Next Steps

A meeting is being planned by several agencies and community groups for the near future. When the details have been finalized, you will be sent the information by mail.

## For More Information

For questions about EPA activities at the site, please contact one of the following people:

Mike Slater, Brownfields Project Officer  
(503) 326-5872

Krista Rave, Grant Warehouse Removal Outreach  
Coordinator (206) 553-6686 or,  
toll-free at 1-800-424-4372

For additional information about the Portland Brownfields Showcase Program, please contact either Domonic Boswell or Dan Heister at (503) 823-7053.

To ensure effective communication with everyone, additional services can be made available to persons with disabilities by contacting EPA toll free at 1-800-424-4372.



# Portland Combined Sewer Overflow Management

Oregon Department of Environmental Quality

## Background

A large part of the City of Portland, about 30,000 acres, is served by a combined sewer system in which sanitary sewage from homes and businesses, and stormwater from streets, roofs and driveways flow into a single set of sewer pipes. During periods of dry weather, virtually all of the sanitary sewage is delivered by the sewer system to the Columbia Boulevard Wastewater Treatment Plant (CBWTP) for proper treatment and discharge to the Columbia River.

However, almost any time it rains, the capacity of the large interceptor sewers that run along the Willamette River and Columbia Slough is exceeded, and a combination of stormwater and untreated sanitary sewage discharges into these water bodies. The CSO discharges result in violations of the Water Quality Standards, established by the Environmental Quality Commission in the Oregon Administrative Rules, for bacteria, floatables and solids, and perhaps other pollutants.

The NPDES Wastewater Discharge Permit issued to Portland by the Department of Environmental Quality (DEQ) for the Columbia Boulevard Plant expressly prohibits violation of Water Quality Standards by the CSO discharges.

To address these violations, DEQ entered into a mutually agreed upon

administrative enforcement order (called a Stipulation and Final Order, or SFO) with Portland in August of 1991. The SFO was amended in August 1994. (ASFO.)

The ASFO requires that Portland virtually eliminate CSOs to Columbia Slough by the end of the year 2000, and that CSOs to the Willamette River be drastically reduced by the year 2011. A detailed compliance schedule of implementation milestones is set forth, with stipulated penalties identified for failure to meet the schedule, or to attain the level of CSO control required.

## Portland Complies With CSO Order

The City of Portland has thus far met all CSO compliance schedule milestones set forth in the original and amended versions of the Order. The city has already made substantial progress constructing the stormwater inflow reduction facilities, together called the "Cornerstone Projects", and intended to reduce combined sewage volume.

These projects include stormwater infiltration sumps, down spout disconnections, sewer separations and stream diversions. Construction of the CSO control facilities for the Columbia Slough sewer basins has recently begun, with completion scheduled by the end of the year 2000. Detailed planning and pre-design for the CSO control facilities for the Willamette River sewer basins is well advanced and

construction is scheduled to begin by the year 2003.

The city also has undertaken other activities to improve water quality and habitat in the main stem Willamette River, Johnson Creek, Tryon Creek and Columbia Slough, including implementation of the TMDL for Columbia Slough.

Over the past year, the city has initiated a process to address water quality and habitat issues on an integrated watershed basis for these water bodies. This focus takes on special importance with recent Endangered Species Act listings of salmon and steelhead in the Willamette Basin and lower Columbia River.

## **DEQ/Portland CSO Chronology**

### August 1991

The Environmental Quality Commission (EQC) and the City of Portland execute original SFO to address NPDES permit violations caused by CSOs. Requires that CSOs to Columbia Slough and Willamette River be controlled except when 10 year return summer storm/5 year return winter storm or larger occur. Requires Facilities Plan.

### June 1993

Draft Facilities Plan Completed. Analyzes facilities and costs needed to meet level of CSO control specified in SFO, and other more stringent and less stringent levels of control for Willamette. Makes no recommendation.

### November 1993-March 1994

The non-decision making "Collaborative Process" Committee (2 EQC members, 2 City Council members, DEQ Director, a BES senior manager) hold a series of well-attended public meetings to

evaluate Facilities Plan. Committee recommends to EQC and Council that the less stringent "Enhanced Federal Level" of CSO control be adopted for Willamette discharges, but that Columbia Slough control requirement remain as in SFO.

### June-August 1994

EQC and Council concur in Collaborative Process recommendation and execute ASFO. CSO control requirement for Willamette is set at 3 year return summer storm and 4-in-year winter storm because it is the most "cost effective" level of control. This reduces estimated overall CSO control program cost from about \$1billion to about \$700million (in 1993 dollars).

### December 1994

City completes Final Facilities Plan, which elaborates on facilities needed to meet ASFO. EQC approves "Schedule and Control Strategy" set forth in Plan in April 1995.

### January 1996

EQC adopts new "Bacteria Rule" Water Quality Standard which establishes 10 year summer/5 year winter storm prohibition of raw sewage discharges as regulatory standard, but allows EQC to approve less stringent standard for individual CSO systems. DEQ considers prior EQC concurrence in ASFO and Final Facilities Plan to constitute such approval for Portland's CSOs to Willamette.

### 1995-1998

1. "Cornerstone Projects" (sewer separations, storm water sumps, down spout disconnections, stream diversions, sewer system inline storage optimization) make

- significant progress to remove storm water from sewer system and reduce CSO volume.
2. Columbia Slough CSO control facilities designed and construction begun. Most contracts let and work about 20-25% complete by December 1998.
  3. Willamette River CSO Predesign Project to define precise sizing and configuration of Willamette CSO control facilities draws toward mid-1999 conclusion.
  4. City begins working on Integrated Watershed Plan in 1998. Looks at CSO Control Program in that context.
  5. March 1998 NWEA and City settle CSO citizen lawsuit. Terms of settlement include commitment by City to implement ASFO, and plaintiff's standing to seek relief from the court for City's failure to comply with ASFO schedule.





# Permit Protects Columbia Slough Water Quality

Oregon Department of Environmental Quality

## Overview

The Department of Environmental Quality (DEQ) has issued a permit (known as an NPDES permit) limiting anti-icing and deicing discharge to the Columbia Slough. The permit also limits stormwater runoff, rinse water, sheer, overspray and drip discharges associated with the anti-icing and deicing chemicals. The permit establishes bioassay requirements to assure the discharge is not toxic to aquatic life in the Columbia Slough.

Discharges covered by this permit occur when snow and ice events at Portland International Airport require application of deicing and anti-icing materials to aircraft and related runways. Co-permittees include the Port of Portland, the Oregon Air National Guard and 35 commercial operators that use the Portland airport facilities.

The permit sets specific timelines for compliance with discharge limits contained in the Columbia Slough Total Maximum Daily Load (TMDL). The Columbia Slough TMDL was approved by the federal Environmental Protection Agency in December 1998.

Load allocations in the TMDL amount to an 85 percent reduction of deicing discharges into the slough no later than the fall of 2005. DEQ has modeled the discharges and determined that water quality standards would not be violated outside of a mixing zone.

Deicing and anti-icing of aircraft and airport pavement results in the introduction of glycol-based materials into stormwater runoff. The principal contaminant of concern with these materials is Biochemical Oxygen Demand (BOD). These materials are highly biodegradable, which reduces the amount of oxygen in the receiving water, the Columbia Slough.

## Permit Requirements and History

The existing system for controlling the amount of deicing and anti-icing materials that enter the Columbia Slough comprises a variety of operational and control practices that include source control, containment, collection and disposal elements. These practices were implemented through a 1996 stipulated consent order. The permit goes beyond the consent order and requires implementation of additional Best Management Practices (BMPs). Compliance with the TMDL's numeric load allocation will rely on a final control strategy developed under the permit compliance.

The permit also directs permittees to submit reports on how the discharge limits will be met. The permit includes some options under consideration, but does not limit ultimate approaches to those options alone. These approaches include routing of glycol-carrying discharges to the City of

Portland Sanitary Sewer, or other collection system that may discharge to the Columbia River. The permit also sets monitoring requirements that include water sampling at identified Columbia Slough discharge points, bio-assays and tracking of anti-ice/de-ice material inventory and usage amounts.

Discharge to the Columbia River would require a separate NPDES permit. The current permit applies only to Columbia Slough discharges and neither allows nor disallows future Columbia River discharges.

Flight Safety requires that airplanes and related airport ground areas must be free of ice, snow and frost (for airplanes) to assure safe takeoff, flight and landing. The permit therefore recognizes that federal Flight Safety and other human safety concerns are paramount priorities for the applicants, and pilot discretion with respect to Flight Safety may alter or amend BMPs on a case-by-case basis.

## **Background**

The Deicing and Anti-icing Runoff Control Program at Portland International Airport (PDX) is a combination of strategies to control, collect, and dispose of these materials. The program addresses concerns over the impacts on dissolved oxygen in the Columbia Slough. In 1995-96, an airport-wide evaluation of the nature and extent of Deicing and anti-icing application included an assessment of potential environmental impacts, and a preliminary identification and evaluation of possible control strategies.

Based on the findings of this investigation, the Port of Portland eliminated the use of urea for pavement Deicing in the winter of 1996-97.

Tenants stopped using urea in May 1998. Further, the Port started a program of pilot-scale implementations of the most promising control techniques during the 1996-97 Deicing season. Results from these pilot evaluations, coupled with continued investigation of alternatives employed at other airports worldwide, led to the current program.

The system of deicing and anti-icing runoff controls is being accomplished in phases. The 1997-98 program incorporates controls expected to provide significant immediate benefits in reducing BOD loading to the Columbia Slough. Subsequent phases will involve the design and construction of new collection, containment, and treatment facilities, as well as new source reduction practices that are just emerging in this industry.

During the development of the permit the Department held public hearings and accepted public comments. There were several questions commonly raised. The questions and associated answers include:

**Q:** Why is DEQ allowing until 2003-04 to meet TMDL load requirements?

**A:** The Department agrees that controlling the discharge into the slough is important, and should be done quickly. The permit provides an aggressive schedule for achieving compliance. The proposed NPDES permit is the appropriate mechanism for regulating the discharge in order to achieve water quality standards.

**Q:** Why can't DEQ simply set a zero discharge limit?

**A:** The permit limits establish the maximum allowable pollutant loads with a reasonable margin of safety as described by the TMDL. DEQ will continue to work with the Port's Long Term Solutions Group to develop options that minimize discharge to the slough. DEQ agrees that reuse, recycle, and other pollution prevention measures are preferable to discharging pollutants, however requiring zero pollutant discharge may be an unattainable goal with any currently available technology. DEQ will continue to work with the Port to define alternative implementation strategies.

**Q:** Why require chronic toxicity testing when the intermittent nature of stormwater discharges makes such testing difficult and unreliable?

**A:** Chronic toxicity is a concern whenever the potential pollutants of concern could persist and allow for sub-lethal exposures. Stormwater is typically an intermittent discharge; however in this region stormwater could be discharging for extended periods and could stay in the slough for several days. Therefore, exposure regimes instream may be longer, making chronic toxicity a significant concern.

**Q:** Doesn't this permit encourage potential discharges to the Columbia River?

**A:** The proposed draft permit does not merely contemplate shifting the burden of discharge from one water body to another. Although not required as part of this permit, DEQ is evaluating appropriate waste load allocations for the potential discharge to the Columbia

River. Any permitted discharge must comply with state water quality standards including mixing zone constraints.

**Q:** Why doesn't the permit require the permittees to use or explore specific approaches and technologies to reduce or eliminate the discharges?

**A:** The Department establishes permit limits, but leaves it up to the permittee to figure out how to meet the limits. The Port has established the Long Term Solutions Group (LTSG) to look at alternatives and decide what to implement. This group consists of the Port of Portland, airlines, government agencies including DEQ, citizens, and technical experts.

**Q:** This permit doesn't address groundwater concerns. Why not?

**A:** The Port and DEQ are already discussing groundwater issues at the airport under Oregon's groundwater protection rules and cleanup authorities. These discussions are the appropriate forum to determine whether additional analysis or monitoring is needed.

If elements of the long-term solution raise groundwater issues related to potential new construction (for example, comparing lined with unlined lagoons as part of detention facilities), those issues will be addressed in the engineering report and analysis of alternatives.

There are no specific indicators of groundwater problems at the airport relating to Deicing. Some of the technical factors that distinguish this situation from the other airports referred to in the comments include:



- the water table at PDX is high, at the level of many of ditches. The rapid drop-off in BOD and Deicing materials after events is not consistent with significant build-up of these fluids in the groundwater.
- Deicing events are intermittent and occasional, typically followed by rainfall. This is different from airports in cold climates where Deicing fluids may be on the ground for weeks or months.
- There have been no apparent signs, such as discolored soils or odors that would indicate a problem from deicing materials to groundwater.

**Q:** Does this permit meet requirements for protection of species listed under the Endangered Species Act?

**A:** Salmonid fish rearing is indeed a designated use. Juvenile salmonids have been observed in the Lower Columbia Slough near Smith and Bybee Lakes. Criteria to assure protection of the salmonids were described in the

development of the Dissolved Oxygen Standard. Consultation with other agencies is not required for NPDES permits. However, the Department encourages comments. The National Marine Fisheries Service has not commented. The Department is working with the National Marine Fisheries Service and the Port for evaluating mixing zone limits for the potential discharge to the Columbia River.

**Q:** How does DEQ make certain that permittees meet permit requirements?

**A:** The Department plans to regulate the Port as a major discharger under this permit.

DEQ typically inspect majors once a year and typically split samples with them during annual compliance inspections. Enforcement action can be taken under this permit and under the Mutual Agreement and Order (MAO) which the Department expects to issue associated with the permit.



## Columbia Slough Water Quality Issues and Activities

### **Columbia Slough:**

The Columbia Slough has problems with:

- Bacteria from Combined Sewer Overflows and urban runoff
- Low Dissolved Oxygen due to urban and industrial runoff, and airport deicing
- High Algal Growth resulting in high pH and low dissolved oxygen as the result of water management in the Slough and excessive nutrients. Nutrients come mostly from groundwater and urban runoff
- The presence of toxics in sediment, fish tissue and the water column. Toxics include heavy metals, organic, and pesticides. Many of these toxics are persistent bio-accumulative toxics.
- We have established a TMDL to address these problems. We will implement the pollution control through:
  - A basin-specific industrial stormwater permit (1200 COLS) recently issued
  - Urban stormwater permits (MS4)
  - Memoranda of Agreement with Local Agencies
  - Greater scrutiny and control of cleanup sites associated with the toxics identified in TMDL
  - An individual NPDES permit for the airport

### **The Airport and de-icing:**

- Deicing and anti-icing is done according to FAA plane safety requirements.
- There are about one to seven significant weather events requiring de-icing events per year, typically 3 or 4 events a year.
- The deicing material, principally glycol and additives, causes depletion of oxygen in the slough during the event.
- When the Willamette or Columbia Rivers are high, the depletion can last several days or weeks.

- The Port is implementing Best Management Practices designed to achieve limits established in their permit
- The Port has reduced loads to the slough, and the discharge permit sets a compliance schedule deadline of November 2003.

**Overall pollution control efforts** incorporate pollution control, flow management, and habitat improvement.

- The slough is regulated for flood control. Managing flow for water quality and habitat improvement can occur without impairing flood control operations.
- With the Corps of Engineers we are also working toward other habitat improvements along the slough.
- Tree planting and riparian management being implemented to improve habitat and water quality
- Migratory salmonids are present in the lower slough, but are restricted from upper slough. The Slough is a remnant backwater area that historically was an important refuge for juvenile salmonids
- CSO control is well underway. By December, 2000 the volume of CSO discharges will be reduced by 99.6%. (See separate CSO fact sheet)





## City of Portland Columbia South Shore Well Field

### Overview

Portland, Tigard, Gresham and Tualatin depend on the Columbia South Shore well field as a backup water supply for 840,000 customers. The well field is located between I-205 and Blue Lake Park, and south to Sandy Boulevard.

The well field has been used ten times since 1985, when Bull Run Reservoir water was unusable due to turbidity, or unavailable due to washout of conduits. Portland has no filtration plant at Bull Run and turbidity interferes with disinfection.

The well field cannot supply sufficient water to meet base demand for public use and safety due to contaminated sites where chlorinated solvents have been released to groundwater. Portland limits withdrawal to about 70 million gallons per day (mgd) to avoid spreading groundwater contamination and potentially drawing contamination into the water system. Base need is about 90 mgd during winter months, and considerably higher during summer.

### DEQ Cleanup Actions Underway

DEQ and Portland are developing a partnership agreement to aggressively pursue the discovery, assessment and cleanup of contaminated sites to allow unlimited use of the well field up to the 120 mgd water right.

With DEQ oversight and approval, successful groundwater treatment remedies have been implemented at:

- Boeing of Portland
- Cascade Corporation
- Swift Adhesives

Assessment and evaluation of cleanup options is underway at:

- ICN Pharmaceuticals
- Oregon Fir Supply
- Dollar Development
- 148<sup>th</sup>/158<sup>th</sup> Avenues (site discovery)

### Future Actions

DEQ has committed to more quickly discover, assess, and remediate contaminated sites and will use its Orphan Site Account where responsible parties cannot be located or are unwilling to undertake the needed work.

We are also working with EPA to procure a greater federal commitment for funding discovery efforts. In addition, Portland has announced expansion plans for the well field. The well field has not been designated as a "Federal NPL" site under Superfund, largely due to DEQ's successful cleanup actions.

### For More Information

Contact Dave St Louis, Manager, Site Response Program, (503)-229-5532  
E-mail: [STLouis.Dave@deq.state.or.us](mailto:STLouis.Dave@deq.state.or.us)



# Oregon Air National Guard Cleanup Project

Oregon Department of Environmental Quality

## Overview

Current and historic air base operations have resulted in ten areas of the base being identified as known or suspected areas contaminated by chlorinated solvents, heavy metals or petroleum hydrocarbons. There is a potential for the site to be listed on the federal National Priorities List under the Superfund program.

The most highly contaminated area is the plane "washrack", where jet fighters were cleaned with trichloroethylene (TCE) that was released to soils and groundwater.

Potential exposure pathways for human health and ecological impacts include:

- Surface water discharges to the Columbia Slough
- Groundwater recharge to the Slough
- Groundwater impacts to the Portland South Shore Columbia Well Field

Both the Port of Portland (landowner) and the Oregon Air National Guard have requested DEQ oversight in the assessment and development of cleanup alternatives funded by the federal Department of Defense (DOD).

The Port is currently paying DEQ's oversight costs, as DOD to date has been unable to agree to pay the overhead rate (184%) for the Environmental Cleanup Program. Discussions with DOD on an

alternative to the standard agreement have not been successful to date.

## DEQ Cleanup Actions

DEQ has begun review and comment on the characterization of soil and groundwater contamination and on cleanup alternatives. A contractor recently removed contaminated soils at the washrack. The project will address groundwater contamination at the washrack area next, followed by the other nine areas.

The Port of Portland is considering expansion of the Portland Airport by adding a third runway in the area now occupied by the Oregon Air National Guard.

## Future Actions

DEQ will continue to pursue an agreement with DOD that covers the full cost of oversight, including the Cleanup Program overhead rate.

DEQ oversight will be provided through the Voluntary Cleanup Program and will include evaluation of any potential impacts on the Portland well field.

## For More Information

Contact Matt McClincy, Voluntary Cleanup Program (503)-229-5538  
E-mail: [MCCLincy.Matt@deq.state.or.us](mailto:MCCLincy.Matt@deq.state.or.us)  
May 1, 2000





# Port of Portland-Light Rail Extension Cleanup Project

## **Overview:**

The Port of Portland (Port)-Light Rail Extension property is a 2.25 mile strip of land located between Interstate 205 and Portland International Airport over which a light rail extension to the Airport is currently being constructed. Past uses of the site are primarily agricultural, with some residential and commercial use. Most of the site is currently vacant. The Port requested in June 1998 that Voluntary Cleanup Program staff review environmental assessment reports completed in preparation for light rail construction.

## **Environmental Concerns:**

The rail line crosses over a number of areas of potential or known concern. These include the former Cadet Manufacturing facility, former automobile wrecking yards, former residential property with USTs, construction staging yards, and tanks and underground fuel lines related to Portland Airport. The area of greatest concern – the former Cadet Mfg. site – is being evaluated by the Port and ODOT under separate agreements with DEQ.

## **DEQ/Port Actions:**

Environmental investigations of the subject property were completed by the Port in 1998 and 1999. DEQ has reviewed the reports and determined in 1999 that most of the site was free of actionable contamination. Some additional investigation and limited soil removal was subsequently completed. Based on this work, DEQ issued a “pre-construction” no further action (NFA) determination for the site in January 2000. Under an agreement with the Port and design/build contractor Bechtel, DEQ continues to provide general oversight on environmental matters related to the light rail construction. DEQ will issue a final NFA after completion of the construction if no additional environmental problems are found or created during the construction work. A communication and response plan has been developed between Bechtel, the Port, and DEQ in the event that contamination is encountered or released at the site.

## **For More Information:**

Contact Dan Hafley, Voluntary Cleanup Program, (503)229-5417, or e-mail [hafley@deq.state.or.us](mailto:hafley@deq.state.or.us)



# ICN Pharmaceuticals Cleanup Project May 2000

## PROJECT OVERVIEW

ICN operated a large clinical laboratory that conducted studies on biological fluids and tissues over the period 1961 to 1980. Operations utilized many organic and inorganic compounds to conduct analytical tests and involved up to 1,600 people. A large vehicle maintenance facility was also on site. Laboratory wastewater was apparently discharged to a dry well and/or drainfield system. The operation was abandoned in 1980. Site buildings have since been demolished.

## ENVIRONMENTAL CONCERNS

The chlorinated solvents detected at this site are considered to be carcinogens. The maximum contaminant level (MCL) in drinking water supplies is 5 ppb TCE and 70 ppb cis-1,2-DCE. Deep groundwater in the area is used as a backup drinking water supply for the City of Portland. Exposure pathways of concern include the potential for the contamination detected at ICN to affect the city well field.

## PROJECT HISTORY

In December 1992, ICN joined the Voluntary Cleanup Program to continue with an environmental investigation that was initiated by the Portland Development Commission.

Investigation to date has included:

- Soil and groundwater sampling in the vicinity of the vehicle maintenance facility;
- Soil and groundwater sampling in the vicinity of a former dry well; and,

- Cleaning and sampling associated with a storm sewer line.

The investigation has revealed the presence of significant levels of chlorinated solvent contamination in groundwater in the vicinity of the former dry well. Concentrations as high as 500,000 parts per billion (ppb) trichloroethene (TCE) and 300,000 ppb cis-1,2-dichloroethene (1,2-DCE) were found at depths of 20 to 40 feet below ground surface, indicating the presence of residual free-phase solvent.

The vertical and lateral extent of groundwater contamination in the vicinity of the former dry well was defined in January 1998. No Further Action determinations have been provided for a former service station, shallow soils, sewer lines and several surrounding properties. Assessment on vertical extent of contamination within deeper groundwater areas was completed in May 1999. DEQ issued a Record of Decision on August 1999, and a Unilateral Order was issued September 1999.

## CURRENT ACTIVITY

The contractor installed a array of electrodes about 60 feet deep around the site. These electrodes will be heated by electrical current. Electrical resistance in the soil will heat the subsurface to temperatures that will vaporize groundwater and residual solvents. Steam and contaminants will be collected in a vapor extraction system and treated prior to discharge. This extraction process began in early May 2000.

DEQ Project Manager: Jennifer Sutter,  
503-229-6148



## City of Portland Columbia South Shore Well Field

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We are also working with EPA to procure a greater federal commitment for funding discovery efforts. In addition, Portland has announced expansion plans for the well field. The well field has not been designated as a "Federal NPL" site under Superfund, largely due to DEQ's successful cleanup actions.

### For More Information

Contact Dave St Louis, Manager, Site Response Program, (503)-229-5532  
E-mail: [STLouis.Dave@deq.state.or.us](mailto:STLouis.Dave@deq.state.or.us)



Minutes are not final until approved by the EQC

## Environmental Quality Commission Minutes of the Two Hundred and Eighty-Third Meeting

March 30-31, 2000  
Regular Meeting

On March 30, 2000, the Environmental Quality Commission (EQC) traveled to Hood River to view the Powerdale Dam fish trap. In the evening the Commission had dinner with local officials at the Discovery Center in The Dalles, Oregon. The regular meeting of the EQC was held on March 31, 2000, at the Discovery Center, 5000 Discovery Drive, The Dalles, Oregon. The following Environmental Quality Commission members were present:

Melinda Eden, Chair  
Harvey Bennett, Member  
Tony Van Vliet, Member

Also present were Larry Knudsen, Assistant Attorney General, Oregon Department of Justice (DOJ); Langdon Marsh, Director, Department of Environmental Quality; and other staff from DEQ.

Note: The Staff reports presented at this meeting, which contain the Department's recommendations, are on file in the Office of the Director, 811 SW Sixth Avenue, Portland, Oregon 97204. Written material submitted at this meeting is made a part of the record and is on file at the above address. These written materials are incorporated in the minutes of the meeting by reference.

The Commission held an executive session to consult with legal counsel regarding G.A.S.P., et al v. Department of Environmental Quality (Case No. 9708-06159) before the regular meeting.

Chair Eden called the meeting to order at 9:55 a.m. on Friday, March 31.

### A. Approval of Minutes

One correction was made to the February 10-11, 2000 minutes. On page 3, first paragraph, the last line should read "...kind of a *precedent* to rely on." Commissioner Bennett moved the minutes be approved as corrected. Commissioner Van Vliet seconded the motion and it carried with three "yes" votes.

### B. Action item: National Marine Fisheries Request for a Waiver for Total Dissolved Gas for Fish Passage on the Main Stem of the Columbia River

Russell Harding, Columbia River Coordinator, introduced a petition received from the National Marine Fisheries Service requesting a variance to the State's total dissolved gas water quality standard to enable water to be spilled over the four lower Columbia River Dams. The period of spill is to be from April 10, 2000, until August 31, 2000, to assist outmigrating threatened and endangered salmon smolts. The variance sought is a total dissolved gas level of 115 percent saturation in the forebay of each dam and 120 percent saturation in the tailrace of the each dam. A biological trigger is included at which the Director can stop the spill program. There is also an instantaneous level of total dissolved gas set at 125 percent saturation for no more than two of the highest 12 hours per calendar day.

Dr. Mark Schneider of the National Marine Fisheries Service and Dr. Margaret Filardo of the Fish Passage Center presented information on the 1999 spill season. While 1999 had a greater than average snowpack, climatological factors (i.e. a cooler than usual spring) provided a very even runoff that could be managed generally within the variance given by the Commission last year. Times at which the variance was not met were characterized by involuntary spill, i.e. times when the quantity of water exceeded the capacity of the dam to constrain it, or when lack of power market meant that water could not be run through the powerhouse.

The smolt-monitoring program in 1999 collected fewer fish for monitoring, but at 25,184 provided a statistically valid sample for management purposes. Few signs of gas bubble disease were detected. Incidences of gas bubble disease coincided with total dissolved gas levels greater than the allowed variance.

Commissioner Van Vliet made a motion to approve the variance request including the required findings and the attached draft order with corrections. The motion was seconded by Commissioner Bennett, and passed with three "yes" votes.

The Commission requested that next year information from Bonneville Power Administration be provided relating to powerhouse capacity at each of the projects and details of electricity market conditions. They also requested the annual report and waiver come to them by December 31, 2000, for next year.

### **C. Informational Item: Legislative Update**

Lauri Aunan, Assistant to the Director, presented the draft legislative concepts DEQ may present to the Governor.

### **D. Commissioners' Reports**

There were no Commissioner reports.

### **E. Director's Report**

The majority of the field work for Ross Island's Phase I investigation and the Port's assessment of confined disposal cells has been completed and DEQ is evaluating the data draft report. Investigation of the disposition of the breach material has revealed the material removed from the Port's confined disposal cell in 1998 appears to be present in Ross Island's settling pond. The Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife, National Marine Fisheries Service, DEQ, Division of State Lands, U.S. Army Corps of Engineers, City of Portland, and the Environmental Protection Agency (EPA) have been meeting periodically to discuss common issues and coordinate reviews.

The Environmental Cleanup Advisory Committee met in March to review the draft guidelines DEQ is developing for Alternative Dispute Resolution (ADR). The Environmental Cleanup Advisory Committee was supportive of DEQ's efforts and will help the agency evaluate the success of ADR in the future. The committee members have expertise in economics, environmental law, and banking, and will be supported by DEQ staff and a contractor.

DEQ has been meeting with City of Portland representatives to review "The Clean River Plan" and its proposed nine-year extension for completion of the Portland's Combined Sewer Overflow (CSO) control program. DEQ has not been convinced to support an extension and the Department sent a letter explaining DEQ's position to the City of Portland.

On March 31 EPA will make a decision on whether to list Portland Harbor as a Superfund site or defer the environmental cleanup of Portland Harbor to DEQ. DEQ has put together a documentation package that shows its progress towards meeting EPA criteria for state deferral, including information on Tribal interactions, community outreach plan, enforcement plan, and RI/FS work plan. Mary Wahl, Waste Prevention and Management Division Administrator, and Langdon Marsh met with Chuck Clarke, EPA Region 10 Administrator, on March 24 in Seattle to discuss the progress the State has made towards deferral.

The Willamette Restoration Initiative (WRI) group is discussing its preliminary findings and recommendations with various interests, and will make final revisions to its draft recommendations to protect and restore water quality. They plan to release their proposed recommendations in late spring for public review and comment.

### **Public Comment**

Ronald Somers of The Dalles, Oregon, gave testimony regarding the air quality in the Columbia Gorge.

There being no further business, the meeting was adjourned at 11:45 a.m.

**Environmental Quality Commission**

Rule Adoption Item

Action Item

Information Item

**Agenda Item B**

**May 17, 2000 Meeting**

<b>Title:</b> Denial of Preliminary Certification Application 5009 -- Independent Spent Fuel Storage Installation Portland General Electric Company
<b>Summary:</b> Staff recommends the denial of tax credit application number 5009.
<p>Portland General Electric Company requested the preliminary certification of their Independent Spent Fuel Storage Installation (ISFSI) as a pollution control facility for tax credit purposes. PGE is constructing the ISFSI to replace the spent fuel storage pool that will be dismantled and decontaminated as part of the Trojan Nuclear Power Plant decommissioning plan.</p> <p>Staff recommends that the Commission deny the application because the facility does not meet the definition of a pollution control facility in ORS 468.155(1). The Department concludes that the facility:</p> <ul style="list-style-type: none"><li>• does not have an "exclusive" purpose of pollution control, prevention or reduction; and it</li><li>• does not control a substantial quantity of air and water pollution over what is currently being provided in the spent fuel storage pool.</li></ul> <p>Please read the transcript in Attachment B for a full description of the ISFSI.</p>
Deny preliminary certification of the facility presented on application number 5009 as presented in the Director's Letter and Attachment A. Read the transcript in Attachment B.
<p><i>Margaret C. Vandenberg</i>      <i>Allen Fortridge</i>      <i>Langdon Wash</i></p> <p>Report Author                      Division Administrator                      Director</p>

May 1, 2000

†Accommodations for disabilities are available upon request by contacting the Public Affairs Office at (503) 229-5317/(503) 229-6993 (TTD).



**Date:** May 1, 2000

**To:** Environmental Quality Commission

**From:** Langdon Marsh, Director

**Subject:** Agenda Item B, May 17, 2000, EQC Meeting  
Denial of Preliminary Certification  
Application 5009 -- Independent Spent Fuel Storage Installation  
Portland General Electric Company

**Statement of the Need for Action**

This report presents staff's analysis of application number 5009 and their recommendation for Commission action. Portland General Electric Company (PGE) requested the preliminary certification of their Independent Spent Fuel Storage Installation (ISFSI) under the "pollution control facility tax credit" laws.

1995 legislation provided for the preliminary certification of any facility that would otherwise be eligible for a pollution control facility tax credit. The Environmental Quality Commission is the authority that approves or denies preliminary certification that a facility is in fact a pollution control facility according to ORS 468.155 to 468.190.

**Background**

PGE is constructing the ISFSI to replace a spent fuel storage pool that will be dismantled and decontaminated as part of the Trojan Nuclear Power Plant decommissioning plan.

The claimed facility is a dry storage system that will provide temporary storage of spent nuclear fuel assemblies, fuel debris, and radioactive waste materials. The ISFSI consists of the following major components.

1. Thirty-four sealed metal baskets used to store radioactive materials.
2. A vacuum drying system used to remove water from each basket following loading of radioactive waste.
3. A semi-automatic welding system used to seal-weld the baskets.
4. A ventilated concrete storage cask for each basket.
5. A transfer station and associated transfer equipment. A transfer cask is used to move a loaded basket from the spent fuel pool to the concrete cask. It is also designed to be used to transfer a basket to a shipping cask, or to a basket overpack.
6. A reinforced concrete storage pad used to support the storage system baskets.

The facility is described in the Review Report shown in Attachment A.

PGE permanently ceased operating the Trojan Nuclear Power Plant in 1992 and is required to decommission Trojan. PGE must provide for the temporary safe-storage of spent nuclear fuel until the federal government provides a permanent storage site for its disposal. The U.S. Department of Energy estimates that it will not begin accepting spent nuclear fuel until after 2010. On February 10, 2000, staff briefed the Environmental Quality Commission regarding the physical aspects of claimed facility, the background of the Trojan Nuclear Power Plant, the nature of the spent fuel and PGE's decommissioning plan. The transcript from that session is in Attachment B.

For the ISFSI to be certified for tax credit purposes it must meet the definition of a "pollution control facility" in ORS 468.155(1). Additionally, the ISFSI must not be excluded from the definition of a pollution control facility as defined in ORS 468.155(2). There are two parts to the definition of a pollution control facility — the first part must apply to the ISFSI before the second part is considered. The first part defines the purpose of the facility and the second defines part how the pollution control must be accomplished.

Part 1: The ISFSI must have a "principal purpose" or a "sole purpose" of pollution control. If it fails to have a pollution control purpose then it must be denied certification as a pollution control facility.

Part 2: If the ISFSI has a pollution control purpose then the pollution control must be accomplished in a specific manner. If it fails to accomplish the pollution control as defined then the facility must be denied certification as a pollution control facility.

**Exclusions :** Several exclusions from the definition of a "pollution control facility in ORS 468.155(2) are worth mentioning as they relate to the claimed facility.

The department reviewed other certified facilities located at the Trojan Nuclear Power Plant site. The previously issued certificates did not certify (nor did the applicant claim) any part of the spent fuel pool. The ISFSI would replace the spent fuel pool; therefore, the department does not consider that the ISFSI is a "replacement" facility.

Even if the claimed facility would meet the definition of a "pollution control facility", distinct portions of the ISFSI make an "insignificant contribution" to any pollution control purpose. These are identified later in this document.

**Purpose of the Facility** The ISFSI is not a requirement of DEQ, the federal Environmental Protection Agency or a regional air pollution authority. Therefore, it is not a "principal purpose" facility. The applicant claimed the "sole purpose" of the installation is to control, prevent, or reduce a substantial quantity of air and water pollution. To meet the definition of a "sole purpose" facility, the ISFSI must:

1. Control<sup>1</sup> air pollution as defined by air quality statute or water pollution as defined by water quality statute; and
2. Control a substantial quantity of air or water pollution; and
3. Have an "exclusive" pollution control purpose.

If any one of items 1, 2, or 3 above is not met then the ISFSI does not meet the definition of a pollution control facility and must be denied certification.

If items 1, 2, and 3 above are met then the EQC must exclude any distinct portions of the facility that make an insignificant contribution to the sole purpose of pollution control.

DEQ staff concludes that the facility does not meet all three items above.

The applicant, however, claims the sole purpose of the ISFSI is pollution control, and that it controls air and water pollution. The spent fuel assemblies in the spent fuel pool contain radioactive substances. Radioactive substances meet the definition of a water pollutant (ORS 468B.005) and an air pollutant (ORS 468A.005.) Radioactive material is specifically excluded from the definition of a Hazardous Waste in ORS 466.005. (Definitions and relevant citations are shown in Attachment C.)

The department concludes that radioactive waste meets the definition of air pollution as defined by the air quality statute or water pollution as defined by the water quality statute.

### Substantial Quantity

To meet the second "sole purpose" criteria, the ISFSI must control a substantial quantity of air or water pollution.

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<sup>1</sup> "Control" is used in the pollution control facility tax credit program to mean "prevent, control or reduce." For used oil facilities it means "to recycle or appropriately dispose of."



Dry storage controls, prevents, or reduces a substantial quantity of pollution control over no storage as indicated by 10 CFR 20 (Standards For Protection Against Radiation.) To consider the quantity of pollution controlled by the ISFSI over background (no storage) would deviate from previous program implementation and would expand the program. The applicant did not provide evidence that:

- Dry storage would control, prevent, or reduce a substantial quantity of air or water pollution over what is provided by the existing wet storage system; or that
- The probability that releases to the atmosphere or spills to waters of the state with the current system is more than infinitesimal.

In the spent fuel pool, the vast majority of any possible releases would be captured by the water treatment systems for disposal. The balance would be gaseous fission-products but the applicant did not provide evidence that this would pose a threat to the environment. In the ISFSI, the spent fuel assemblies would be encapsulated in the baskets and casks.

The department did not review any part of the claimed facility from the perspective of protecting the environment from pollution occurring as a result of a catastrophic event – either man-made or naturally occurring. The department considers that protecting the environment from catastrophic events is beyond the scope of the pollution control facility tax credit program. To adopt this perspective would expand the program.

The department concludes that the ISFSI would not control a substantial quantity of pollution as compared to what is provided by the existing wet storage system.

#### Other Purposes

To meet the third “sole purpose” criteria, the ISFSI must have an “exclusive” pollution control purpose.

Concern for public health and safety as relates to nuclear materials was specifically separated from other types of environmental concerns:

On June 1, 1976, the U.S. Supreme Court held that pollutants subject to regulation under the Federal Water Pollution Control Act do not include source, byproduct, and special nuclear materials,...” *Train v. Colorado PIRG*, 426 U.S. 1 at 25.  
*10 CFR 51, Subpart A – National Environmental Policy Act – Regulations Implementing Section 102 (2)*

In Oregon, the regulatory agency that applies the Federal Rules governing the release of

radioactive materials into the environment is the Oregon Health Division, Radiation and Protection Services. The Health Division established the standard for levels of safety for releases of radioactive material to the atmosphere.

Safe storage of the spent and failed fuel is required under 10 CFR 20 (Standards For Protection Against Radiation.) Safe storage meets the requirements of OAR 345-026-0390 for Spent Nuclear Fuel Storage as administered by the Oregon Office of Energy. The requirements are, in part, for protection of the environment.

There is no regulatory requirement for PGE to install a dry storage system in place of a wet storage system other than the legal obligation to implement its decommissioning plan approved by the NRC and the Oregon Energy Facility Siting Council (EFSC.) Both dry storage and wet storage meet the requirements for safe storage set out in the U.S. NRC's Standards For Protection Against Radiation, 10 CFR 20.

PGE's Decommissioning Plan includes the Independent Spent Fuel Storage Installation. The Oregon criteria under which the plan was approved are contained in Division 26 of OAR 345. Once approved, the applicant is now legally bound to meet these conditions or request approval of an amendment to the plan from EFSC.

As a result of the installation, most of the Trojan site would be available for unrestricted use. At that time, PGE would operate the facility under a Part 72 license – Licensing Requirements for the Independent Storage of Nuclear Fuel and High Radioactive Waste (10 CFR 72). The site is a prime Oregon location; transportation is readily available with a rail line running through the property, access to the I-5 corridor and sited on the Columbia River. The site is suitable to be used as a power plant fueled by natural gas and the applicant is considering donating most of the site for recreational purposes.

The cost savings appear to be a significant factor in PGE's decision to move from wet storage to dry storage at this time. The decommissioning plan tracks the costs associated with operation and maintenance of the independent spent fuel storage installation (\$3.6 million a year) and the spent fuel pool (\$10.4 million a year), which represent a savings of \$6.8 million per year.

The applicant is required to provide safe storage of spent nuclear fuel and high level radioactive waste, and is legally obligated to meet the conditions of the approved decommissioning plan. The financial benefits to decommissioning at this time are significant. The department concludes that the purpose of the ISFSI is to facilitate decommissioning and the applicant has not demonstrated that the exclusive purpose of the facility is pollution control.

Because the facility does not meet all three of the "sole purpose" criteria, the department concludes that the ISFSI does not meet the definition of a pollution control facility, and recommends the Commission deny certification.

### Further Determination

If the Commission agrees with the department's conclusion then no further determinations are required.

If, however, the Commission determines that the facility meets all three criteria, then the EQC must exclude any distinct portions of the facility that make an insignificant contribution to the sole purpose of the pollution control.

The department provides the following analysis for the Commission's use, should this determination be needed.

Baskets: The purpose of 34 PWR and two GTCC sealed metal-baskets is for temporary storage of the spent fuel assemblies while in Oregon, during transportation within and outside Oregon, and then for permanent storage at the federal repository. The sealed metal-baskets would provide for secondary containment of the spent fuel pellets should the primary containment fail. Currently, the majority of any releases within the spent fuel pool would be captured by the water treatment system. The remaining releases would be gaseous fission-products but the applicant did not demonstrate that this would pose a threat to the environment. The applicant did not demonstrate the probability and the conditions under which the current system could release contaminants to the atmosphere or spill to public waters.

Vacuum Drying Equipment: The purpose of the vacuum drying equipment is to remove residual water from each basket after they are loaded with the spent fuel assemblies within the spent fuel pool. The department concludes that the vacuum drying equipment makes an insignificant contribution. The equipment has a one-time use. The 1998 rule formalized the Commission's practice to remove the cost of equipment purchased for the purpose of installing the pollution control because that equipment makes an insignificant contribution to the purpose of the facility — OAR 340-0016-0070 (3)(o).

### Welding System

The purpose of the semi-automatic welding system is to weld the baskets closed. The department concludes that the welding system makes an insignificant contribution to the pollution control purpose and it does not have an exclusive pollution control purpose. The 1998 rule formalized the Commission's practice to remove the cost of equipment purchased for the purpose of installing the pollution control because that equipment makes an insignificant contribution to the purpose of the facility — OAR 340-0016-0070 (3)(o).

### Concrete Storage Casks

The concrete storage casks have openings in the top and bottom to allow air to circulate through the inside of the cask. They do not have the ability to prevent, control, or eliminate releases to air or water pollution should the spent fuel assemblies and baskets fail. The purpose of the



concrete storage casks is to provide shielding of gamma-rays and to provide structural integrity for the baskets to withstand a man-made or natural catastrophic event such as an earthquake, flood, tsunami or tornado etc.

Shielding has not previously been approved for tax credit purposes. Approval would mean medical and industrial x-ray shielding would then become eligible for a tax credit and would expand the program. Tertiary containment has not been approved for tax credit purposes – approval of the casks as tertiary containment would expand the program.

#### Transfer Station

The transfer station and associated transfer equipment provides for the safe movement of the spent fuel during the transfer of spent fuel assemblies from the spent fuel pool to the baskets and then during transportation to the federal repository. The transfer station must remain with the storage system as long as the fuel is on site. The transfer station provides an essential material handling function. Though essential, material handling is not a pollution control purpose.<sup>2</sup> The department concludes that the transfer station provides an insignificant contribution to the pollution control purpose. Approval of this type of material handling system would expand the program.

#### Concrete Storage Pad:

The concrete storage pad is not capable of preventing, controlling or reducing releases to the air or spills to the water should the spent fuel assemblies and the baskets fail. The pad provides structural support for the casks.

Considering each of these factors, the department concludes that the ISFSI does not have an exclusive purpose of pollution control. Therefore, the department recommends the Commission deny certification of the ISFSI as a pollution control facility.

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<sup>2</sup> Material handling is allowable in the material recovery or alternatives to open field burning parts of the tax credit program.

### **How the Pollution Control Is Accomplished**

Should the Commission determine that the ISFSI does have a pollution control purpose, then the Commission must also determine whether the facility accomplished the pollution control by one of the methods in statute. The department offers the following analysis of several systems and their ability to accomplish the prescribed pollution control even though the department concludes that the ISFSI does not have a pollution control purpose.

The pollution control facility tax credit statute specifically identifies how pollution control must be accomplished for both air and water pollution control facilities.

#### Air Pollution Control

The air pollution control must be accomplished by disposing of or eliminating air contaminants, air pollution or air contaminant sources. The pollution control must also be accomplished by the use of air cleaning devices.

The department concludes that the radioactive waste could be considered an air contaminant source because some fission products (krypton, xenon isotopes, etc.) may become airborne in the gaseous space above the spent fuel pool. However, the department concludes that the ISFSI does not meet the definition of an air-cleaning device because it does not remove, reduce, or render the air contaminants less noxious prior to discharge to the atmosphere. The radioactive waste is only stored until it can be removed from Oregon and rendered less noxious to Oregonians over time and distance.

#### Water Pollution Control

Water pollution control must be accomplished by disposing of or eliminating industrial waste. The pollution control must also be accomplished by the use of a treatment works.

##### Baskets

The 34 PWR and two GTCC sealed metal-baskets serve as a secondary containment for the spent fuel with the spent fuel assemblies serving as primary containment. The spent fuel assemblies will permanently reside in the baskets. The baskets would meet the definition of "disposal" because they are the permanent container for the spent fuel assemblies, though Oregon is not the permanent location for the baskets. The baskets would be considered a "treatment works" because they hold waste.

The department determined that the baskets would accomplish pollution control as prescribed in statute.

##### Concrete Storage Casks

The concrete storage casks do not eliminate or dispose of industrial waste and they do not meet the definition of a treatment works. They are not capable of "holding" industrial waste should the primary and secondary containment fail.

Concrete Storage Pad

The concrete storage pad does not eliminate or dispose of industrial waste. The pad does not meet the definition of a treatment works because it does not treat, stabilize or hold wastes as required in the definition of "treatment works."

As mentioned above, if the Commission agrees with the department's conclusions, no analysis of how pollution control is accomplished is required.

Preliminary Applications

On May 1, 1998 rules (new rules) became effective that implemented 1995 legislation. This legislation reinstated the preliminary certification process. The Department reviewed PGE's preliminary application according to the 1995 legislation and the 1990 rules (old rules) that were in effect on April 30, 1998 – the date PGE submitted their application.

An applicant may submit a preliminary application anytime prior to completing the construction of a facility. PGE submitted their preliminary application within this timing.

The Department reviewed the claimed facility to determine if it met the definition of a pollution control facility. The Department did not review any financial details.

The Commission's approval of a preliminary application is prima facie evidence that the facility meets the definition of a pollution control facility under ORS 468.170. However, it does not ensure that the facility will receive certification under ORS 468.170 or tax relief under ORS 307.405 or 315.304.

Should the claimed facility be approved for preliminary certification and if the applicant builds the facility as planned then the final application would be reviewed under the new rules and would focus on the facility cost and the percentage of the cost allocable to pollution control.



**Other Tax Credits Issued at Trojan**

If the Commission determines that the IFSI does qualify as a pollution control facility, then the Commission must decide whether the IFSI is a replacement facility.

The EQC certified the following seven facilities located at the Trojan site in Rainier during 1983 and 1984. Staff concludes that the Independent Spent Fuel Storage Installation did not replace any previously certified facility as defined in ORS 468.155(2) and shown in Attachment C.

App. No.	Description of Facility	Certified Cost	Percent Allocabl
1603	AIR POLLUTION CONTROL: Radioactive emission controls associated with the containment building.	\$13,243,985	100%
1604	WATER POLLUTION CONTROL: A 499' high natural draft cooling tower and a circulating cooling water system.	\$10,355,754	100%
1606	WATER POLLUTION CONTROL: Dechlorination system consisting of 2 sampler pumps, 2 pH sampler pumps, sulfite injection equipment, an instrument panel, piping, valves and instruments.	\$210,778	100%
1638	AIR POLLUTION CONTROL: Radioactive emission controls associated with fuel and auxiliary buildings:	\$4,774,207	100%
1639	WATER POLLUTION CONTROL: A liquid waste radioactivity control system consisting of five subsystems: <ul style="list-style-type: none"> <li>• A clean radioactive waste treatment system</li> <li>• A dirty radioactive waste treatment system</li> <li>• A steam generator blowdown treatment system</li> <li>• A solid radwaste system</li> <li>• A liquid radiation monitoring system.</li> </ul>	\$6,927,850	100%
1675	WATER POLLUTION CONTROL: A water treatment filter backwash solids settling system consisting of: <ul style="list-style-type: none"> <li>• A 70,000 gal reinforced concrete basin</li> <li>• A wet well discharge pumping station with two 5-hp pumps</li> <li>• A sludge collection system and 3-hp pumps</li> <li>• Electrical flow panels, flow recorders, and alarms</li> </ul>	\$628,971	100%
1677	AIR POLLUTION CONTROL: Certain elements of the containment building consist of containment- cleanup re-circulating units, spray system, cooling-water system and isolation valves.	\$7,263,820	100%

If the Commission agrees with the department's conclusion, the replacement facility determination is not necessary.

**Conclusions**

Staff concludes that the claimed facility does not meet the definition of a pollution control facility. The department concludes that staff's recommendation is consistent with statutory provisions and administrative rules related to the pollution control facility tax credit program.

**Recommendation for Commission Action**

The Department recommends the Commission deny certification of the facility claimed on application number 5009 as presented in Attachment A of the Department's Staff Report.

**Intended Follow-up Actions**

Staff will notify applicant of the Environmental Quality Commission's action by Certified Mail.

**Attachments**

Attachment A	Review Report – Application 5009
Attachment B	Transcript from Work Session
Attachment C	Relevant Citations


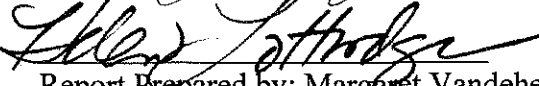
**Reference Documents (available upon request)**

1. ORS 468.150 through 468.190.
2. OAR 340-016-0005 through 340-016-0050.

Approved:

Section:

Division:

  
  
Report Prepared by: Margaret Vandehey  
Phone: (503) 229-6878  
Date Prepared: May 1, 1999

***Attachment A***

***Review Report***





# Tax Credit Review Report

EQC 0005

**Pollution Control Facility: Water and Air**  
ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation operating an **electric utility company**. The applicant's taxpayer identification number is 93-0256820 and their address is:

**121 SW Salmon Street  
Portland, OR 97204**

### *Technical Information*

The claimed facility consists of a vertical dry cask storage system, which will provide temporary storage of spent nuclear fuel assemblies, fuel debris, and radioactive waste materials. Sierra Nuclear Corporation designed the passive TranStor Storage System.

Fission product gamma rays, which are emitted from the spent fuel, are a continuing source of radiation after shutdown of a reactor. The spent fuel assemblies are currently stored in the spent fuel pool. The spent fuel assemblies are about one centimeter in diameter (less than 1/2 inch) and 12 feet long. Each assembly consists of 144 fuel spent fuel pins. Each pin is a zirconium alloy tube sealed at each end and filled with ceramic uranium fuel pellets. If the seal of a pin is broken, water will enter and become contaminated with radioactive materials in the form of fission products; these fission products emit gamma rays, alpha particles, and beta particles. Some of the fission products are gaseous, including krypton and xenon isotopes; therefore they may become airborne in the gaseous space above the spent fuel pool. All of the spent fuel at Trojan has been out of the reactor for over five years and is no longer required to be cooled with water.

## PRELIMINARY APPLICATION

Director's  
Recommendation: **DENY**

Applicant	<b>Portland General Electric</b>
Application No.	<b>5009</b>
<u>Estimated</u> Facility Cost	<b>\$ 55,000,000</b>
<u>Claimed</u> Useful Life	<b>10 years</b>

### *Facility Identification*

The applicant claimed the following facility:

**An Independent Spent Fuel Storage  
Installation.**

The applicant is the owner of the facility located at:

**Trojan Nuclear Plant  
71760 Columbia River Highway  
Rainier, OR 97048**

The spent fuel pool and supporting plant systems will be dismantled and decontaminated as part of the ongoing decommissioning of the Trojan Nuclear Plant. The dry cask storage system will take the place of the spent fuel pool until the spent fuel assemblies can be transferred to a federally operated disposal site.

The applicant claimed the following major components as part of the pollution control facility.

1. Thirty-four PWR (pressurized water reactor) and two GTCC (greater than class C) sealed metal baskets used to store radioactive materials. The baskets are about 15 feet tall and 5-1/2 feet in diameter. The outside of the basket is made of 3/4-inch thick stainless steel and the internal structures are made of high carbon steel, coated to prevent corrosion. The PWR baskets are capable of storing up to 24 spent fuel assemblies. The GTCC baskets are capable of storing up to 28 individual canisters containing other radioactive waste.
2. A vacuum drying system used to remove water from each basket following loading of radioactive waste. Each PWR basket is loaded with up to 24 spent fuel assemblies in the spent fuel pool and the residual water must be removed.
3. A semi-automatic welding system used to seal weld the baskets. A shield lid and a structural lid are seal-welded in place after the contents are dried.
4. A ventilated concrete storage cask for each basket. Each cask is made of high density concrete about 21 inches thick and provides structural support for the basket. It also provides shielding of the radiation produced by the radioactive materials in the spent fuel.
5. A transfer station and associated transfer equipment. The transfer station is used for basket transfer operations. Lateral and vertical support is provided with the transfer station to prevent a loaded cask from overturning or falling during transfer operations. A transfer cask is used to move a loaded basket from the spent fuel pool to the concrete cask. It is also designed to be used to transfer a basket to a shipping cask, or to a basket overpack. An air pad system is used to move a loaded cask. Air pads are inserted under the cask and inflated with an air compressor. A specially modified vehicle would then be used to move the concrete cask from one location to another.
6. A reinforced concrete storage pad used to support the storage system baskets. The storage pad is 170 foot by 105 foot and 18 inches thick. The concrete casks will be on the pad until the U.S. Government is prepared to take the spent fuel.

**Eligibility**

- ORS 468.155 (1)(a) The **sole purpose** of this new equipment is **not** to prevent, control or reduce a substantial quantity of air or water pollution. The applicant did not provide evidence that dry storage would provide a substantial quantity of pollution control over what is provided by the existing wet storage system. The ISFSI would serve purposes other than pollution control such as to facilitate decommissioning.<sup>1</sup> The vacuum drying system; the semi-automatic welding system; the ventilated concrete storage casks; the transfer station and associated transfer equipment; and the reinforced concrete storage pad have purposes other than pollution control or they make an insignificant contribution to the claimed pollution control purpose.
- ORS 468.155 (1)(b)(B) The ISFSI does not dispose of or eliminate air contaminants with the use of an air cleaning device as defined in ORS 468A.005.
- ORS 468.155 (1)(b)(A) The baskets would dispose of industrial waste with the use of a treatment works as defined in ORS 468B.005. The other systems either do not dispose of or eliminate industrial waste or the control is not accomplished by the use of a treatment works.
- OAR-016-0025 (2)(g) The applicant claimed the installation would be used to detect, deter, or prevent spills or unauthorized releases. The applicant did not demonstrate the probability that releases to the atmosphere or spills to waters of the state with the current system is more than infinitesimal.

**Timeliness of Application**

The application was submitted prior to the completion of construction.

*Application Received*

5/5/1998

*Application Substantially Complete*

4/27/00

<sup>1</sup> See Director's Letter 5/17/00 for full discussion.

# ***Attachment B***

## ***Transcript***



BEFORE THE ENVIRONMENTAL QUALITY COMMISSION

WORK SESSION ON:

Portland General Electric  
Company's independent spent fuel  
storage installation at the  
Trojan Nuclear Power Plant.

**TRANSCRIPT OF PROCEEDINGS**

November 18, 1999

**BEFORE:**

COMMISSIONERS

MELINDA EDEN, Chair  
TONY VAN VLIET  
LINDA McMAHAN  
MARK REEVE

DIRECTOR:

LANGSTON MARSH  
LARRY KNUDSEN  
DEQ Counsel

*Transcribed from electronic recording by*

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Official Transcriber

(503) 631-8885

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1 CHAIR EDEN: Good afternoon. This is the regularly  
2 scheduled meeting of the Environmental Quality Commission,  
3 and we welcome you here.

4 I'm Melinda Eden. To my right are Linda McMahan and  
5 Tony Van Vliet, and to my left is Mark Reeve, our newest  
6 member. Harvey Bennett, unfortunately, is ill and unable to  
7 be with us today. So we are it.

8 And we have convened this afternoon to begin with a  
9 work session. On?

10 COMMISSIONER VAN VLIET: Madam Chair, I'd like to  
11 make a nomination right now.

12 CHAIR EDEN: Commissioner Van Vliet. That's right,  
13 we don't have a chair.

14 COMMISSIONER VAN VLIET: I would like to nominate  
15 Melinda Eden to be the chair of the Environmental Quality  
16 Commission commencing as soon as possible.

17 COMMISSIONER McMAHAN: Second.

18 CHAIR EDEN: It's been moved and seconded that  
19 Melinda Eden be elected chair of the Environmental Quality  
20 Commission. Is there any discussion? All those in favor  
21 signify by saying aye.

22 (Three aye votes)

23 CHAIR EDEN: Can I vote for myself? Aye.

24 All those opposed. There is no one. So, thank you  
25 very much for your confidence that I can run a meeting

1 responsibly, and I will do my best.

2 And now is the time schedule for a work session on  
3 Portland General Electric's company's independent spent fuel  
4 storage installation at the Trojan Nuclear Power Plant. And  
5 Maggie Vandehey is here and --

6 MS. TAYLOR: Chair Eden, maybe I could introduce  
7 Maggie Vandehey --

8 CHAIR EDEN: You may.

9 MS. TAYLOR: -- who will be presented the work  
10 session report to you along with David Stewart-Smith from  
11 the Department of Energy, who is an expert in this arena.  
12 And they'll both kind of describe the facility to you. And  
13 then Maggie will express to you the questions that the  
14 Department will be attempting to answer between now and next  
15 spring about the -- whether the facility qualifies for tax  
16 credit. And what we'd like from you today, of course, is to  
17 provide you with information but also if you have questions  
18 of us that you would like us to explore in the interim, we'd  
19 like to hear that today.

20 Know that there are members of the company here who  
21 would be more than willing to answer questions when our  
22 staff has completed their -- their information to you, if  
23 you have questions. If you do not, I'm sure they'll be  
24 available in the spring when we bring this item back to you.

25 CHAIR EDEN: Okay. Then let's proceed on that basis.



1 I would like to say ahead of time that it is not a time --  
2 it's not a public hearing, so it's not a time for that; it's  
3 a time for the Department to make its presentation to us,  
4 but as Ms. Taylor said, if we have questions, I appreciate  
5 that there are company representatives here to assist us.

6 MS. VANDEHEY: Good afternoon, Madam Chair,  
7 Commissioners. As Lydia told you, my name's Maggie  
8 Vandehey, and I'm Tax Credit Coordinator for the DEQ. Dave  
9 Stewart-Smith on my right has timely agreed to be here  
10 today. He's the administrator of the Energy Resource  
11 Division with the Oregon Office of Energy. Dave is also the  
12 Secretary of the Energy Consulting Siting Council.

13 We're here today to talk about Portland General  
14 Electric proposed application for preliminary certification.  
15 The application is for certification of their independent  
16 spent fuel storage installation. PGE refers to it as the  
17 ISFSI. Because I have trouble getting that off of my lips  
18 I'll be referring to it in tax credit terms as "the  
19 facility."

20 PGE submitted the application under the Pollution  
21 Control Facility Tax Credit laws. The plant facility is  
22 located at the Trojan Nuclear Power Plant site in Ranier.  
23 To quote from PGE's application, "The sole purpose of the  
24 Trojan ISFSI is to control spent nuclear fuel and to prevent  
25 spills or unauthorized releases of radioactive materials to

1 the air, water and adjacent land during interim storage  
2 period pending final disposal."

3 PGE estimates the facility will cost \$55 million. As  
4 Ms. Taylor told you, at this time, the Department is not  
5 prepared to offer a recommendation regarding the eligibility  
6 of the facility. We'll do that next spring. Our purpose  
7 today is to provide the Commission with an overview of the  
8 planned facility, background at the Trojan site, and a  
9 discussion of questions that we'll answer before finalizing  
10 the preliminary review report.

11 Before I talk about the specifics of the application,  
12 a brief chronology may be helpful in understanding why the  
13 facility is constructed. In 1976, Trojan Nuclear Power  
14 Plant began commercial production. In January of '93, PGE  
15 notified the Nuclear Regulatory Commission of their decision  
16 to cease operating the power plant. PGE bases this -- based  
17 this decision on the uncertainty of plant's reliability, the  
18 uncertainty about the cost of operation, particularly as  
19 related to the steam generators, and also about the  
20 availability of replacement power at a lower cost.

21 Once PGE made their decision to stop operating the  
22 nuclear power plant, NRC regulations requires them to  
23 completely decommission the plant within 16 years. In 1995,  
24 PGE moved four contaminated steam generators and a  
25 pressurizer to the regional commercial low level waste

1 disposal site at Hanford.

2 In '96, the NRC and the Oregon Energy Facility Siting  
3 Council approved the Trojan decommissioning of the plant.  
4 This year, PGE removed the reactor vessel to the disposal  
5 site at Hanford. Currently PGE is preparing the Trojan site  
6 for unrestricted use. Unrestricted use means that the  
7 property could be used for other industrial or recreational  
8 purposes. Finally, during the first quarter of the next  
9 century, the spent nuclear fuel will be moved to a yet  
10 unknown federal repository.

11 In a minute, I'll discuss the scope of the  
12 preliminary application with you. I'll also discuss  
13 questions that the staff will have to answer before we  
14 complete the review. At this time, Dave Stewart-Smith will  
15 provide information regarding the independent spent fuel  
16 storage installation, dry storage versus wet storage, air or  
17 water contaminants, decommissioning of Trojan, and the  
18 federal repository.

19 MR. STEWART-SMITH: Thank you, Madam Chair. For the  
20 record, my name is David Stewart-Smith, Secretary to the  
21 Oregon Energy Facility Siting Council. I'm pleased to be  
22 here today. I have some brief prepared notes that I will go  
23 over, and I would encourage the Commission to interrupt me  
24 at any time, in case I get a bit too oblique or I say  
25 something that needs to be clarified.

1           As Maggie mentioned the Trojan plant closed its  
2 commercial operations in 1993. Under the rules of the U.S.  
3 Nuclear Regulatory Commission they had -- first choice they  
4 had to make was whether or not they would put the plant into  
5 long-term storage and allow much of the radioactivity to  
6 decay, and the Nuclear Regulatory Commission refers to that  
7 option as Safe Store. Or whether they should decommission  
8 the plant in the near term, and they refer to that option as  
9 Decom.

10           Portland General Electric made the case to the NRC  
11 and to the Energy Facility Siting Council that, given the  
12 specifics in their situation, that immediate dismantlement  
13 was an appropriate option. The regulatory agencies agreed,  
14 and shortly thereafter PGE began preparations for  
15 decommissioning the plant.

16           They are well over halfway done with decommissioning  
17 at this point, having sent five large components, the -- the  
18 four steam generators and a pressurizer tank, off for  
19 disposal at our regional disposal site in 1995. And having  
20 sent the reactor vessel itself, without the spent fuel in  
21 it, to our regional low level waste disposal site in August  
22 of this year.

23           About 10 percent of the nonspent fuel radioactivity  
24 was disposed of with the large components: the steam  
25 generators and the pressurizer, something less than 10



1 percent. And about 90 percent of the nonspent fuel  
2 radioactivity was disposed of with the reactor vessel. The  
3 balance of the contamination on the Trojan site is in the  
4 form of contaminated concrete, piping, tanks, storage and  
5 radioactive waste treatment systems and similar pieces of  
6 equipment.

7           Once the site is decontaminated, the site can be  
8 released, as Maggie mentioned, for unrestricted use. It  
9 doesn't mean that all of the buildings will be gone. It  
10 means that what is left will not need to be restricted for  
11 reasons of radiation safety.

12           The process of site release is a -- is a complex and  
13 detailed one. PGE has broken some new ground in this area,  
14 being the first large commercial power plant to undergo  
15 decommissioning. There have been several of them a number  
16 of years older that that have undergone decommissioning, but  
17 this was a very different kind of decommissioning because of  
18 the size of the facility, and they will use many different  
19 measurements throughout the site and a sophisticated  
20 computer model to determine the potential pathway exposures  
21 to the public once the site is unrestricted. And based on  
22 their measurements and on the computer modeling, the  
23 company, along with the regulatory agencies will decide when  
24 the site is ready for unrestricted release.

25           Maggie also asked me to talk about the difference

1 between storing spent nuclear fuel in the spent fuel pool,  
2 as it is today, and storing it in dry spent fuel casks. Let  
3 me explain those a little bit. Since the plant began  
4 commercial operation, spent nuclear fuel which comes out of  
5 the plant -- an individual fuel bundle stays in the reactor  
6 for about -- in Trojan's case for about three years. Every  
7 year they had an annual refueling outage at which time about  
8 a third of the reactor core was removed, having spent three  
9 years in the reactor, and placed in the spent fuel pool.

10 The spent fuel pool is a water cooling system. It  
11 has about eight-foot thick foundation built on basaltic  
12 bedrock. The plant itself is built on a bedrock outcropping  
13 next to the Columbia River. It's got about five-foot thick  
14 concrete walls. It maintains about 20 feet of water over --  
15 at all times over the top of the spent fuel. The water  
16 provides not only cooling capacity, because, as these spent  
17 fuel bundles come out of the reactor, their degree of  
18 radioactivity is high enough that they generate a great deal  
19 of heat, but it also provides for the shielding. You can  
20 walk up to the edge of the spent fuel pool, look down  
21 through ultra-pure water that is a boric acid solution, and  
22 you can see the top of the spent fuel bundles and the racks  
23 that hold them.

24 The spent fuel pool has active pumping cooling and  
25 purification systems. That's the main -- other than the

1 difference between wet and dry -- that's the main difference  
2 between storing spent fuel and spent fuel pool -- I'm going  
3 to trip over that phrase, I know I am -- and storing it in  
4 dry concrete casks. The spent fuel pool relies on active  
5 cooling and maintenance in order to maintain its  
6 capabilities. Once the spent fuel is welded into stainless  
7 steel cylinders and placed inside concrete silos or concrete  
8 casks, it's basically a passive protective and cooling  
9 system.

10 Water is a better heat transfer medium than air  
11 convection, and as long as the fuel is less than five years  
12 out of the reactor, it must be cooled with water. All of  
13 the spent fuel at Trojan is greater than five years out of  
14 the reactor, having been closed in 1993. So this an  
15 appropriate spent fuel storage medium for fuel of this age.

16 The dry casks are massive structures. They provide  
17 not only radiation shielding capability with about 21 inches  
18 of concrete, high-density concrete as part of the concrete  
19 cask, but they provide for a very robust structurally sound  
20 storage medium. These concrete casks are placed on a  
21 concrete pad that's about 18 inches thick, and, as I recall  
22 seeing it before the concrete was poured, I think it has as  
23 much rebar in it as it has concrete. And this system is  
24 designed with enough mass and enough structural stability to  
25 withstand any credible earthquake.

1           The spent fuel pool was also designed to withstand an  
2 earthquake, but being open at the top, it was certainly less  
3 contained, if you will, than a dry concrete cask system.

4           I want to talk a little bit about air and water  
5 pathways of release of radioactive materials. A spent fuel  
6 pool is open to the environment. As I mentioned, you can  
7 walk up to the edge of it and you can look through the water  
8 and you can see the tops of the spent fuel assemblies. And  
9 it's housed in an industrial building. There are, because  
10 of -- because of the nature of spent nuclear fuel, the  
11 temperatures and pressures inherent in a commercial nuclear  
12 reactor are such that on the order of one half to one  
13 percent of the spent fuel pins that make up a fuel assembly  
14 that are sealed when the fuel assembly goes into the reactor  
15 become unsealed. That provides a small but a measurable  
16 pathway for radioactive materials to be released into the  
17 water of the spent fuel pool, hence the radioactive waste  
18 treatment systems that are built into that storage material.

19           COMMISSIONER REEVE: Excuse me. Did you pens?

20           MR. STEWART-SMITH: Pins.

21           COMMISSIONER REEVE: Pins.

22           MR. STEWART-SMITH: They're called pins. Each fuel  
23 assembly contains 144 pins that are about a centimeter in  
24 diameter and about 12 feet long, making up a fuel assembly.  
25 held together with brackets. But for a commercial nuclear



1 reactor, the need to maximize surface area to transfer the  
2 heat from the fuel to the water surrounding it means you  
3 need a lot of small pins rather than one large fuel rod.  
4 You'll often hear people talk about nuclear fuel rods.  
5 Well, the actual fuel assemblies for a commercial reactor  
6 are a 12 by 12 array of about one-centimeter diameter zircon  
7 tubes -- excuse me, zirconium alloy tubes filled with  
8 ceramic uranium fuel.

9 COMMISSIONER REEVE: Okay, so there -- you said some  
10 percentage of them -- of those -- are those the little tubes  
11 that actually --

12 MR. STEWART-SMITH: The tubes. Correct.

13 COMMISSIONER REEVE: Some percentage leak or --

14 MR. STEWART-SMITH: One or something less than one  
15 percent. They're sealed at each end. They're -- they're  
16 spring loaded at each end to keep the fuel pellets  
17 themselves held together and held in place, but in fact the  
18 seals at the ends of some small percentage of them become  
19 unsealed because of -- because of the conditions inherent in  
20 the core of a commercial reactor.

21 COMMISSIONER REEVE: Now, if that happens, what --  
22 what is it that escapes? Is it actual physically the fuel  
23 or is it radiation or what --

24 MR. STEWART-SMITH: It's not the pellets themselves.  
25 And certainly there's a great deal of radiation that can

1 escape from the fuel pins, radiation being either high  
2 energy photons or particulate alpha particles, beta  
3 particles, different kinds of radiation. Some of that can  
4 escape from the fuel assemblies themselves.

5       What I'm talking about is a small amount of fission  
6 products. These are the -- usually radioactive isotopes  
7 left over from an individual atom or, in this case,  
8 countless individual atoms of uranium undergoing nuclear  
9 fission, becoming two smaller atoms. Some of those are  
10 gaseous in nature: Isotopes of krypton and xenon. Many of  
11 them -- most of them are not, but in any case, once the seal  
12 in the end of one of those spent fuel pools begins to leak,  
13 the annular space around -- between the zirconium tubing and  
14 the fuel pellets themselves can become filled with water,  
15 become contaminated, and a small amount of it can leak out  
16 through the leak in the seal at the end of the tube.

17       COMMISSIONER REEVE: Now, during this act that you  
18 described -- the current storage is kind of an active system  
19 in terms of the water being filtered and whatnot. Is there  
20 a system that actually is able to remove that from the  
21 water --

22       MR. STEWART-SMITH: Yes.

23       COMMISSIONER REEVE: -- as it circulates?

24       MR. STEWART-SMITH: Yes. There are radioactive waste  
25 treatment systems that remove the contamination that is

1 dissolved in the water; also remove the excess heat from  
2 that water and transfer it to another system, another  
3 industrial heat removal system (indiscernible) in the plant.

4 So those isotopes can be removed. There are,  
5 however, as I mentioned, some small amount of those isotopes  
6 that are gaseous in nature, and once they're released into  
7 that cooling water, the spent fuel pool may become airborne  
8 in the gaseous space above the spent fuel pool itself.

9 So there is a pathway, however, vanishingly small it  
10 might be. During normal storage of spent fuel for a small  
11 amount of radioactive material to be released into the  
12 cooling water and into the air surrounding the spent fuel  
13 pool all of which is tightly regulated under federal and  
14 state rules.

15 CHAIR EDEN: Excuse me, but that creates -- taking  
16 the radioactivity out of the water in the pool then creates  
17 another repository of --

18 MR. STEWART-SMITH: A more --

19 CHAIR EDEN: -- contamination.

20 MR. STEWART-SMITH: A more concentrated low-level  
21 radioactive waste which is in turn disposed of at our  
22 regional commercial low-level radioactive waste site.

23 CHAIR EDEN: So it does ultimately become low level  
24 through that -- through the systems that --

25 MR. STEWART-SMITH: Correct.

35

1 CHAIR EDEN: -- pull it out of the water?

2 MR. STEWART-SMITH: Correct.

3 CHAIR EDEN: In the most simple terms.

4 MR. STEWART-SMITH: The spent fuel itself is known as  
5 high-level radiation.

6 CHAIR EDEN: Right.

7 MR. STEWART-SMITH: But any resulting contamination  
8 or treatment system that works with the cooling water, any  
9 radioactive material resulting from that is -- is low level.

10 CHAIR EDEN: Thanks.

11 MR. STEWART-SMITH: As I -- as I mentioned there are  
12 small amounts, however vanishingly small, of radioactive  
13 material released from the spent fuel pool. In contrast, a  
14 -- a dry spent fuel storage system, the fuel has been -- has  
15 been vacuum dried and sealed inside a stainless steel  
16 container known -- you'll see references to it in some of  
17 the material Maggie has supplied you -- known as a basket.  
18 For the life of me I don't know why they would could  
19 something a basket. But if you see that term, that's what  
20 they're talking about.

21 The walls are about three-quarters of an inch thick  
22 stainless steel; there's a shielding and a structural lid  
23 that are -- that are more massive yet. And these are welded  
24 on so that the spent fuel becomes sealed inside this  
25 stainless steel cylinder known as a basket, and the



1 atmosphere around it, rather than being atmosphere as is  
2 around us, is replaced with an atmosphere of helium. The  
3 reason for that is that helium is a very good heat transfer  
4 gas, unlike nitrogen which is the bulk of the air around us.

5 So the dry spent fuel storage system is sealed, and  
6 even if the spent fuel pool was remarkable effective at --  
7 at isolating radioactive materials from the environment, the  
8 dry spent fuel storage system theoretically, at least, is  
9 probably more effective yet, because of the nature of it  
10 being a dry storage medium and being welded shut.

11 In addition, under severe accident conditions,  
12 because the dry storage casks are sealed and massive, they  
13 should be able to withstand even more external forces, be it  
14 earthquake, be it some kind of intentional destructive  
15 force. The dry spent fuel storage system is probably more  
16 robust yet than the spent fuel pool that is in use at  
17 Trojan.

18 Portland General Electric, let me briefly explain  
19 what they have proposed. Let me preface that by saying that  
20 this system has been -- has been reviewed by the Nuclear  
21 Regulatory Commission, has been reviewed by the technical  
22 staff at the Oregon Office of Energy, approved by Oregon's  
23 Energy Facility Siting Council through a publicly accessible  
24 process.

25 The applicant in their tax credit application, I

1 believe, claimed 36 storage baskets to use within the  
2 concrete casks to store spent fuel. My understanding is  
3 their -- their current plans are to build 34. They -- they  
4 needed to leave themselves a little bit of flexibility  
5 earlier on in the process, and the first number, some years  
6 ago, is 36, but I believe there will be 34 double sealed  
7 sealed canisters that serve a rather unique purpose in the  
8 American nuclear industry: They are proposed to be both  
9 storage baskets and transport baskets. The only difference  
10 will be the shielding container that the basket is put into.  
11 It'll be stored in these concrete casks on site until the  
12 material is taken possession of by the U.S. Department of  
13 Energy at which time the transfer system that the company  
14 has built on site will be used to transfer the baskets in a  
15 shielded condition from the storage cask into a transport  
16 cask that will be loaded onto a rail car -- PGE being  
17 fortunate to have a rail line running through the middle of  
18 their plant site. They have easy access to rail. -- and  
19 shipped to wherever the final spent nuclear fuel disposal  
20 site will be for the country.

21           The baskets are about 15 feet tall, about five and a  
22 half feet in diameter. The outside of the basket is made of  
23 stainless steel, as I mentioned, and the internal structures  
24 inside the cylinder are made of high carbon steel, coated  
25 with a coating to prevent corrosion.

1           Each basket can store up to 24 spent fuel assemblies.  
2           That's the assemblies of 144 fuel pins each. And after the  
3           basket is loaded with the fuel assemblies, and all that  
4           loading happens in the spent fuel pool itself, by the way,  
5           so that the spent fuel can never be unshielded. It's much  
6           too radioactive to ever be in an unshielded condition. So  
7           the loading of the basket happens in the spent fuel pool. A  
8           shield lid and a structural lid are welded in place.

9           The applicant has also built a fuel transfer station  
10          and transfer cask assemblies. If they are going to  
11          decommission the spent fuel pool, which is their intention,  
12          once the independent spent fuel storage facility is  
13          finished, they will decommission the spent fuel pool. They  
14          have to have the ability in the unforeseen chance that there  
15          is a leak of one of those baskets to be able to -- or damage  
16          to one of the shield containers -- to be able to transfer  
17          that basket to an interim shield and then finally into a new  
18          shield. So that the transfer station and the transfer cask  
19          assemblies are something that the regulatory agencies have  
20          insisted beyond site if the spent fuel pool will no longer  
21          be there, because it would serve similar purposes.

22          The transfer cask and the -- and the transfer station  
23          will also be used when it comes time to ship the fuel off  
24          site, transferring these baskets into a shipping cask.

25          When the basket is removed from the transfer cask,

1 it's placed inside the dry spent fuel storage, the massive  
2 structure that I described before, the concrete cask, which  
3 is seventeen and a half feet tall and eleven feet in  
4 diameter. The cask is lined with carbon steel, and the  
5 walls are 29 inches thick to provide the massive shielding  
6 necessary to contain the spent fuel.

7           The casks will have their own temperature monitoring  
8 systems because the easiest way to determine whether or not  
9 all is well with this kind of a system is whether or not the  
10 temperature is going up. If the temperature goes up, that's  
11 some indication that the provision for natural convective  
12 cooling is somehow been interfered with, whether it's debris  
13 of some kind blowing into the vents at the bottom of the  
14 storage cask, preventing air from moving up the channels and  
15 out the top, or whatever it may be; that possibility is  
16 monitored for.

17           When loaded, these casks weight about 145 tons. They  
18 are -- there's an example of a cask over here, and you'll  
19 see on one of the examples a -- I believe the one in the  
20 middle has an air pallet on the bottom of it. An air pallet  
21 is essentially an inflatable heavy rubber circle open at the  
22 bottom; it's pressurized and then allows the cask to be  
23 repositioned floating on a cushion of air. Strap it to a --  
24 to a truck, if you will, and move it around the site  
25 wherever they need it with the pressurized air pallets

1 inflated. It really is pretty amazing to see 100 pounds per  
2 square inch move 145 tons, but it works.

3 Then the concrete casks are placed on the -- on the  
4 storage pad, 170 feet by 105 feet, for its long-term storage  
5 until the U.S. Government is prepared to take it.

6 That's pretty much my explanation and presentation on  
7 the site. And at this point, I would be happy to answer any  
8 questions the Commission would have.

9 CHAIR EDEN: Thank you. Questions or comments from  
10 the Commission? Commissioner Van Vliet.

11 COMMISSIONER VAN VLIET: In the very last statement,  
12 you said, when the U.S. Government was prepared to take it.

13 MR. STEWART-SMITH: Correct.

14 COMMISSIONER VAN VLIET: Is it -- have they had a  
15 site really ready to go to accept these now at all in the  
16 future?

17 MR. STEWART-SMITH: No.

18 COMMISSIONER VAN VLIET: They do not?

19 MR. STEWART-SMITH: No.

20 COMMISSIONER VAN VLIET: The Nevada thing still is up  
21 in the air?

22 MR. STEWART-SMITH: It is -- the -- the U.S.  
23 Department of Energy is preparing an acceptance document for  
24 the President's signature. I don't believe that it's  
25 actually been signed yet, but the U.S. Department of Energy



1 has made it clear they feel there is no fatal flaw with the  
2 site. But the U.S. Nuclear Regulatory Commission must  
3 license this site, and site licensing is -- is some years  
4 off yet. I think an optimistic estimate of when that site  
5 might be available will be sometime after 2012, 2014.

6 COMMISSIONER VAN VLIET: So to use the current Trojan  
7 site, what you have to do is develop a series of these to  
8 store for a long period of time with guarded --

9 MR. STEWART-SMITH: Right.

10 COMMISSIONER VAN VLIET: -- fence around it and  
11 security and everything?

12 MR. STEWART-SMITH: Yes. That is PGE's plan. They  
13 could have left the spent fuel in the spent fuel pool.  
14 That's a perfectly adequate long-term storage system, but  
15 because of its active components, it -- it requires  
16 additional staff. It is a more detailed and expensive site  
17 to maintain over time, and, as I mentioned the dry spent  
18 fuel storage facility is more massive and is sort of  
19 inherently passively safe.

20 COMMISSIONER VAN VLIET: The legislature in this last  
21 session did not do anything, right, on this issue?

22 MR. STEWART-SMITH: To my knowledge there were --  
23 other than -- other than the bill that was in to allow PGE  
24 to continue to recover a portion of its investment from the  
25 decommissioned plant, this session, I believe there were no

1 bills affecting storage of spent fuel on site.

2 Current state law requires that if spent fuel is  
3 stored on site, it must be stored under the auspices of both  
4 a license issued by a Nuclear Regulatory Commission and  
5 site certified issued by the Oregon Energy Facility Siting  
6 Council, (indiscernible), and we'll be maintaining those in  
7 the future.

8 COMMISSIONER VAN VLIET: And when the people of the  
9 State of Oregon voted to shut Trojan down, was there any  
10 provision in that at all as to the responsibility for the  
11 cost of the eventual decommissioning?

12 MR. STEWART-SMITH: Well, while there were three  
13 votes that I remember, the question of which was whether or  
14 not to shut down Trojan, none of them passed. And I don't  
15 believe any of them specifically dealt with the monetary  
16 issues. They were fairly simple measures that required the  
17 closure of the plant. They all were defeated by 60-40  
18 percentages or better. So I don't -- I can't quote you  
19 chapter and verse on those initiatives --

20 COMMISSIONER VAN VLIET: Okay.

21 MR. STEWART-SMITH: -- but I do not believe that  
22 there were any financial --

23 COMMISSIONER VAN VLIET: That's my memory too.

24 MR. STEWART-SMITH: -- components to those. The  
25 company may be able to answer that more competently than I

45

1 can.

2 COMMISSIONER REEVE: What -- just one. You mentioned  
3 that there's a decommissioning plan that has been approved?

4 MR. STEWART-SMITH: Correct.

5 COMMISSIONER REEVE: That -- and that was approved by  
6 EFSC?

7 MR. STEWART-SMITH: Yes.

8 COMMISSIONER REEVE: Okay. Does the NRC review that,  
9 or is that really the State?

10 MR. STEWART-SMITH: The NRC reviewed and approved  
11 that plan as well, although under current NRC rules that  
12 have been promulgated after that approval, the Nuclear  
13 Regulatory Commission has changed their policy so that they  
14 no longer require a plan for NRC approval. They have a set  
15 of conditions that must be met by a utility with a closed  
16 nuclear reactor, and they will inspect against those  
17 conditions, but they no longer, for the next plant, for  
18 example, that closes will no longer require specific  
19 approval of the decommissioning of the plant, is my  
20 understanding.

21 COMMISSIONER REEVE: Okay, now, is the plant -- is  
22 the plan tied to the site certificate somehow?

23 MR. STEWART-SMITH: Yes. The plan -- the plan  
24 recognizes the existence of both state requirements and  
25 federal requirements (indiscernible). Most of our

1 requirements for the Trojan plant are in administrative  
2 rules. The site certificate itself is a one-page document  
3 signed by Governor McCall in 1971 and had no conditions.  
4 But it did require that the company comply with all future  
5 rules of the (indiscernible).

6 COMMISSIONER REEVE: Okay. So this decommissioning  
7 plan, does it require this dry storage?

8 MR. STEWART-SMITH: The decommissioning plan, as put  
9 together by the company, said they were going to do that,  
10 and the company has held essentially to what they said they  
11 were going to do. While there is no regulatory requirement  
12 for a dry spent fuel storage facility, either at the state  
13 or the federal level, other than tying the company to the  
14 commitments they made, the Nuclear Regulatory Commission has  
15 made it very clear that their preference for a closed  
16 reactor is dry interim storage of spent fuel, rather than an  
17 active spent fuel pool storage. They have not made that a  
18 mandatory requirement but they've made it clear that that's  
19 their strong preference.

20 COMMISSIONER REEVE: Okay, but in terms of the need  
21 for the company to meet its obligations to the Office of  
22 Energy, does PGE have to move forward and construct this dry  
23 storage facility?

24 MR. STEWART-SMITH: They do today because they made  
25 the commitment to do it. And we will hold them to their

1 commitment. Save for that, the Energy Facility Siting  
2 Council has no requirement for dry spent fuel storage per  
3 se.

4 COMMISSIONER REEVE: Per se, but if they were --  
5 obviously they could come in and, with a proposal for a  
6 modification or amendment or some other type of storage,  
7 you'd have to review it --

8 MR. STEWART-SMITH: Correct.

9 COMMISSIONER REEVE: -- but as it stands today,  
10 they've committed, and it's an enforceable commitment?

11 MR. STEWART-SMITH: Correct.

12 COMMISSIONER REEVE: Okay. And the criteria under  
13 which that plan was approved, I take it they must be -- a  
14 number of criteria, a number of factors, public interest,  
15 health and safety, all those sorts of things, including  
16 water and air pollution?

17 MR. STEWART-SMITH: Correct.

18 COMMISSIONER REEVE: But not solely limited to water  
19 and air pollution?

20 MR. STEWART-SMITH: Correct. And those are contained  
21 in Condition 26 or OAR Chapter 345, rules of the Siting  
22 Council.

23 COMMISSIONER REEVE: Okay.

24 MR. STEWART-SMITH: The Siting Council promulgated  
25 criteria by which a decommissioning plan would be reviewed



1 and approved. Then the company submitted the  
2 decommissioning plan; that review was done; staff wrote a  
3 review of the plan and a recommendation to Council, and then  
4 Council did approve the decommissioning plan. By rule  
5 (indiscernible).

6 COMMISSIONER REEVE: Thanks.

7 CHAIR EDEN: Do we have any idea, or is appropriate  
8 to ask at this point, what the relative cost of the two  
9 systems is? Given -- given a finite date which I realize  
10 doesn't exist for removal -- final removal of the spent  
11 fuel?

12 MR. STEWART-SMITH: The company's decommissioning  
13 plan does keep track of both costs of decommissioning and  
14 ongoing operation and maintenance costs of both the plant  
15 and the independent spent fuel storage installation. And it  
16 -- the annual costs of maintaining the spent fuel pool are  
17 in that -- in that cost matrix is pegged, I believe, at  
18 about \$10.4 million a year. The cost of maintaining the  
19 independent spent fuel storage installation is pegged at  
20 about \$3.6 million a year. So while there's a higher  
21 initial cost, there is some point at which the costs are  
22 even and -- and/or, if stored on site long enough, the cost  
23 of storage in the spent fuel pool would have been more  
24 expensive.

25 CHAIR EDEN: And we as a State have no control move

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1 when --

2 MR. STEWART-SMITH: No.

3 CHAIR EDEN: -- the federal facility is going to be  
4 ready?

5 MR. STEWART-SMITH: We do not. PGE has estimated  
6 that the last of their spent fuel will be off site in year  
7 2018. Given U.S. Department of Energy record to meeting  
8 their deadlines, that may be optimistic in itself. It seems  
9 (indiscernible).

10 COMMISSIONER VAN VLIET: At the time that this fuel  
11 is safely stored, the value of that property now becomes  
12 both useable as real estate, and has it got any other  
13 projected uses at this current time?

14 MR. STEWART-SMITH: There are certainly possible uses  
15 for the site. It is currently a site served with a -- an  
16 active water right. It's a site with a switchyard and a 500  
17 kilovolt power line to it. It has natural gas service on  
18 Highway 30 right outside the front gate of the plant. So  
19 it's a site that is situated both geographically and  
20 electrically, being near the major load centers of the state  
21 as an advantageous site for a power plant.

22 The company has considered putting in natural gas  
23 combustion turbines on that site. They have not made the  
24 decision yet to do that, but I believe it's still an option  
25 they are holding open. It is a good site for a power plant.

1 And they certainly -- given the expected load growth over  
2 the next 20 years, in order to maintain an healthy  
3 electrical transmission system, they would be well served by  
4 having electrical resources on the west side of the Cascades  
5 rather than the most on the east side of the Cascades with a  
6 line -- long -- very long transmission lines.

7 So, it's very possible that that site could be used  
8 in the future as a power plant again. The company has also  
9 offered to the Department of -- the State Department of  
10 Parks to delegate on the order of 500 acres of the 640 or so  
11 acre site as a state park which they currently maintain much  
12 of it as a state park and wildlife refuge. But they are  
13 going to be moving most of their equipment off the site,  
14 then they'll looking for somebody else to take over that  
15 responsibility.

16 So there are possible multiple uses for the site.  
17 But for the area inside the fence, it may be in the future  
18 redeveloped into a power plant, probably fueled by natural  
19 gas.

20 COMMISSIONER VAN VLIET: That's interesting, because  
21 in the '90's -- late '80's and '90's all we heard from the  
22 legislature was the abundance of electric power in the  
23 Pacific Northwest power grid, and all of a sudden now we're  
24 hearing that there's a substantial shortage, which means the  
25 advocates who were trying to shut down all the nuclear

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1 plants in the world at the same time you're trying to get  
2 rid of dams and the hydroelectric part didn't quite have the  
3 scenario right as to what our needs were actually going to  
4 be as the population increased.

5 So now we're faced with the fact that we not only  
6 have to store this material, we no longer have the nuclear  
7 plant to provide the power which doesn't give us an option  
8 to do anything away with dams, but we'll have to bring  
9 additional power plants back on line.

10 MR. STEWART-SMITH: That is correct. There were power  
11 surpluses in the Pacific Northwest in the 1980's, but they  
12 were fairly well gone by 1992. And given the anticipated  
13 restructuring of the electric industry, new power plants  
14 will probably come on line as closely as possible to match  
15 load growth rather than building large -- very, very large,  
16 like Trojan was an 1130 megawatt electric generating station  
17 -- that's twice as big -- over twice as big as any power  
18 plant left in the state. Most of the plants that are being  
19 proposed now are either in the 260 megawatt range or the 500  
20 megawatt range. And they'll come on line, you know, in a  
21 fashion that the market dictates they can build the plant  
22 and begin with a profit and not any time before that.

23 CHAIR EDEN: Other questions or comments? Are there  
24 any questions of the company representatives?

25 COMMISSIONER McMAHAN: Madam Chair --

1 MS. VANDEHEY: Madam Chair --

2 CHAIR EDEN: Maggie has a few more comments --

3 COMMISSIONER McMAHAN: Oh, sorry.

4 MS. VANDEHEY: Madam Chair -- Madam Chair, I would  
5 like to talk about the scope of the preliminary application  
6 review. When the Department reviews applications, whether  
7 it be preliminary or final to determine if a facility meets  
8 eligibility requirements (indiscernible), first we determine  
9 the purpose of the facility. Did DEQ or EPA require this  
10 facility? Or is the facility's only purpose for pollution  
11 control? If the answer's no to both of these questions, the  
12 facility does not meet (indiscernible).

13 Secondly, we determine the purpose of the  
14 installation is to prevent, control or reduce a substantial  
15 quantity of pollution. If it does not, the facility does  
16 not meet the eligibility criteria.

17 Thirdly, we determine if the pollution control is  
18 accomplished by one of the methods used listed in the  
19 statute. If the pollution control is not accomplished by  
20 one of those methods, the facility does not meet the  
21 eligibility criteria.

22 These three steps properly describe how the staff  
23 will review PGE's preliminary application. Personally,  
24 (indiscernible) purpose (indiscernible).

25 Portland General Electric Company submitted their



1 preliminary application a few days before the rules  
2 implementing 1995's legislation became effective. The  
3 legislation states that the Commission's approval of the  
4 preliminary application's prima facie evidence that the  
5 facility meets the facility eligibility criteria. The  
6 legislation also states that preliminary certification does  
7 not ensure that the facility will be (indiscernible).

8           Can staff rely upon the statute alone when there are  
9 no (indiscernible) rules. The answer to this question is an  
10 important one, because the findings (indiscernible)  
11 preliminary application (indiscernible). If staff were to  
12 review the preliminary application based upon the statutes  
13 alone, the staff would report possible benefits  
14 (indiscernible) PGE as a result of installing  
15 (indiscernible) facility. Staff would answer questions such  
16 as is there a reduced risk of liability to (indiscernible)?  
17 Does the facility provide increased health and safety  
18 benefits? Are fees, operations and maintenance costs or  
19 insurance costs reduced? Is there a reduction in on-site  
20 staff, inspections, reporting requirements, and monitoring  
21 requirements? Does the site's unrestricted use designation  
22 provide any benefits to the applicant? And finally, are  
23 these benefits sufficient enough to become the overriding  
24 purpose of the facility?

25           If staffs prepares the review, considering the rules

1 in effect at the time that PGE submitted their application,  
2 even (indiscernible) those rules did not include a provision  
3 for preliminary application. Staff would report on  
4 financial benefits that may accrue to the applicant in the  
5 final application phase.

6 Before I continue with the preliminary application, I  
7 would like to talk a little bit about what would be  
8 happening (indiscernible) final application when the  
9 Commission grants a preliminary certification. The final  
10 application would be -- would be received under the 1998  
11 rules, the rules that came into effect just a few days  
12 before PGE filed for preliminary application. The rule  
13 states that if an applicant builds a facility as planned and  
14 approved under the preliminary certification, then the  
15 facility meets the definition of a pollution control  
16 facility --

17 COMMISSIONER McMAHAN: Say that again, please.

18 MS. VANDEHEY: If the applicant builds the facility  
19 as planned and approved under the preliminary application,  
20 then the facility meets the definition of a pollution  
21 control facility. All that remains to be -- to be performed  
22 during the final review is to verify that it was built  
23 according to plan and then to the permanent facility  
24 (indiscernible), and percentage of the cost allocable to  
25 pollution control.

1           Now, I'll continue with the preliminary application  
2 process. Staff then determines that the amount of pollution  
3 control prevented or eliminated is substantial. Does the  
4 installation that PGE claimed on their application control  
5 or prevent a substantial quantity of pollution above what  
6 (indiscernible) rule currently provides. The staff would  
7 ask these questions: Can all systems (indiscernible)  
8 determine if they meet eligible (indiscernible) criteria  
9 (indiscernible), transfer station, the concrete pads  
10 auxiliary systems.

11           If the facility passes the purpose of the of  
12 threshold eligibility criteria, the staff will then focus on  
13 how the pollution control is accomplished. PGE claims the  
14 facility as an air, water, and hazardous waste facility,  
15 (indiscernible) focus on the water quality portion  
16 (indiscernible). Any facility that qualifies as a water  
17 pollution control facility if -- if the pollution control is  
18 accomplished by the disposal or elimination of industrial  
19 waste and was accomplished by the use of (indiscernible)  
20 industrial waste. Tax credit statutes refer to water  
21 quality, control loss and (indiscernible). The terms of  
22 disposal and elimination are not defined under the water  
23 pollution control laws. Industrial waste is defined, and it  
24 includes radioactive waste. Treatment (indiscernible) is  
25 also defined. It includes facilities used to treat,

1 stabilize or hold waste.

2 In their review, staff will address questions such  
3 as: Does this interim storage constitute disposal or  
4 (indiscernible) of industrial waste? I also would ask how  
5 does PGE's facility compare to other facilities granted  
6 certification under the same eligibility criteria? It'll  
7 ask how does PGE's facility compare to other facilities  
8 (indiscernible) waste, (indiscernible) waste and dispose of  
9 that properly. Are their risks similar?

10 During the preliminary application review, staff will  
11 determine if the facility is a replacement facility.  
12 Legislative history of Senate Bill 112 shows that the  
13 purpose of a replacement facility were always to eliminate  
14 eligibility for facilities that have already received tax  
15 credits.

16 The purpose of the minimum is make sure that the tax  
17 credit (indiscernible) and was not (indiscernible). The  
18 definition of a replacement facility is not clearly defined,  
19 and it's not easy to determine whether a facility is a  
20 replacement facility. Staff researched the location of the  
21 planned facility, the source of control, the process and  
22 (indiscernible) control. These may help us determine if the  
23 planned facility (indiscernible).

24 The Commission certified seven pollution control  
25 facilities at the Trojan (indiscernible); it was certified

1 between 1983 and 1984 for over \$40 million (indiscernible)  
2 costs. None of the previously certified facilities were  
3 (indiscernible). They were associated with painting the  
4 building, cooling tower, radioactive emissions  
5 (indiscernible), and a dechlorination facility. What  
6 (indiscernible).

7 Does the facility plan to have PGE on its preliminary  
8 application and replace the pollution control facilities  
9 previously certified to a fully functioning nuclear power  
10 plant? The Oregon legislature has not placed a limit on the  
11 amount or the number of tax credits for any one applicant or  
12 any one site may receive under its program.

13 Staff will address all of these questions that I've  
14 raised today in their review report, and I'll bring that  
15 before you again in the spring. PGE representatives will be  
16 here to answer any questions at the time, and Dave and I  
17 will be glad to answer any questions you may have.

18 CHAIR EDEN: Thank you. At the risk of jumping the  
19 gun, is it going back to Dave again --

20 MS. VANDEHEY: It's going back to you.

21 CHAIR EDEN: Okay. Does the Commission have any  
22 other questions or comments of staff or the company  
23 representatives who are here?

24 COMMISSIONER VAN VLIET: I think the most interesting  
25 question about this whole thing is who has the ultimate



1 responsibility at this time for controlling the pollution  
2 that has been generated by the plant. Company decision or  
3 is does the public still have a large interest in the  
4 responsibility of it? How much of it is really entailed in  
5 trying to make the site useful again? How much of it has a  
6 bearing on future mergers? All of these have some  
7 interesting aspects that I think will be interesting to have  
8 the company people talk to us about.

9           Whether the Committee wants to entertain that today,  
10 it seems to me we have to make a decision right now  
11 apparently on the preliminary, is that right?

12           COMMISSIONER McMAHAN: No.

13           MS. VANDEHEY: No.

14           COMMISSIONER VAN VLIET: Don't have to? Okay.

15           MS. VANDEHEY: No, this is a briefing --

16           COMMISSIONER McMAHAN: This is a work session.

17           MS. VANDEHEY: -- for you and the decision on the  
18 preliminary will be in the spring, and then subsequently  
19 when the facility's completed, you would have the -- it  
20 would come to you as an action for a final approval.

21           CHAIR EDEN: I perceive this work session as an  
22 opportunity for us to be introduced to some of the issues  
23 that we're going to face in the spring. But we don't have  
24 to do anything today.

25           Any other questions?

1           COMMISSIONER REEVE: Can I ask a procedural question?  
2 Just because you went over it fairly quickly, or at least  
3 too quickly for my mind, in terms of when the application  
4 was received and when these rules became effective? Is  
5 there a question that needs to be resolved, either today or  
6 in the spring, about whether we're operating under old rules  
7 or new rules?

8           MS. VANDEHEY: We -- we will address that before we  
9 bring the fin -- the preliminary application to you. We'll  
10 address that in our report to you.

11           COMMISSIONER REEVE: Okay. Do you know -- has staff  
12 taken a position, different than the applicant as far as  
13 that goes?

14           MS. VANDEHEY: We have not. We have not taken a  
15 position until we know all the details.

16           COMMISSIONER REEVE: Okay, has the applicant sort of  
17 said we're operating under new or old or do we know?

18           MS. VANDEHEY: We know that they submitted --  
19 submitted the preliminary application under the pre-1998  
20 rules.

21           COMMISSIONER REEVE: Okay.

22           MS. VANDEHEY: They're looking at the definition of  
23 sole purpose under the rules that were at the time, even  
24 though those rules would not -- did not address preliminary,  
25 (indiscernible) certain (indiscernible).

1           COMMISSIONER REEVE:  Would that -- maybe I'm still a  
2 little slow on it --

3           MS. VANDEHEY:  Okay, they --

4           COMMISSIONER REEVE:  Would that make a difference in  
5 terms of procedurally how do we -- do we get to a  
6 preliminary first and then go to final, or are we -- is the  
7 applicant and the DEQ in agreement that this process of  
8 coming first to a preliminary --

9           MS. VANDEHEY:  We're still exploring that  
10 procedurally.

11          MR. KNUDSEN:  I think I may be able to answer some of  
12 those questions, though.  The -- the rules that became  
13 effective after the applicant filed allow for the applicant  
14 to elect to go under the new rules.  Right?

15          MS. VANDEHEY:  That's correct.

16          MR. KNUDSEN:  And they haven't done so, so that part  
17 has been answered.  But -- at least today.  But that doesn't  
18 necessarily or probably likely control the procedures that  
19 we're talking about, but it may affect some of the criteria  
20 or standards by which you evaluate the application, and  
21 that's what we're looking into.

22          COMMISSIONER REEVE:  Okay.

23          MS. VANDEHEY:  Thank you.

24          COMMISSIONER McMAHAN:  And will that include a  
25 determination as to whether there's a substantial difference

1 between the definition of sole purpose under the old rules  
2 and the new rules?

3 MR. KNUDSEN: Yes.

4 CHAIR EDEN: Anything else from the Commission?

5 Or staff?

6 I think we're finished then with the work session.

7 MS. VANDEHEY: Thank you very much.

8 CHAIR EDEN: Thank you. Appreciate you explaining  
9 that all to us. And I look forward to hearing more.

10 (Requested portion concluded)

DECLARATION OF TRANSCRIBER

I, Patricia Morgan, of Morgan Verbatim, Inc., hereby certify that:

(A) I am an Official Transcriber for State of Oregon, and an Official Transcriber for the United States Court Administrator;

(B) that I personally transcribed the electronic recording of the proceedings had at the time and place hereinbefore set forth;

(C) that the foregoing pages, consisting of pages 1 through 39, represent an accurate and complete transcription of the entire record of the proceedings, as requested, to the best of my belief and ability.

WITNESS my hand at Oregon City, Oregon this 20th day of January, 2000.

  
\_\_\_\_\_  
Patricia Morgan  
Official Transcriber



# ***Attachment C***

## ***Relevant Citations***

**Citations Relevant to Definition of a Pollution Control Facility**

**ORS 468.155**

468.155 Definitions for ORS 468.155 to 468.190.

(1)(a) As used in ORS 468.155 to 468.190, unless the context requires otherwise, "pollution control facility" or "facility" means any land, structure, building, installation, excavation, machinery, equipment or device, or any addition to, reconstruction of or improvement of, land or an existing structure, building, installation, excavation, machinery, equipment or device reasonably used, erected, constructed or installed by any person if:

**Part 1**

**Principal Purpose**

(A) The principal purpose of such use, erection, construction or installation is to comply with a requirement imposed by the department, the federal Environmental Protection Agency or regional air pollution authority to prevent, control or reduce air, water or noise pollution or solid or hazardous waste or to recycle or provide for the appropriate disposal of used oil; or

**Sole Purpose**

(B) The sole purpose of such use, erection, construction or installation is to prevent, control or reduce a substantial quantity of air, water or noise pollution or solid or hazardous waste or to recycle or provide for the appropriate disposal of used oil.

**Part 2**

**How Pollution Control Accomplished**

ORS 468.155(1)(b) Such prevention, control or reduction required by this subsection shall be accomplished by:

- (A) The disposal or elimination of or redesign to eliminate industrial waste and the use of treatment works for industrial waste as defined in ORS 468B.005;
- (B) The disposal or elimination of or redesign to eliminate air contaminants or air pollution or air contamination sources and the use of air cleaning devices as defined in ORS 468A.005;
- (C) The substantial reduction or elimination of or redesign to eliminate noise pollution or noise emission sources as defined by rule of the commission;
- (D) The use of a material recovery process which obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005, hazardous waste as defined in ORS 466.005, or used oil as defined in ORS 459A.555; or
- (E) The treatment, substantial reduction or elimination of or redesign to treat, substantially reduce or eliminate hazardous waste as defined in ORS 466.005.

**Exclusions from Definition**

ORS 468.155(2) "Pollution control facility" or "facility" does not include:

- (a) Air conditioners;
- (b) Septic tanks or other facilities for human waste;
- (c) Property installed, constructed or used for moving sewage to the collecting facilities of a public or quasi-public sewerage system;

**Insignificant Contribution**

(d) Any distinct portion of a pollution control facility that makes an insignificant contribution to the principal or sole purpose of the facility including the following specific items:

- (A) Office buildings and furnishings;
- (B) Parking lots and road improvements;
- (C) Landscaping;
- (D) External lighting;
- (E) Company or related signs; and
- (F) Automobiles;

**Replacements**

(e) Replacement or reconstruction of all or a part of any facility for which a pollution control facility certificate has previously been issued under ORS 468.170, except:

- (A) If the cost to replace or reconstruct the facility is greater than the like-for-like replacement cost of the original facility due to a requirement imposed by the department, the federal Environmental Protection Agency or a regional air pollution authority, then the facility may be eligible for tax credit certification up to an amount equal to the difference between the cost of the new facility and the like-for-like replacement cost of the original facility; or
- (B) If a facility is replaced or reconstructed before the end of its useful life then the facility may be eligible for the remainder of the tax credit certified to the original facility;

(f) Asbestos abatement; or  
(g) Property installed, constructed or used for cleanup of emergency spills or unauthorized releases, as defined by the commission.

<Formerly 449.605; 1975 c.496 s1; 1977 c.795 s1; 1979 c.802 s 1; 1983 c.637 s1; 1987 c.596 s4; 1989 c.802 s4>

## Citations Relevant to Purpose

- Sole Purpose** ORS 468.155(1)(a)(B) The sole purpose of such use, erection, construction or installation is to prevent, control, or reduce a substantial quantity of air, water or noise pollution or solid or hazardous waste or to recycle or provide for the appropriate disposal of used oil.
- OAR 340-016 0010 (9)<sup>1</sup> "Sole Purpose" means the exclusive purpose.
- 0025 (1)(b)<sup>1</sup> The sole purpose of the facility is to prevent, control or reduce a substantial quantity of air, water or noise pollution or solid or hazardous waste or to recycle or provide for the appropriate disposal of used oil. In order to meet the definition of sole purpose, the only function or use of the facility must be the control, reduction, or prevention of pollution, or, for the material recovery of solid waste, hazardous waste or used oil. Sole purpose is not applicable where the facility is established in response to the environmental requirements identified in subsection (a) of this section. Other benefits of economic value which result from the facility are not eligible for tax credit and must be eliminated through the return on investment calculation.
- Insignificant Contribution** ORS 468.155(2) (d) Any distinct portion of a pollution control facility that makes an insignificant contribution to the principal or sole purpose of the facility including the following specific items...

**ORS 468.155 (1)(b)**

**Citations Relevant to Air Pollution Control**

Such prevention, control or reduction required by this subsection shall be accomplished by:

(B) The disposal or elimination of or redesign to eliminate air contaminants or air pollution or air contamination sources and the use of air cleaning devices as defined in ORS 468A.005;

**Air Quality  
Laws**

ORS 468A.005

There is no definition for "dispose of" or "eliminate" in the air quality rules. The department interprets both words as "to get rid of."<sup>1</sup>

"Air pollution" means the presence in the outdoor atmosphere of one or more air contaminants, or any combination thereof, in sufficient quantities and of such characteristics and of a duration as are likely to be injurious to public welfare, to the health of human, plant, or animal life or to property or to interfere unreasonably with enjoyment of life and property throughout such areas of the state as shall be affected thereby.

"Air contaminant" means a dust, fume, gas, mist, odor, smoke, vapor, pollen, soot, carbon, acid or particulate matter or any combination thereof.

"Particulate Matter" means all finely divided solid or liquid material, other than uncombined water, emitted to the ambient air as measured by an applicable reference method in accordance with the Department's Source Sampling Manual, (January 1992).

"Air contamination source" means any source at, from, or by reason of which there is emitted into the atmosphere any air contaminant, regardless of who the person may be who owns or operates the building, premises or other property in, at or on which such source is located, or the facility, equipment or other property by which the emission is caused or from which the emission comes.

An "air-cleaning device" means any method, process or equipment that removes, reduces or renders less noxious air contaminants prior to their discharge in the atmosphere.

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<sup>1</sup> Webster's II New Riverside University Dictionary



**ORS 468.155 (1)(b)**  
**Citations Relevant to Water Pollution Control**

Such prevention, control or reduction required by this subsection shall be accomplished by:

(A) The disposal or elimination of or redesign to eliminate industrial waste and the use of treatment works for industrial waste as defined in ORS 468B.005;

**Water Quality** There is no definition for “dispose of” or “eliminate” in the air quality rules.  
**ORS 468B.005** The department interprets both words as “to get rid of.”<sup>2</sup>

“Water pollution” means such alteration of the physical, chemical or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof.

“Industrial waste” means any liquid, gaseous, radioactive or solid waste substance or a combination thereof resulting from any process of industry, manufacturing, trade or business, or from the development or recovery of any natural resources.

“Treatment works” means any plant or other works used for the purpose of treating, stabilizing or holding wastes.

“Wastes” means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances which will or may cause pollution or tend to cause pollution of any waters of the state.

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<sup>2</sup> *Webster’s II New Riverside University Dictionary*

**State of Oregon**  
**Department of Environmental Quality**

**Memorandum**

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**Date:** May 16, 2000  
**To:** Environmental Quality Commission  
**From:** Langdon Marsh, Director  
**Subject:** Addendum to Agenda Item C  
May 17, 2000, EQC Meeting

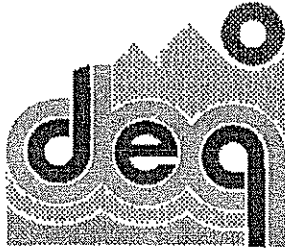
The department presents the following two corrections for the Environmental Quality Commission's consideration during the approval of the Review Reports presented in Attachment B of Agenda Item C.

Application 5262 – Oregon Steel Mills

The department subtracted \$582,577 as an unsubstantiated amount from the claimed facility cost presented on Oregon Steel Mill's application number 5262. All claimed costs have been substantiated. Therefore, the Director's Recommendation for the certified facility cost increased from \$1,806,533 to \$2,389,110 as shown on the attached Review Report.

Application Number 5311 – Neo Leasing

Denton Plastics, Inc. leases some equipment from Neo Leasing, LLC. However, the equipment represented on application number 5311 is owned by Denton Plastics. Therefore, the certificate should be issued to Denton Plastics, Inc. as corrected on the attached Review Report.



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Oregon Steel Mills, Inc.**  
Application No. **5262**  
Facility Cost **\$2,389,110**  
Percentage Allocable **100%**  
Useful Life **10 years**

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## **Pollution Control Facility: Water**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**

Business: **manufacturer of steel plates  
and coils**

Taxpayer ID: **94-0506370**

The applicant's address is:

**1000 SW Broadway, Suite 2200  
Portland, OR 97205-3003**

### ***Facility Identification***

The certificate will identify the facility as:

**Melt Shop Solid Contact Clarify  
System**

The applicant is the owner of the facility located  
at:

**14400 N. Rivergate Blvd  
Portland, OR 97203**

### ***Technical Information***

The applicant's plant on Rivergate Boulevard manufactures steel plates and coils from scrap steel. This pollution control facility is a solid contact clarify system designed to coagulate, flocculate and remove mullet, oil and grease, and colloidal materials from the mold sump wastewater effluent. The removed solids are dewatered and disposed of in a landfill. Prior to the installation of this facility the wastewater from the melt shop and the plate mill both were processed through a pressure filter plant, which was not designed to remove all the contaminants found in this combined waste water. Then the wastewater from the filter was pumped to a settling pond. With the addition of this facility for the mold shop waste, the original pressure filter system is now performing as designed.

**Eligibility**

ORS 468.155 (1)(a)(B) The **sole purpose** of this **new installation, building, device, structure, equipment and machinery** is to prevent, control or reduce a substantial quantity of water pollution.

The “exclusive” purpose of the restrooms, storage areas, locker rooms, process piping and the repair of the fire hydrant is not pollution control. They serve other puposes.

The applicant claimed the principal purpose facility was pollution control. However, DEQ or EPA did not impose the requirement to install this facility. The report prepared for the EPA did identify the mullite ponds as a solid waste management unit (SWMU 12 in the report) but concluded “the potential for release of hazardous constituents from these ponds to any of the media is low” and recommended no further corrective action required.

OAR 340-16-025(g)(B) **Replacement:** No tax credit was taken on the preexisting facility.

ORS 468.155 (1)(b)(A) The pollution control is accomplished by the disposal or elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468A.005

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>8/30/99</b>
<i>File Complete and Ready to Process</i>	<b>11/17/99</b>
<i>Construction Started</i>	<b>4/1/95</b>
<i>Construction Completed</i>	<b>12/31/97</b>
<i>Facility Placed into Operation</i>	<b>9/21/97</b>

**Facility Cost**

Claimed Cost	<b>\$2,593,735</b>
Insignificant Contribution ORS 468.155(2)(d)	
Removed by Applicant	
Restrooms, storage areas, locker room	<b>(\$143,669)</b>
Removed by Reviewer	
Process Piping, Repair Fire Hydrant	<b>(\$ 60,956)</b>
Eligible Facility Cost	<b>\$2,389,110</b>

The facility cost was greater than \$500,000. Deloitte & Touche LLP performed the accounting statement on behalf of the applicant. The reviewers analysed the facility cost based upon the invoices submitted with the application.

***Facility Cost Allocable to Pollution Control***

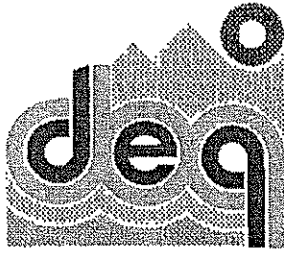
The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control. The percentage of the facility cost allocable to pollution control is **100%**.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	The applicant indicates that the new clarify system does have the capability of producing mullite cake that may be recyclable, but the applicant has not found any use or market for the material.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No alternative investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or increase in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: NPDES Permit No. 101007 File no. 64905

Reviewers: Darrel Allison, P.E. HCMA Consulting Group  
Jeff Ament, P.E. HCMA Consulting Group  
M.C. Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**  
Applicant **Denton Plastics, Inc.**  
Application No. **5311**  
Facility Cost **\$18,000**  
Percentage Allocable **100%**  
Useful Life **5 years**

## Reclaimed Plastic Products Final Certification

ORS 468.451 -- 468.491

OAR 340-017-0010 -- 340-017-0055

### *Applicant Identification*

Organized As: **a Corporation**

Business: **a recycler, reprocessor &  
manufacturer of post  
consumer & industrial plastics.**

Taxpayer ID: **93-1291873**

The applicant's address is:

**4427 NE 158<sup>th</sup>  
Portland, Oregon 97230**

### *Technical Information*

This new barrel is used in an existing plastic extrusion machine to manufacture plastic pellets from reclaimed plastic.

### *Eligibility*

ORS 468.461 (1) Any person may apply to the EQC for certification of an investment made to allow the person to collect, transport or process reclaimed plastic or to manufacture a reclaimed plastic product.

### *Facility Identification*

The certificate will identify the facility as:

**6" X 30:1 extruder barrel with x102  
inlay and threaded flange**

The applicant is the owner of the facility located at:

**4427 NE 158<sup>th</sup>  
Portland, Oregon 97230**

<i>Preliminary Application Received</i>	<b>11/02/1999</b>
<i>Preliminary approval granted</i>	<b>11/02/1999</b>
<i>Date of investment</i>	<b>12/01/1999</b>
<i>Final application received</i>	<b>03/23/2000</b>
<i>Application substantially complete</i>	<b>03/28/2000</b>



***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.461(6).

***Facility Cost***

Claimed Facility Cost	<b>\$18,000</b>
Ineligible Costs	
Eligible Facility Cost	<u><b>\$18,000</b></u>

Pursuant to OAR 340-017-0030 (1)(a), invoices substantiated the cost of the facility. The facility cost does not exceed \$50,000; therefore, an independent accounting review was not required.

***Facility Cost Allocable to Pollution Control***

Pursuant to ORS 468.486, the following factors were used to determine the percentage of the investment allocable to the collection, transportation or processing of reclaimed plastic or the manufacture of reclaimed plastic product.

<u>Factor</u>	<u>Applied to This Facility</u>
OAR 340-017-0030 (2)(a) Extent used to convert reclaimed plastic into a salable or usable commodity.	The equipment is used 100% of the time to for processing reclaimed plastic into a salable or useable commodity.
OAR 340-017-0030 (2)(b) The alternative methods, equipment and costs for achieving the same objective;	No alternative methods were considered.
OAR 340-017-0030 (2)(c) Other relevant factors used to establish portion of the cost allocable to collection, transportation or processing of reclaimed plastic or the manufacture of reclaimed plastic products.	No other factors were considered relevant.

Considering these factors, the percentage allocable to pollution control is 100%.

***Compliance***

The facility is in compliance with Department rules and statutes and with EQC orders. There are no DEQ permits issued to this facility:

Reviewers: William R Bree

## Environmental Quality Commission

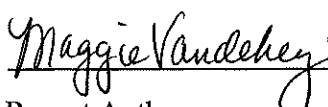
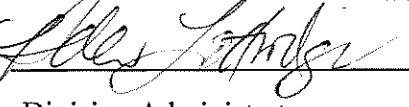

Rule Adoption Item

Action Item

Information Item

Agenda Item C

May 17, 2000 Meeting

<b>Title:</b> Tax Credit Applications		
<b>Summary:</b> Staff recommends the following actions regarding tax credits:		
	<u>Certified Cost</u>	<u>Value</u>
<b>Approvals</b>		
<i>Pollution Control Facility Tax Credit</i>		
Air (19 applications)	\$8,868,556	\$4,434,278
Solid Waste (17 applications)	\$2,627,628	\$1,313,814
USTs (5 applications)	\$405,917	\$184,016
Water (18 applications)	\$20,805,980	\$3,790,325
<i>Pollution Control Facility Tax Credit (59 applications)</i>	<b>\$32,708,081</b>	<b>\$9,722,433</b>
 <i>Pollution Prevention Tax Credit</i>		
<i>Pollution Prevention Tax Credit (1 application)</i>	\$68,800	\$34,400
 <i>Reclaimed Plastics Products Tax Credit</i>		
<i>Reclaimed Plastics Products Tax Credit (5 applications)</i>	\$147,415	\$73,708
<b>Approve (65 applications)</b>	<b>\$32,924,296</b>	<b>\$9,830,540</b>
 <b>Denials</b>		
<i>Pollution Control Facility Tax Credit</i>		
Air (1 application)	\$38,267	
Noise (1 application)	\$809,813	
Water (3 applications)	\$186,022	
<b>Denials (6 applications)</b>	<b>\$1,034,102</b>	
 <b>Rejection</b>		
Air (1 application)		
<b>Rejection (1 application)</b>	<b>\$1,010,046</b>	
 <b>Transfer</b>		
Certificate Number 2385		
 <b>Preliminary Certifications</b>		
There are no applications presented for preliminary certification in Agenda Item C.		
Approve issuance of tax credit certificates for the applications presented in Attachment B. Deny issuance of tax credit certificates for the applications presented in Attachment C. Reject issuance of a tax credit certificate for application presented in Attachment D. Transfer the certificate presented in Attachment E.		
 Report Author	 Division Administrator	 Director

May 1, 2000

†Accommodations for disabilities are available upon request by contacting the Public Affairs Office at (503) 229-5317/(503)229-6993 (TTD).

**Date:** May 1, 2000  
**To:** Environmental Quality Commission  
**From:** Langdon Marsh, Director  
**Subject:** Agenda Item B, May 17, 2000, EQC Meeting  
Tax Credit Application 5009  
Denial of Preliminary Certification

**Statement of the Need for Action**

This staff report presents the staff analysis of pollution control facility, the pollution prevention tax credit and reclaimed plastics applications and the Department's recommendation for Commission action on these applications.

- All applications are summarized in Attachment A of this staff report.
- Applications recommended for Approval are presented in detail in Attachment B.
- Applications recommended for Commission Denial are presented in Attachment C.
- Applications recommended for Commission Rejection are presented in Attachment D.
- A certificate presented for Transfer is presented in Attachment E.

According to the Commission's direction, this letter only calls out applications that may require background information not contained in the Review Reports or where staff seeks the Commission's policy direction.

**Background APPROVALS: Attachment B**

The applications presented for approval in Attachment B:

1. Meet the eligibility requirements for approval according to the pollution control facility, pollution prevention, and the reclaimed plastics tax credit programs.
2. Do not represent any preliminary applications under the pollution control facility tax credit program.
3. Are organized in application number sequence.

**Willamette Industries – Application 4989**

Willamette Industries submitted application number 4979 as a sanderdust recovery and recycling system. The facility qualifies as a material recovery facility that reduces a substantial quantity of solid waste. It qualifies because it uses waste to produce particleboard – a salable product that is competitive with other states.

Calculation of the return on investment was used as the method for determining the portion of the facility properly allocable to pollution control, in this case recycling. (Average annual cash flow is a

component of the return on investment calculation.) In determining the average annual cash flow of the claimed facility,

- The applicant limited their consideration of income to the material recovery components, not the entire particleboard production process. Willamette included the fair market value of the sanderdust generated at Duraflake (\$1,500,419) by multiplying the quantity by the price paid for similar material purchased through their Eugene MDF plant. The Department agrees with the method for determining the fair market value and limiting income to just the material recovery activities.
- The applicant included the cost of additional resins (\$1,320,831) used to bind the sanderdust in the expenditures. The Department agrees that the increase in resins is necessary to bind the sanderdust in order to produce particleboard.

For tax credits other than material recovery, raw materials are not allowed as a valid operating expense in the average annual cash flow of the pollution control. However, staff could not find where crucial raw materials had previously been considered as an operating expense on a material recovery application. For this facility, staff recommends that the resin be considered a valid operating expense and crucial to the material recovery process; the effect being 100% of the facility cost allocable to pollution control. However, the resin could be considered part of the production process and the resulting percentage of facility cost allocable to pollution control would become 0% under the following circumstances:

- Not allowing the cost of the resins to be included as a valid operating expense in the average annual cash flow of the pollution control; or
- Including all revenues associated with the production of particleboard in the return on investment consideration.

The Department recommends the inclusion of the resin costs and the exclusion of the revenues from particleboard sales because, as a material recovery facility, the applicant is required to produce a salable product and the additional resin is crucial in the recovery of this waste stream.

### **Policy Implications**

Approval of this application will set precedence for including crucial raw materials as a valid expenditure in the return on investment calculations for material recovery facilities.

### **Mitsubishi Silicon America**

#### **Applications Numbered 5049, 5100, 5101, 5102, 5103, 5104, and 5105**

The Department included the Mitsubishi Silicon America applications in the February 10, 2000 EQC Staff Report. Due to confusion regarding the date that construction was completed, both parties mutually agreed to remove the applications from that agenda.

Brian Krytenburg, Environmental Engineer for Mitsubishi Silicon America provided the following explanation regarding the applicant's methods for determining the construction completion dates and the placed-in-service dates.

....”Whenever the majority of the project was completed, i.e., the scrubber was placed, electricity provided and chemical/drain lines functional, this was then considered the completed date. After the equipment was in place and utilities were provided, the equipment was then tested, calibrated and adjusted for the process conditions that would be experienced (design criteria). Sometimes the completed date and the placed into operation date were the same; however, the placed into operation date usually followed, by a month or more, depending on the quality, quantity and complexity of incoming waste streams. MSA (in agreement with their pollution control tax credit filer, Symonds, Evans and Larson) also viewed the date of significant completion as the date when product was first produced by a particular process that was dependent upon the operation of the applicants pollution control facility. This latter date, placed into operation, was consistently used for all of MSA's pollution control tax credit applications as the date for tolling of the two-year window requirement. We viewed the placed into operation date as synonymous with the date of substantial completion.”

Substantial Completion, as defined in OAR 340-016-0010 (11), means the completion of the erection, installation, modification, or construction of all elements of the claimed facility, which are essential to perform its purpose. Substantial completion is used in ORS 468.165 (6) to determine if an application has been filed in a timely manner.

ORS 468.165 (6) The application shall be submitted after construction of the facility is substantially completed and the facility is placed in service and within two years after construction of the facility is substantially completed. Failure to file a timely application shall make the facility ineligible for tax credit certification.

Unfortunately, the statutory definition of “substantial completion” is almost identical to the Internal Revenue Service's definition of “placed in service.” Placed in service is not defined in ORS 468.165 but it is a commonly understood accounting term for when an applicant may begin depreciating an asset. When accounting firms or accountants complete the application they understand the two terms to have the same meaning.

The Department's application guidance at the time these applications were submitted states that “[f]or some companies the date of substantial completion may be the date that operations began or it may simply be the date of purchase. For others it may be the date the asset was placed on the books or began depreciation.” Thought the guidance has a disclaimer that it expresses an interpretation of the rules and statutes, the Department considered the applicant had reason to believe they were filing their application in a timely manner. To assure the Commission that this confusion does not continue, the Department has changed the guidance materials. The Department will seek to publish a short description of the pollution control facility tax credit filing deadline in the AOI Newsletter.

The Department recommends approving the Mitsubishi Silicon America applications because the applicant reasonably believed they were filing their application in a timely manner.

**Reduced Facility Cost and Percentage Allocable to Pollution Control**

ORS 468.155(3) specifically excludes certain equipment or portions of a claimed facility from eligibility as a pollution control facility. ORS 468.155(3)(d) excludes any distinct portion that makes an insignificant contribution to the principal or sole purpose of the facility. Additionally, 468.170 (1) directs the Environmental Quality Commission (EQC) to certify the actual cost of the facility and the portion of the actual cost properly allocable to pollution control. 468.190 directs the EQC to consider certain factors in establishing the percentage of the facility cost that is properly allocable to pollution control

The Department recommends that the following applications be certified for a facility cost or a percentage allocable that is less than what the applicant claimed on their application.



**Recommended Cost and Allocation Less Than Application**

<b>App. No.</b>	<b>Applicant</b>	<b>Claimed Cost</b>	<b>Recommended Cost</b>	<b>Percent Allocable</b>
4979	Willamette Industries, Inc.	\$ 982,203	\$ 615,050	100%
4989	Willamette Industries, Inc.	\$ 1,798,421	\$ 1,678,150	100%
5140	Wacker Siltronic Corporation	\$ 18,554,507	\$ 12,543,553	0%
5158	Balzer Pacific Equipment Co.	\$ 96,409	\$ 93,023	100%
5159	Deschutes Brewery	\$ 752,843	\$ 681,777	0%
5161	AGPR, Inc.	\$ 648,866	\$ 275,003	100%
5210	Barenburg USA, Inc.	\$ 164,930	\$ 93,376	100%
5236	Smurfit Newsprint Corp.	\$ 318,325	\$ 24,184	100%
5242	Carson Oil Company	\$ 151,615	\$ 138,278	100%
5262	Oregon Steel Mills, Inc.	\$ 2,593,735	\$ 1,806,533	100%
5270	Portland General Electric Company	\$ 232,396	\$ 146,409	100%
5280	Forrest Products Company	\$ 25,060	\$ 19,604	100%
5289	Portland General Electric Company	\$ 228,764	\$ 220,632	
5302	Willamette Industries, Inc.	\$ 168,258	\$ 116,162	100%
5304	Hewlett-Packard Company	\$ 4,806,238	\$ 4,476,238	100%
5326	Eagle Foundry Company	\$ 243,273	\$ 232,902	100%
5327	Smith Seed Services	\$ 142,320	\$ 133,047	100%
5348	WSCO Petroleum Corp.	\$ 138,453	\$ 138,618	88%
5362	Environmental Waste Systems, Inc.	\$ 36,350	\$ 32,350	100%
5367	PMD Fuel, LLC	\$ 129,824	\$ 129,128	91%
5368	Pacific Sanitation, Inc.	\$ 29,853	\$ 29,772	100%
5374	Blue Dog Farms	\$ 97,015	\$ 96,297	90%
5378	Willamette Egg Farms LLC	\$ 207,075	\$ 189,732	100%
5380	PED Manufacturing, Ltd.	\$ 28,512	\$ 27,272	100%

**Background COMMISSION DENIALS – Attachment C**

The applications presented for approval in Attachment C:

1. Meet the eligibility requirements for approval according to the pollution control facility, pollution prevention, and the reclaimed plastics tax credit programs.
2. Do not represent any preliminary applications under the pollution control facility tax credit program.
3. Are organized in application number sequence.

**Background COMMISSION REJECTIONS – Attachment D**

The applications presented for rejection in Attachment C:

1. Do not meet the timing requirements in the pollution control facility tax credit statute.
2. Do not represent any preliminary approvals for the pollution control facility tax credit program.
3. Are organized in application number sequence.

Staff recommends the rejection of an application presented for certification if the Oregon taxpayer fails to file a final Pollution Control Facility Tax Credit Application within two years after construction of the facility is substantially completed.

Staff's recommendation to reject these applications is based on ORS 468.165(6).

**ORS 468.165 (6)**

The application shall be submitted after construction of the facility is substantially completed and the facility is placed in service and within two years after construction of the facility is substantially completed. Failure to file a timely application shall make the facility ineligible for tax credit certification.

**Submitted** means the date that the application is received at the Department of Environmental Quality. The DEQ Business Office date-stamps the application upon receipt.

**Substantial Completion**, as defined in OAR 340-016-0010 (11), means the completion of the erection, installation, modification, or construction of all elements of the claimed facility, which are essential to perform its purpose.

Facility The term "facility" as it is used in the pollution control facility tax credit statutes does not refer to the plant site, the entire construction project or the business endeavor. It refers to the eligible pollution control components as defined in ORS 468.155, shown below in abbreviated form.

**ORS 468.155 (1)(a)**

As used in ORS 468.155 to 468.190, unless the context requires otherwise, "pollution control facility" or "facility" means any land, structure, building, installation, excavation, machinery, equipment or device, ... reasonably used, erected, constructed or installed by any person ...

Purpose The term "purpose" means either the principal or sole purpose of the facility not how the pollution control is accomplished. The eligible purposes are:

Principal purpose means the applicant is required to comply with a requirement imposed by the Department of Environmental Quality, the federal Environmental Protection Agency or regional air pollution authority. It means they are required to "prevent, control or reduce air, water or noise pollution or solid or hazardous waste or to recycle or provide for the appropriate disposal of used oil..."

Sole purpose means that the exclusive purpose of facility is "to prevent, control or reduce a substantial quantity of air, water or noise pollution or solid or hazardous waste or to recycle or provide for the appropriate disposal of used oil."

In addition to defining a "facility, the statute defines what is not a facility.

ORS 468.155 (2)

"Pollution control facility" or "facility" does not include:...(d) Any distinct portion of a pollution control facility that makes an insignificant contribution to the ... sole purpose of the facility.

#### **Background TRANSFERS – Attachment E**

When the Commission's approval of a certificate transfer includes the revocation of the original certificate as of the date the facility was sold or exchanged. The approval also includes the reissue of the certificate to the new certificate holder. The actual remaining certificate value is subject to the verification by the Department of Revenue and they are not allowed to share that information. Therefore, the certificate is reissued showing all original conditions of issue with the addition of the reissue information. It is also reissued under the same certificate number as a Transfer for ease of tracking by the Department of Revenue.

ORS 315.304(8) Upon any sale, exchange or other disposition of a facility, notice thereof shall be given to the Environmental Quality Commission who shall revoke the certification covering such facility as of the date of such disposition.

Notwithstanding ORS 468.170 (4)(c), the transferee may apply for a new certificate under ORS 468.170, but the tax credit available to such transferee shall be limited to the amount of credit not claimed by the transferor. The sale, exchange or other disposition of shares in an S corporation as defined in section 1361 of the Internal Revenue Code or of a partner's interest in a partnership shall not be deemed a sale, exchange or other disposition of a facility for purposes of this subsection.

On March 23, 2000, Weyerhaeuser requested the transfer of Certificate Number 2385 issued on March 11, 1991, from Weyerhaeuser to Sierra Pine as presented in Attachment E of the Department's Staff Report, in this case, May 27, 1999. This is pursuant to ORS 315.304 as administered by the Department of Revenue.

**Conclusions**

The recommendations for action on the attached applications are consistent with statutory provisions and administrative rules related to the pollution control facility, pollution prevention and reclaimed plastic product tax credit programs.

**Recommendation for Commission Action**

The Department recommends the Commission approve certification for the tax credit applications as presented in Attachment B of the Department's Staff Report.

The Department recommends the Commission deny certification for the tax credit applications as presented in Attachment C of the Department's Staff Report.

The Department recommends the Commission reject certification for the tax credit applications as presented in Attachment D of the Department's Staff Report.

The Department recommends the Commission transfer Certificate Number 2385 issued on March 11, 1991, from Weyerhaeuser to Sierra Pine as presented in Attachment E of the Department's Staff Report.

**Intended Follow-up Actions**

Staff will notify applicants of the Environmental Quality Commission's action. The Department will provide applicants with approved applications with a facility cost reduced from the amount claimed on the application by Certified Mail. The Department will notify applicants with denied or rejected applications or applications with a facility cost reduced from the amount claimed on the application by Certified Mail. Staff will notify Department of Revenue of any Issued, Transferred or Revoked certificates the following January.

**Attachments**

- A Summary
- B Approvals
- C Denials
- D Rejections
- E Transfers

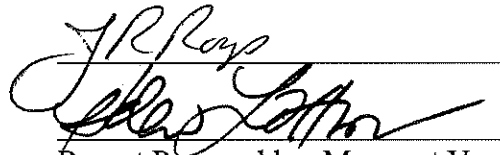
**Reference Documents (available upon request)**

1. ORS 468.150 through 468.190.
2. OAR 340-016-0005 through 340-016-0050.
3. ORS 468A.095 through 468A.098.
4. OAR 340-016-0100 through 340-016-0125.
5. ORS 468.451 through OAR 468.491.
6. OAR 340-017-0010 through 340-017-0055.

Approved:

Section:

Division:



A handwritten signature in cursive, appearing to read "J.R. Roy", is written over a horizontal line. Below this line, another horizontal line is present, with a second handwritten signature in cursive, possibly reading "Margaret Vandehey", written over it.

Report Prepared by: Margaret Vandehey

Phone: (503) 229-6878

Date Prepared: May 1, 1999

# ***Attachment A***

## ***Summary***



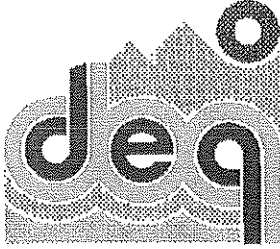
## Application Summary

App.No.	Action	Media	Applicant	Certified Cost	Percent Allocable	Value
5311	Approve	Plastics	Neo Leasing, LLC	\$ 18,000	100%	\$ 9,000
5321	Approve	Plastics	Neo Leasing, LLC	\$ 4,995	100%	\$ 2,498
4867	Approve	Water	PGE	\$ 37,382	100%	\$ 18,691
4979	Approve	Air	Willamette Industries, Inc.	\$ 615,050	100%	\$ 307,525
4989	Approve	SW	Willamette Industries, Inc.	\$ 1,678,150	100%	\$ 839,075
5049	Approve	Air	Mitsubishi Silicon America	\$ 278,399	100%	\$ 139,200
5100	Approve	Water	Mitsubishi Silicon America	\$ 1,599,606	100%	\$ 799,803
5101	Approve	Air	Mitsubishi Silicon America	\$ 37,358	100%	\$ 18,679
5102	Approve	Air	Mitsubishi Silicon America	\$ 95,170	100%	\$ 47,585
5103	Approve	Air	Mitsubishi Silicon America	\$ 145,824	100%	\$ 72,912
5104	Approve	Air	Mitsubishi Silicon America	\$ 146,236	100%	\$ 73,118
5105	Approve	Air	Mitsubishi Silicon America	\$ 128,179	100%	\$ 64,090
5140	Approve	Water	Wacher Siltronic Corporation	\$ 12,543,553	0%	\$ -
5141	Approve	Air	Wacker Siltronic Corp.	\$ 1,859,515	100%	\$ 929,758
5158	Approve	Water	Balzer Pacific Equipment Co.	\$ 93,023	100%	\$ 46,512
5159	Approve	Water	Deschutes Brewery	\$ 681,777	0%	\$ -
5161	Approve	Air	AGPR, Inc.	\$ 275,003	100%	\$ 137,502
5210	Approve	Air	Barenburg USA, Inc.	\$ 93,376	100%	\$ 46,688
5223	Approve	Water	Cascade General, Inc.	\$ 1,996,920	100%	\$ 998,460
5236	Approve	Air	Smurfit Newsprint Corp.	\$ 24,184	100%	\$ 12,092
5242	Approve	Water	Carson Oil Company	\$ 139,278	100%	\$ 69,639
5262	Approve	Water	Oregon Steel Mills, Inc.	\$ 1,806,533	100%	\$ 903,267
5270	Approve	Water	PGE	\$ 146,409	100%	\$ 73,205
5278	Approve	Water	PGE	\$ 14,099	100%	\$ 7,050
5280	Approve	Air	Forrest Products Company	\$ 19,604	100%	\$ 9,802
5284	Approve	Plastics	Denton Plastics	\$ 22,619	100%	\$ 11,310
5285	Approve	Water	Elf Atochem North America	\$ 948,062	100%	\$ 474,031
5289	Approve	Water	Portland General Electric	\$ 220,632	100%	\$ 110,316
5298	Approve	Water	Willamette Industries, Inc.	\$ 29,166	100%	\$ 14,583
5301	Approve	Water	Willamette Industries, Inc.	\$ 169,065	100%	\$ 84,533
5302	Approve	Air	Willamette Industries, Inc.	\$ 116,162	100%	\$ 58,081
5303	Approve	Air	The Ridge Company	\$ 107,099	100%	\$ 53,550
5304	Approve	Air	Hewlett-Packard Company	\$ 4,476,238	100%	\$ 2,238,119
5326	Approve	Air	Eagle Foundry Company	\$ 232,902	100%	\$ 116,451
5327	Approve	Air	Smith Seed Services	\$ 133,047	100%	\$ 66,524
5335	Approve	Water	PGE	\$ 31,323	100%	\$ 15,662
5336	Approve	Water	PGE	\$ 49,090	100%	\$ 24,545
5348	Approve	USTs	WSCO Petroleum Corp.	\$ 138,618	88%	\$ 60,992
5350	Approve	USTs	Deschutes Valley Equipment	\$ 11,834	100%	\$ 5,917
5355	Approve	SW	Dunn & Leblanc, Inc.	\$ 6,750	100%	\$ 3,375
5356	Approve	USTs	Roland J. Schmidt	\$ 30,040	100%	\$ 15,020
5360	Approve	SW	Capitol Recycling & Disposal	\$ 156,043	100%	\$ 78,021
5362	Approve	SW	Environmental Waste Systems	\$ 32,350	100%	\$ 16,175
5364	Approve	SW	Environmental Waste Systems	\$ 23,000	100%	\$ 11,500
5366	Approve	Perc	Philip B. Park	\$ 68,800	100%	\$ 34,400

## Application Summary

App.No.	Action	Media	Applicant	Certified Cost	Percent Allocable	Value
5367	Approve	USTs	PMD Fuel, LLC	\$ 129,128	91%	\$ 58,753
5368	Approve	SW	Pacific Sanitation, Inc.	\$ 29,772	100%	\$ 14,886
5369	Approve	Air	Tokai Carbon USA, Inc.	\$ 57,938	100%	\$ 28,969
5370	Approve	SW	United Disposal Service, Inc.	\$ 4,250	100%	\$ 2,125
5371	Approve	SW	United Disposal Service, Inc.	\$ 4,570	100%	\$ 2,285
5372	Approve	SW	Albany-Lebanon Sanitation	\$ 10,242	100%	\$ 5,121
5374	Approve	USTs	Blue Dog Farms	\$ 96,297	90%	\$ 43,334
5375	Approve	Water	Bruce Pac	\$ 111,329	100%	\$ 55,665
5376	Approve	SW	United Disposal Service, Inc.	\$ 46,603	100%	\$ 23,301
5377	Approve	SW	United Disposal Service, Inc.	\$ 18,220	100%	\$ 9,110
5378	Approve	Water	Willamette Egg Farms LLC	\$ 189,732	100%	\$ 94,866
5380	Approve	Air	PED Manufacturing, Ltd.	\$ 27,272	100%	\$ 13,636
5381	Approve	SW	KE Enterprises, Inc.	\$ 286,543	100%	\$ 143,272
5382	Approve	SW	KE Enterprises, Inc.	\$ 211,440	100%	\$ 105,720
5383	Approve	SW	KE Enterprises, Inc.	\$ 35,000	100%	\$ 17,500
5385	Approve	SW	Pacific Sanitation Inc.	\$ 33,244	100%	\$ 16,622
5396	Approve	Plastics	Denton Plastic, Inc.	\$ 14,050	100%	\$ 7,025
5398	Approve	Plastics	Neo Leasing, LLC	\$ 87,751	100%	\$ 43,876
5403	Approve	SW	Environmental Waste Systems	\$ 5,947	100%	\$ 2,973
5404	Approve	SW	Environmental Waste System	\$ 45,504	100%	\$ 22,752
5167	Deny	Air	Willamette Industries, Inc.	\$ 38,267	100%	\$ 19,133
5232	Deny	Noise	Fujitsu Microelectronics Inc.	\$ 809,813	100%	\$ 404,907
5276	Deny	Water	Teledyne Industries, Inc.	\$ 132,705	100%	\$ 66,353
5286	Deny	Water	Teledyne Industries, Inc.	\$ 22,500	100%	\$ 11,250
5299	Deny	Water	Willamette Industries, Inc.	\$ 30,817	100%	\$ 15,409

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# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Portland General Electric**  
Application No. **4867**  
Facility Cost **\$37,382.00**  
Percentage Allocable **100%**  
Useful Life **10 years**

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## **Pollution Control Facility: Water**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **C Corporation**

Business: **Supplier of Electrical Energy**

Taxpayer ID: **93-0256820**

The applicant's address is:

**121 SW Salmon Street  
Portland, OR 97204**

### ***Facility Identification***

The certificate will identify the facility as:

**Used Oil and Wastewater Recovery  
System**

The applicant is the owner of the facility located  
at:

**3700 SE 17<sup>th</sup> Ave  
Portland, OR**

### ***Technical Information***

The facility collects used oil and wastewater from a truck staging and maintenance area lubrication pit. Prior to installation of the facility, spilled oil and wastewater from the lubrication pit flowed to a containment sump, then when necessary both the oil and wastewater were pumped into a containment barrel. The sump had a valve-controlled drain connected to the storm water system that could inadvertently be opened, causing the oil and wastewater to be released into the storm water system. The facility installation permanently blocked the sump drain, preventing an accidental release into the storm water system, and provided separate oil and wastewater recovery systems. For the oil recovery system, a rolling catch pan collects oil from the sump and pumps the oil to a concrete encased holding tank, which has a high level alarm and automatic off switch connected to the oil recovery system pump to prevent overflow. The wastewater recovery system automatically pumps wastewater from the sump to barrels located in an approved secondary containment enclosure. A sump float valve automatically starts the pump when the sump reaches the decided level, and each of the barrels has a high level alarm and automatic off switch connected to the sump pump to prevent overflow.

**Eligibility**

- ORS 468.155 (1)(a)(A) The **principal purpose** of this **construction or installation** is to comply with a requirement imposed by the federal Environmental Protection Agency to **control** water pollution and to provide for the appropriate disposal of used oil.
- ORS 468.155 (1)(b)(A) The reduction is accomplished by the **use of treatment works** for industrial waste as defined in ORS 468B.005.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>11/6/97</u>
<i>Construction Started</i>	<u>8/15/95</u>
<i>Construction Completed</i>	<u>12/10/95</u>
<i>Facility Placed into Operation</i>	<u>12/10/95</u>

**Facility Cost**

Eligible Facility Cost

\$37,382.00

\$37,382.00

The facility cost does not exceed \$50,000. However, Coopers & Lybrand LLP provided an independent auditor's report on behalf of the applicant. The reviewers analyzed the facility cost information.

**Facility Cost Allocable to Pollution Control**

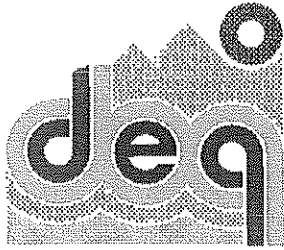
The facility cost does not exceed \$50,000. According to ORS 468.190 (1) and (3), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 36 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	Two alternatives were rejected due to higher costs and operational maintenance.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or increase in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.
ORS 468.190(3) Facility Use	The facility is used for the prevention or control or water pollution and for the appropriate disposal of used oil 100% of the time the facility is in use.

**Compliance and Other Tax Credits**

The applicant claims the facility is in compliance with Department rules and statutes.

Reviewers: Mika Kaplan, Envirometrics, Inc.  
 Michael G. Ruby, Ph.D., P.E., Envirometrics, Inc.  
 Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Willamette Industries, Inc.**  
Application No. **4979**  
Facility Cost **\$615,050**  
Percentage Allocable **100%**  
Useful Life **7 years**

## Pollution Control Facility: Air

### Final Certification

ORS 468.150 – 468.190

OAR 340-016-0005 – 340-016-0050

### *Applicant Identification*

The applicant is a C corporation operating as a **particleboard manufacturer**. Their taxpayer identification number is 93-0312940. The applicant's address is:

**KorPine Division**  
**1300 SW Fifth Avenue, Suite 3800**  
**Portland, OR 97201**

### *Facility Identification*

The applicant claimed the following facility:

**A Wellons Electrostatic Precipitator  
(ESP)**

The applicant is the owner of the facility located at:

**55 SW Division**  
**Bend, OR 97702**

### *Technical Information*

The claimed facility consists installation made in Phase I and Phase II:

**Phase I:** The applicant claimed the following components from September of 1995:

- Installation of computerized combustion controls on boilers #1 and #2 to minimize emissions by improving combustion efficiency. Boiler #1 is fired with either sanderdust or natural gas, boiler #2 with sanderdust with a natrual gas pilot light.
- Installation of ductwork rerouting boiler #1 exhaust to finish dryer #4 and boiler #2 exhaust to finish dryers # 1 & #2, routing emissions through the dryers to the dryer scrubbers,
- Overhaul of the star feeder on boiler #1 to improve collection efficiency of the multiclone.

This installation failed to meet the emission requirements in all operating conditions of applicant's air permit. The maximum emission limit allowed in the air permit for boiler #1 was 0.20 gr/dscf and for boiler #2 was 0.10 gr/dscf.

**Phase II:** In September of 1996, the applicant completed installation of the Wellons Model #7 electrostatic precipitator (ESP) to control particulate emissions from both boilers when fired on sanderdust. The applicant claimed the Modification of the boiler exhaust ductwork and installation of a new Wellon's #7 dry ESP to control emissions from boiler #1 and boiler #2. The applicant states that emission levels are now less than 0.075 gr/dscf under all firing conditions.

The dry type Wellon ESP has a design inlet gas flow rate of 60,000 acf/min and a rated efficiency of 65%. Exhaust from each boiler is routed through a multiclone to the inlet of the Wellons ESP. Hot exhaust from the ESP is used in cold weather to heat one or more of the final dryers and otherwise is discharged into the atmosphere.

ESPs are considered best available control technology for controlling particulate emissions and opacity.

### ***Eligibility***

#### **Phase I**

ORS 468.155 (1)(a)(A) The **principal purpose** of this **new equipment and installation** is not to control and reduce a substantial quantity of air pollution because it is not required by the Department or the federal Environmental Protection agency

ORS 468.155 (1)(a)(B) The **sole purpose** of this **new equipment** is **not** to prevent, control, or reduce a substantial quantity of air pollution. The combustion control system's function is to adjust the air to fuel ratio to improve combustion efficiency thereby reducing fuel usage. The boiler exhaust ducting and insulation was installed to reduce energy consumption.

#### **Phase II**

ORS 468.155 (1)(a)(A) The **principal purpose** of the **new ESP and installation** is to control and reduce a substantial quantity of air pollution. DEQ imposes the requirement under ACDP #09-0002 issued 10/4/95 and Mutual Agreement Order #AOP-ER-96-017 dated 4/26/96.

Ducting, ancillary equipment and electrical equipment claimed in Phase II were installed for reasons other than to control or reduce air pollution. The primary purposes or the exclusive purposes of these components are not pollution control. (See the Facility Cost section for further discussion.)

ORS 468.155 (1)(b)(B) The ESPs are an air cleaning device, which **controls** air pollution by **disposing** of the **air contaminants**.



**Timeliness of Application**

Application for Phase I was not submitted within the timing requirements of ORS 468.165 (6). The law states that the application must be submitted within two years after construction is substantially complete. Phase II of the claimed facility meets the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	4/2/98
<i>Additional Information Requested</i>	6/3/98
<i>Additional Information Received</i>	10/13/98
<i>Application Substantially Complete</i>	7/29/99
<b>Phase I</b> <i>Construction Started</i>	5/1/95
	<i>Construction Completed</i>
	9/1/95
	<i>Placed into Operation</i>
	9/1/95
<b>Phase II</b> <i>Construction Started</i>	2/12/96
	<i>Construction Completed</i>
	9/15/96
	<i>Placed into Operation</i>
	9/16/96

**Facility Cost**

**Claimed      Non-      Allowable**  
**Allowable**

**Phase I**

**Computer Combustion controls**

Installed to optimize combustion efficiency and reduce fuel consumption – not pollution control.

**Air piping and installation**

Western Pneumatics (6/5/95) Fabrication and Installation of the Boiler Exhaust – no reduction in pollution.

Western Pneumatics (9/25/95) Fabrication and Installation of a 36" damper – no reduction in pollution.

Western Pneumatics (7/28/95) Fabrication of Pipe Fittings

E.J. Bartells Co (7/19/95) Insulate hot flue gas duct and steam & condensate piping- no reduction in pollution.

\$ 36,643		
	\$ 36,643	\$ 0
\$ 128,444		
	\$ 62,998	
	3,785	
	3,061	
	58,600	\$ 0

**Phase II**

**Excavation/concrete**

Doug Thompson, General Contractor (6/19/96)  
Extra concrete for slab edge and labor  
Unsubstantiated amount:

**Engineering/environmental testing**

Unsubstantiated amount:

**ESP equipment and installation**

Wellons (2/23/96) Equipment & Services for installation of ESP

**Ancillary equipment and installation**

Ancillary equipment included installing the exhaust ductwork from the boiler to the ESP and hooking up the ESP to the boiler.  
Pacific Power (9/27/96) Relocation of overhead power lines is ineligible because it provides no pollution control.  
Unsubstantiated amount:

**Air piping and installation**

Air systems included exhausting the two boilers to the ESP and exhausting the ESP to the dryers. Western Pneumatics 6/24/96 Invoice. Fab & Install Conveyor Negative Air Piping, Expansion Joints, and ESP Piping  
Unsubstantiated amount:

**Electric supply equipment and installation**

ESCO Electric Supplies (6/25/96).  
Eoff Electric Co (9/6/96) Gardner Bender B2000 Cycone Bender  
Unsubstantiated amount:

**Miscellaneous Supplies - Various**

Unsubstantiated amount:

	Claimed	Non- Allowable	Allowable
	\$ 15,265		6,836
		8,429	
	17,026	17,026	0
	595,000	0	595,000
	52,156		
		20,291	
		31,865	0
	89,118		
		62,569	
		26,549	0
	44,910		13,213
		5,152	
		26,544	
	3,641		
		3,641	0
<b>Totals</b>	<b>\$ 982,203</b>	<b>\$ 367,153</b>	<b>\$ 615,050</b>

A certified public accountant's statement was not provided because the claimed costs exceed \$500,000. The reviewers performed the accounting review on behalf of the Department.

***Facility Cost Allocable to Pollution Control***

Since the facility cost exceeds \$50,000, according to ORS.190 (1) the following factors were used to determine the percentage of the facility cost allocable to pollution control.

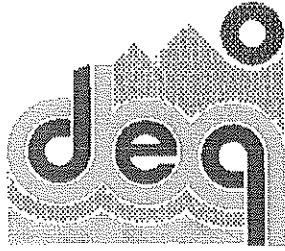
<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 7 years. No gross annual revenues associated with this facility.
ORS 468.190(1)(c) Alternative Methods	Previous short-term strategies were attempted but failed. Other ESPs were evaluated, but the Wellons was selected for its capacity to control both boilers and maintain lower emission levels on a long-term basis.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or increase in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

***Compliance***

The applicant states that the facility is in compliance with Department rules and statutes and with EQC orders. The following DEQ permits have been issued to the Korpine Division plant:

- ACDP 09-0002, issued 10/4/95
- Storm water 1200-Z, issued 11/17/97

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers, Inc.  
Dennis E. Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EOC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Willamette Industries, Inc.**  
Application No. **4989**  
Facility Cost **\$1,678,150**  
Percentage Allocable **100%**  
Useful Life **7 years**

## **Pollution Control Facility: Solid Waste Final Certification**

ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

The applicant is a C corporation operating as a paper mill. The applicant's taxpayer identification number is 93-0312940 and their address is:

**1300 SW Fifth Avenue  
Suite 3800  
Portland, OR 97201**

### ***Facility Identification***

The applicant claimed the following facility:

**A sander dust recovery and recycle system, consisting of 3 Laidig Industrial System Silo Unloaders, model S243.**

The applicant is the owner of the facility located at:

**2550 Old Salem Road, NE  
Albany, OR 97321**

### ***Technical Information***

The new facility is used to store sander dust separate from other production waste and to deliver sander dust to a particleboard manufacturing process. The sander dust was previously being sent to the green dryer burner unit, burned in a boiler or taken to a landfill. The facility does not include any equipment used to remove sander dust from the production process but does include the following equipment:

- three sander dust silos
- a large bag house to vent the silos
- the conversion of existing storage bunkers
- a pneumatic conveying systems to transport sander dust from the silos to the production line;
- a handling systems on each production line to deliver and meter the sander dust into the new particleboard;
- A blending system, with two blenders to resinate the sander dust used in the core; and, two blenders.

**Eligibility**

ORS 468.155 (1)(a) The **sole purpose** of this **new equipment** is to prevent, control or reduce a substantial quantity of solid waste. The facility consists of new equipment designed and exclusively used to handle sanderdust, a material which was previously solid waste.

ORS 468.155 (1)(b)(D) The use of a material recovery process which obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005. The recovered material is used to manufacture a new product, particle board.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>4/3/98</b>
<i>Application Substantially Complete</i>	<b>4/21/98</b>
<i>Construction Started</i>	<b>6/1/96</b>
<i>Construction Completed</i>	<b>1/31/97</b>
<i>Facility Placed into Operation</i>	<b>1/31/97</b>

**Facility Cost**

Claimed Facility Cost	<b>\$1,798,421</b>
Non-allowable Costs	
Fire protection \$	[ 22,200]
Project development \$	[ 98,071]
Allowable Facility Cost	<b>1,678,150</b>

The claimed facility cost exceeded \$500,000; therefore, Symonds Evans & Larson, LLC performed the independent accounting review on behalf of the Department.

**Facility Cost Allocable to Pollution Control**

Since the facility cost exceeds \$50,000, according to ORS 468.190(1) the following factors were used to determine the percentage of the facility cost allocable to pollution control.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	The facility recovers a usable commodity that meets the definition of a solid waste pollution control facility.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 7 years.
	The applicant claimed the average annual cash flow for this facility produced a return on investment factor of 21.05. This resulted in a 0 return on investment and a calculation of 100% allocable to pollution control.

ORS 468.190(1)(c)  
Alternative Methods

No alternative investigated.

ORS 468.190(1)(d)  
Savings or Increase in  
Costs

The applicant estimated that by eliminating burning the sanderdust they would realize annual savings in the amount of \$69,121. By reducing their disposal costs, they claim annual savings in the amount of \$297,915.

ORS 468.190(1)(e) Other  
Relevant Factors

No other relevant factors.

### ***Compliance***

The facility is in compliance with Department rules and statutes and with EQC orders.

There are no DEQ permits issued to this facility. There following DEQ permits are issued to the mill where this facility is located: NPDES permit No. 100668, May 1990 and Title V operating permit # 22-0143, 12/1/95.

Reviewers: William R Bree, DEQ  
Symonds, Evans & Larson, LLC  
Maggie Vandehey, DEQ





# Tax Credit Review Report

EQC 0005

Director's Recommendation:	<b>APPROVE</b>
Applicant	<b>Mitsubishi Silicon America</b>
Application No.	<b>5049</b>
Facility Cost	<b>\$278,399</b>
% Allocable	<b>100%</b>
Useful Life	<b>10 years</b>

## Pollution Control Facility: Air

### Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation. They are a **supplier of electronic grade silicon wafers**. Their taxpayer identification number is 94-1687933 and their address is:

**1351 Tandem Ave. N.E.  
Salem, OR 97303**

### *Facility Identification*

The certificate will identify the facility as:

**An EPI B2 OTE Scrubber System**

The applicant is the owner of the facility located at:

**1351 Tandem Ave. NE  
Salem, OR 97303**

### *Technical Information*

The claimed facility consists of an OTE venturi wet scrubber used for treating hydrogen chloride from the silicon epitaxial process (EPI). Other dopant gases produced include phosphine, diborane, trichlorosilane, and hydrochloric acid.

The OTE scrubber system effectively removes 99% of the HCL gases associated with the EPI process.

### *Eligibility*

- ORS 468.155 The **principal purpose** of this **new equipment installation** is to **control** a (1)(a)(A) substantial quantity of air pollution as required by the applicants air permit.
- ORS 468.155 The control is accomplished by the **elimination of air contaminants** and the use (1)(b)(B) of an air cleaning device as defined in ORS 468A.005.

**Timeliness of Application**

The department determined that the application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	07/27/1998
<i>Additional Information Requested</i>	01/04/1999
<i>Additional Information Received</i>	03/17/1999
<i>Additional Information Received</i>	11/12/1999
<i>Application Substantially Complete</i>	12/06/1999
<i>Construction Started</i>	04/29/1996
<i>Construction Completed</i>	07/19/1996
<i>Facility Placed into Operation</i>	08/01/1996

**Facility Cost**

Claimed Facility Cost	\$ 278,399
Ineligible Costs	0
Eligible Facility Cost	<u>278,399</u>

A copy of the project cost ledger from the contractor was provided which substantiated \$278,399. The facility cost was greater than \$50,000 but less than \$500,000; therefore, **Symonds, Evans & Larson, P.C., C.P.A.**, provided an accounting report on behalf of the applicant according to Department guidelines.

**Facility Cost Allocable to Pollution Control**

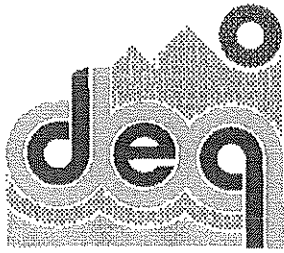
According to ORS.190 (1), the facility cost exceeds \$50,000; therefore, the following factors were used to determine the percentage of the facility cost allocable to pollution control. Considering these factors, the percentage allocable to pollution control is 100%.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity. The resulting hydrochloric acid from the scrubbers is discharged to the acid waste neutralization system.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No alternatives were investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or increase in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

**Compliance**

The applicant states the facility is in compliance with Department rules and statutes and with EQC orders. The following DEQ permits have been issued to the facility: Storm Water 12001L issued March 1993; Air Contaminant Discharge Permit #D-24-4437 issued May 1996

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers, Inc.  
Gordon Chun, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's Recommendation:	<b>APPROVE</b>
Applicant	<b>Mitsubishi Silicon America</b>
Application No.	<b>5100</b>
Facility Cost	<b>\$1,599,606</b>
% Allocable	<b>100%</b>
Useful Life	<b>10 years</b>

## Pollution Control Facility: Water Final Certification

ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation. They are a **supplier of electronic grade silicon wafers**. Their taxpayer identification number is 94-1687933 and their address is:

**1351 Tandem Ave. NE  
Salem, OR 97303**

### *Facility Identification*

The claimed facility is:

**Acid Waste Neutralization (AWN) and  
Solids Removal System**

The applicant is the owner of the facility located at:

**3950 Fairview Industrial Drive SE  
Salem, OR 97302**

### *Technical Information*

The claimed facility consists of an **acid waste neutralization system** in the central utilities building and a **solids removal system**, which consists of a clarifier and solids processing equipment. All acidic waste water (hydrofluoric, nitric, and acetic acids) and slurry wastes from the Mod 3A, 3B, and 5 buildings and silicon slurry wastes generated within the 3A and 3B operating areas are routed to the solids removal system. The solids removal system removes solids from the wastewater, which is then treated in the AWN system in accordance with their permit prior to being discharged. Both systems are highly effective in reducing water pollution.

In the absence of this facility, unacceptable acidic wastewater would be discharged to the city of Salem's wastewater conveyance and treatment system.

### *Eligibility*

- ORS 468.155 (1)(a)(A)** The **principal purpose** of this **new installation of equipment** is to **control** a substantial quantity of water pollution. The requirement is imposed by the applicants wastewater permit #3674-3, issued 12/31/97.
- ORS 468.155 (1)(b)(A)** The control is accomplished by the **elimination of industrial waste** and the use of treatment works for industrial waste as defined in ORS 468B.005.

**Timeliness of Application**

The department determined that the application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>10/20/98</b>
<i>Additional Information Requested</i>	<b>3/15/99</b>
<i>Additional Information Received</i>	<b>4/1/99</b>
<i>Additional Information Received</i>	<b>11/12/99</b>
<i>Application Substantially Complete</i>	<b>12/6/99</b>
<i>Construction Started</i>	<b>7/20/95</b>
<i>Construction Completed</i>	<b>3/8/96</b>
<i>Facility Placed into Operation</i>	<b>10/20/96</b>

**Facility Cost**

Claimed Facility Cost	<b>\$ 1,599,606</b>
Ineligible Costs	<b>0</b>
Eligible Facility Cost	<b>1,599,606</b>

A copy of the project cost ledger from the contractor was provided that substantiated \$1,599,606. In addition, Symonds, Evans, & Larson provided the certified public accountant's statement on behalf of the applicant. The facility cost exceeds \$500,000 therefore, Maggie Vandehey performed an accounting review on behalf of the department.

**Facility Cost Allocable to Pollution Control**

According to ORS.190 (1), the facility cost exceeds \$50,000 and therefore, the following factors were used to determine the percentage of the facility cost allocable to pollution control. Considering these factors, the percentage allocable to pollution control is 100%.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	There is no salable or usable commodity resulting from this facility.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues are associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No other alternatives were considered.
ORS 468.190(1)(d) Savings or Increase in Costs	The cost of operations, materials, and maintenance result in an increase in cost.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

**Compliance**

The applicant states that the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: Waste water #3674-3, issued 12/31/97, Storm Water 1200L, issued 7/22/97.

Reviewers: Lois L. Payne, P.E. SJO Consulting Engineers, Inc.  
Dennis Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant	<b>Mitsubishi Silicon America</b>
Application No.	<b>5101</b>
Facility Cost	<b>\$37,358</b>
% Allocable	<b>100%</b>
Useful Life	<b>10 years</b>

## Pollution Control Facility: Air

### Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation. They are a **supplier of electronic grade silicon wafers.**

Their taxpayer identification number is 94-1687933 and their address is:

**1351 Tandem Ave. NE  
Salem, OR 97303**

### *Facility Identification*

The claimed facility is:

**MOD 3B Torit dust collector**

The applicant is the owner of the facility located at:

**3950 Fairview Industrial Drive SE  
Salem, OR 97302**

### *Technical Information*

The claimed facility consists of a Torit dust collector, model DFT3-36. The dust collector is rated for 20,000 cfm and is used to capture dry particulate from the slicing/polishing processes within the polished wafer building. The captured particulate is collected in a barrel and later transferred to a landfill.

### *Eligibility*

ORS 468.155 (1)(a) The **principal purpose** of this **new installation of equipment** is to **control** a substantial quantity of air pollution. The requirement is imposed by their ACDP 24-0001, issued 2/5/97.

ORS 468.155 (1)(b)(B) The control is accomplished by the **elimination of air contaminants** and the use of an air cleaning device as defined in ORS 468A.005.

**Timeliness of Application**

The department determined that the application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>10/20/98</b>
<i>Additional Information Requested</i>	<b>02/09/99</b>
<i>Additional Information Received</i>	<b>04/08/99</b>
<i>Additional Information Received</i>	<b>11/12/99</b>
<i>Application Substantially Complete</i>	<b>12/6/99</b>
<i>Construction Started</i>	<b>10/10/95</b>
<i>Construction Completed</i>	<b>06/11/96</b>
<i>Facility Placed into Operation</i>	<b>10/20/96</b>

**Facility Cost**

Claimed Facility Cost	<b>\$ 37,358</b>
Ineligible Facility Cost	<b>0</b>
Eligible Facility Cost	<b>37,358</b>

The facility cost does not exceed \$50,000 however, Symonds, Evans, & Larson provided a certified public accountant's statement on behalf of Mitsubishi Silicon America. The reviewers analysed the project cost ledger from the contractor was provided to substantiated the cost of the claimed facility.

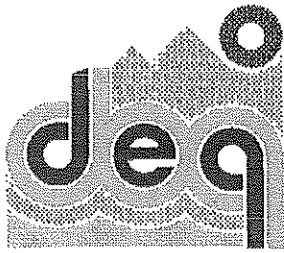
**Facility Cost Allocable to Pollution Control**

According to ORS.190 (3), the facility cost does not exceed \$50,000, therefore the only factor used to determine the percentage of the facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. The percentage of time this facility is used for pollution control and therefore the percentage allocable to pollution control, is 100%.

**Compliance**

The applicant states that the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility:  
Air Contaminant Discharge Permit 24-0001 issued 2/5/97.

Reviewers: Lois L. Payne, P.E. SJO Consulting Engineers, Inc.  
Dennis Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's Recommendation:	<b>APPROVE</b>
Applicant	<b>Mitsubishi Silicon America</b>
Application No.	<b>5102</b>
Facility Cost	<b>\$95,170</b>
Percentage Allocable	<b>100%</b>
Useful Life	<b>10 years</b>

## Pollution Control Facility: Air Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation. They are a **supplier of electronic grade silicon wafers**. Their taxpayer identification number is 94-1687933 and their address is:

**1351 Tandem Ave. NE  
Salem, OR 97303**

### *Facility Identification*

The applicant claimed the following facility:

**CUB Acid Exhaust Scrubber**

The applicant is the owner of the facility located at:

**3950 Fairview Industrial Drive SE  
Salem, OR 97302**

### *Technical Information*

The claimed air pollution control facility consists of an acid exhaust scrubber, model PSH-102-5. The facility is used to capture and treat all fugitive fumes from the central utilities building (CUB) chemical storage tank vents. Corrosive fumes from the acid storage tanks are vented to the acid scrubber for treatment prior to discharge to the environment. This is a new operating plant. Without the scrubber, untreated acid fumes would be discharged to the atmosphere.

### *Eligibility*

- ORS 468.155 The **principal purpose** of this **new installation of equipment** is to prevent, control (1)(a) or reduce a substantial quantity of air pollution as imposed by the applicants air permit. The requirement is imposed by the Air Contaminante Discharge Permit Number 24-0001
- ORS 468.155 The control is accomplished by the elimination of air contaminants and the use of (1)(b)(B) an air cleaning device as defined in ORS 468A.005.



**Timeliness of Application**

The department determined that the application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>10/20/98</b>
<i>Additional Information Requested</i>	<b>2/17/99</b>
<i>Additional Information Received</i>	<b>4/8/99</b>
<i>Application Substantially Complete</i>	<b>12/6/99</b>
<i>Construction Started</i>	<b>7/20/95</b>
<i>Construction Completed</i>	<b>3/8/96</b>
<i>Facility Placed into Operation</i>	<b>10/20/96</b>

**Facility Cost**

Claimed Facility Cost	<b>\$ 95,170</b>
Ineligible Cost	<b>0</b>
Eligible Facility Cost	<b>95,170</b>

The facility cost is greater than \$50,000 but less than \$500,000, therefore Symonds, Evans, & Larson provided the certified public accountant's statement. The reviewers analysed the facility cost documents on behalf of the department.

**Facility Cost Allocable to Pollution Control**

According to ORS.190 (1), the facility cost exceeds \$50,000 and therefore, the following factors were used to determine the percentage of the facility cost allocable to pollution control. Considering these factors, the percentage allocable to pollution control is 100%.

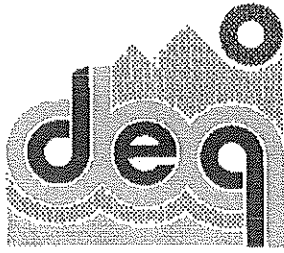
<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	The facility is not used to recover and convert waste products into a salable or usable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	Alternative methods, equipment and costs were not considered to achieve the same objective.
ORS 468.190(1)(d) Savings or Increase in Costs	There is an increase in operating costs as a result of installing this facility.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

**Compliance**

The applicant states that the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility:

Air Contaminant Discharge Permit 24-0001 issued 2/5/97.

Reviewers: Lois L. Payne, P.E. SJO Consulting Engineers, Inc.  
Dennis Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's Recommendation:	<b>APPROVE</b>
Applicant	<b>Mitsubishi Silicon America</b>
Application No.	<b>5103</b>
Facility Cost	<b>\$145,824</b>
% Allocable	<b>100%</b>
Useful Life	<b>10 years</b>

## **Pollution Control Facility: Air**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation. They are a **supplier of electronic grade silicon wafers**. Their taxpayer identification number is 94-1687933 and their address is:

**1351 Tandem Ave. NE  
Salem, OR 97303**

### *Facility Identification*

The claimed facility is:

**MOD 3B Ammonia Scrubber**

The applicant is the owner of the facility located at:

**3950 Fairview Industrial Drive SE  
Salem, OR 97302**

### *Technical Information*

The claimed air pollution control facility consists of a Harrington ammonia exhaust scrubber, model ECH 4 4-5 LB. The facility is used to treat all ammonia process fumes from the polished wafer building. Corrosive ammonia fumes from various process exhaust lines are routed to the ammonia scrubber for treatment prior to discharge to the environment. This is a new operating plant. Without the scrubber, untreated ammonia fumes would be discharged to the atmosphere.

### *Eligibility*

- ORS 468.155 (1)(a)(A) The **principal purpose** of this **new installation of equipment** is to **control** a substantial quantity of air pollution. The requirement is imposed by their ACDP 24-0001, issued 2/5/97.
- ORS 468.155 (1)(b)(B) The control is accomplished by the elimination of air contaminants and the use of an air cleaning device as defined in ORS 468A.005.

**Timeliness of Application**

The department determined that the application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>10/20/98</b>
<i>Additional Information Requested</i>	<b>2/17/99</b>
<i>Additional Information Received</i>	<b>4/8/99</b>
<i>Additional Information Received</i>	<b>11/12/99</b>
<i>Application Substantially Complete</i>	<b>12/6/99</b>
<i>Construction Started</i>	<b>10/10/95</b>
<i>Construction Completed</i>	<b>6/11/96</b>
<i>Facility Placed into Operation</i>	<b>10/20/96</b>

**Facility Cost**

Claimed Facility Cost	<b>\$ 145,824</b>
Ineligible Facility Cost	<b>0</b>
Eligible Facility Cost	<b>\$ 145,824</b>

The facility cost is greater than \$50,000 but less than \$500,000, therefore Symonds, Evans, & Larson provided the certified public accountant's statement on behalf of Mitsubishi Silicon America. The reviewers analysed the facility cost documentation in accordance with Department guidelines. A copy of the project cost ledger from the contractor substantiated the claimed facility cost

**Facility Cost Allocable to Pollution Control**

According to ORS.190 (1), the facility cost exceeds \$50,000 and therefore, the following factors were used to determine the percentage of the facility cost allocable to pollution control. Considering these factors, the percentage allocable to pollution control is 100%.

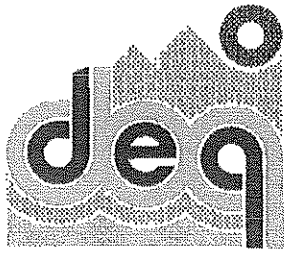
<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	The facility is not used to recover and convert waste products into a salable or usable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	Alternative methods, equipment and costs were not considered to achieve the same objective.
ORS 468.190(1)(d) Savings or Increase in Costs	There is an increase in operating costs as a result of installing this facility.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

**Compliance**

The applicant states that the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility:

Air Contaminant Discharge Permit 24-0001 issued 2/5/97.

Reviewers: Lois L. Payne, P.E. SJO Consulting Engineers, Inc.  
Dennis Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant	<b>Mitsubishi Silicon America</b>
Application No.	<b>5104</b>
Facility Cost	<b>\$146,236</b>
% Allocable	<b>100%</b>
Useful Life	<b>10 years</b>

## Pollution Control Facility: Air Final Certification

ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation. They are a **supplier of electronic grade silicon wafers**. Their taxpayer identification number is 94-1687933 and their address is:

**Mitsubishi Silicon America  
1351 Tandem Ave. NE  
Salem, OR 97303**

### *Facility Identification*

The certificate will identify the facility as:

**MOD 3B NOX Scrubber**

The facility is located at:

**3950 Fairview Industrial Drive SE  
Salem, OR 97302**

### *Technical Information*

The claimed air pollution control facility consists of a Harrington MOD 3B NOX scrubber, model ECH 3 3-8 LB and ECH 3 3-9 LB, serial number S-081995-1. The facility is used to treat nitric acid process fumes. Corrosive fumes from various process exhaust lines are routed to the MOD 3B NOX scrubber for treatment prior to discharge to the environment. This is a new operating plant. Without the scrubber, untreated nitric acid fumes would be discharged to the atmosphere and would result in visible emissions.

### *Eligibility*

- ORS 468.155 The **principal purpose** of this **new installation of equipment** is to **control** a  
(1)(a) substantial quantity of air pollution. The requirement is imposed by their ACDP  
24-0001, issued 2/5/97.
- ORS 468.155 The control is accomplished by the elimination of air contaminants and the use of  
(1)(b)(B) an air cleaning devices as defined in ORS 468A.005.

**Timeliness of Application**

The department determined that the application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>10/20/98</b>
<i>Additional Information Requested</i>	<b>2/16/99</b>
<i>Additional Information Received</i>	<b>4/8/99</b>
<i>Additional Information Received</i>	<b>11/12/99</b>
<i>Application Substantially Complete</i>	<b>12/6/99</b>
<i>Construction Started</i>	<b>10/10/95</b>
<i>Construction Completed</i>	<b>6/11/96</b>
<i>Facility Placed into Operation</i>	<b>10/20/96</b>

**Facility Cost**

Claimed Facility Cost	<b>\$ 146,236</b>
Ineligible Facility Cost	<b>0</b>
Eligible Facility Cost	<b>\$ 146,236</b>

The facility cost does not exceed \$50,000 however, Symonds, Evans, & Larson provided a certified public accountant's statement on behalf of Mitsubishi Silicon America. The reviewers analysed the project cost ledger from the contractor was provided to substantiated the cost of the claimed facility.

**Facility Cost Allocable to Pollution Control**

According to ORS.190 (1), the facility cost exceeds \$50,000 and therefore, the following factors were used to determine the percentage of the facility cost allocable to pollution control.

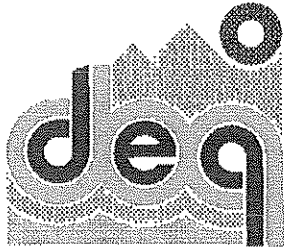
<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	The facility is not used to recover and convert waste products into a salable or usable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	Alternative methods, equipment and costs were not considered to achieve the same objective.
ORS 468.190(1)(d) Savings or Increase in Costs	There is an increase in operating costs as a result of installing this facility.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

Considering these factors, the percentage allocable to pollution control is 100%.

**Compliance**

The applicant states that the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: Air Contaminant Discharge Permit 24-0001 issued 2/5/97.

Reviewers: Lois L. Payne, P.E. SJO Consulting Engineers, Inc.  
Dennis Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ



Director's Recommendation:	<b>APPROVE</b>
Applicant	<b>Mitsubishi Silicon America</b>
Application No.	<b>5105</b>
Facility Cost	<b>\$128,179</b>
% Allocable	<b>100%</b>
Useful Life	<b>10 years</b>

# Tax Credit Review Report

EQC 0005

## Pollution Control Facility: Air Final Certification

ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation. They are a **supplier of electronic grade silicon wafers**. Their taxpayer identification number is 94-1687933 and their address is:

**1351 Tandem Ave. NE  
Salem, OR 97303**

### *Facility Identification*

The claimed facility is:

**Two MOD 3B Acid Exhaust Scrubbers**

The applicant is the owner of the facility located at:

**3950 Fairview Industrial Drive SE  
Salem, OR 97302**

### *Technical Information*

The claimed facility consists of two Harrington MOD 3B acid exhaust scrubbers, both model ECH 8 5-5 LB and serial numbers S-081895-1 and -2, and their associated Harrington HPCA 3300 fans. The facility is used to treat acid process fumes from the polished wafer building. Corrosive fumes from various process exhaust lines are routed to the two MOD 3B Acid Exhaust scrubbers prior to discharge to the environment. This is a new operating plant. Without the scrubber, untreated acid fumes would be discharged to the atmosphere.

### *Eligibility*

- ORS 468.155 The **principal purpose** of this **new installation of equipment** is to **control** a  
(1)(a) substantial quantity of air pollution. The requirement is imposed by their ACDP 24-0001, issued 2/5/97.
- ORS 468.155 The control is accomplished by the **elimination of air contaminants** and the use of  
(1)(b)(B) an air cleaning device as defined in ORS 468A.005.

**Timeliness of Application**

The department determined that the application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	10/20/98
<i>Additional Information Requested</i>	2/18/99
<i>Additional Information Received</i>	4/8/99
<i>Additional Information Received</i>	11/12/99
<i>Application Substantially Complete</i>	12/6/99
<i>Construction Started</i>	10/10/95
<i>Construction Completed</i>	6/11/96
<i>Facility Placed into Operation</i>	10/20/96

**Facility Cost**

Claimed Facility Cost	\$ 128,179
Ineligible Facility Cost	0
Eligible Facility Cost	128,179

The facility cost does not exceed \$50,000 however, Symonds, Evans, & Larson provided a certified public accountant's statement on behalf of Mitsubishi Silicon America. The reviewers analysed the project cost ledger from the contractor was provided to substantiated the cost of the claimed facility.

**Facility Cost Allocable to Pollution Control**

According to ORS.190 (1), the facility cost exceeds \$50,000 and therefore, the following factors were used to determine the percentage of the facility cost allocable to pollution control. Considering these factors, the percentage allocable to pollution control is 100%.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	The facility is not used to recover and convert waste products into a salable or usable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	Alternative methods, equipment and costs were not considered to achieve the same objective.
ORS 468.190(1)(d) Savings or Increase in Costs	There is an increase in operating costs as a result of installing this facility.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

**Compliance**

The applicant states that the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: Air Contaminant Discharge Permit 24-0001 issued 2/5/97.

Reviewers: Lois L. Payne, P.E. SJO Consulting Engineers, Inc.  
Dennis Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ





# Tax Credit Review Report

EQC 0005

Director's Recommendation:	<b>APPROVE</b>
Applicant	<b>Wacker Siltronic Corporation</b>
Application No.	<b>5140</b>
<u>Claimed</u> Facility Cost	<b>\$18,554,507</b>
<u>Adjusted</u> Facility Cost	<b>\$12,543,553</b>
Percentage Allocable	<b>0%</b>
Useful Life	<b>5 years</b>

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## **Pollution Control Facility: Water**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

The applicant is a C corporation and they manufacture hyperpure silicon wafers. The applicant's taxpayer identification number is 94-2518330. The applicant's address is:

**7200 NW Front Avenue  
Portland, OR 97210**

### ***Facility Identification***

The certificate will identify the facility as:

**A wastewater collection system and treatment plant.**

The applicant is the owner of the facility located at:

**7200 NW Front Avenue  
Portland, OR**

### ***Technical Information***

The claimed facility consists of an organic wastewater pretreatment system and a wastewater treatment plant that includes four smaller treatment systems for fluoride, caustic, weak acids, and silicon solids. They both treat process effluent from Fab 2 manufacturing operations.

The pretreatment equipment set is an organic wastewater (OWW) collection tank system with two transfer pumps sized for 800 gpm average and 1600 gpm maximum. This two stage neutralization system includes two 27,500 gallon tanks with 19 foot long by 92 inch diameter turbine blade mixers, chemical feed pump systems for sulfuric acid, antifoam, and sodium hydroxide, monitoring equipment, controls designed to neutralize industrial wastewaters and a data acquisition system. Pretreated wastewaters containing organics are discharged to the Portland municipal treatment plant for further treatment of the organic constituents.

The second major equipment set includes four wastewater treatment systems consisting of fluoride, caustic, weak acids and silicon solids. The treatment system has wastewater collection tanks and forwarding pumps for caustic wastewater, concentrated acid etch solutions, fluoride wastewater, weak acid wastewater, silicon solids wastewater, and cutting oil collection. The wastewater forwarding system transfers the wastewater from Fab 2 processes to each treatment system.

4/2

The fluoride treatment system is the most complex treatment system. The fluoride treatment system uses direct addition of lime to treat wastewaters containing from approximately 3,000 mg/l fluoride. This system is called the Concentrated Acid Drain (CAD) system and consists of a lime silo, mix system and delivery system, two static inline mixers feeding two 35,000 reaction tanks with 24 foot by 92 inch Sharpe mixers which creates a CaF<sub>2</sub> precipitate. The process operates at a pH range of 10 to 11. The fluoride precipitate and lime solids are removed by a Didier Hydrozyklon with sludge rake for solids settling, followed by a 15,500 gallon sludge tank with mixer and sludge transfer pumps that supply a 100 gpm Duriron filter press. The capacity of the CAD fluoride and solids removal system is 500 gpm average and 700 gpm maximum. The effluent from the fluoride treatment system is mixed with wastewater from the Weak Acid Drain (WAD) treatment system.

The WAD system consists of three 35,000 gal tanks with 25 foot by 92 inch Sharpe mixers, caustic storage tank, sulfuric acid storage tank, and dual feed controllers for sulfuric acid and sodium hydroxide or caustic wastewater. The WAD neutralization reaction tanks are followed by three 560 gpm Parkson Dynasand Filters which remove residual total suspended solids. Silicon solids wastewater is treated in the fluoride system to take advantage of the solids removal capability. Caustic wastewater is treated in the OWW or the WAD treatment system depending on capacity and neutralization needs. The WAD system also receives treated effluent from the fluoride removal system. The capacity of the WAD system is 1000 gpm average with a peak capacity of 2000 gpm.

All wastewater from the neutralization system, fluoride treatment system and solids removal system is processed through sand filters for final polishing before discharge to the Willamette River.

All wastewater collection and forwarding sump equipment, treatment equipment and tanks are inside secondary containment systems to control drips or incidental spills. All pump systems and primary control valves have redundant backup.

Concentrated caustic wastewater is collected separately and metered into the waste stream by pH set point to minimize the use of additional treatment chemicals. Concentrated acids are collected separately and metered into the waste treatment system to minimize peak loads on the system. Silicon solids containing wastewater is collected separately to allow flexibility in the choice of treatment system.

Had the claimed facility not been built, chemical solutions used for the manufacture and cleaning of silicon wafers would not be treated or removed from the waste waters resulting in a 2-4 million gallon per day increased hydraulic loading on the City of Portland treatment plant. At full production approximately 125,000 gallons of various chemical solutions are used per day which result in a wastewater contaminant concentration of 83,000 mg/l before treatment.

The WWTP capacity is 4.2 MGD of treated wastewater containing up to 125,000 gallons of chemical solutions in various concentrations. Approximately 2.7 MGD of the capacity is treated under the NPDES discharge permit. NPDES wastewater treatment standards are typically 17 mg/l or less for most parameters. The performance of the new WWTP facility is typically 6 mg/l for most permit parameters and equates to a treatment efficiency of 99.99%. Approximately 1.5 MGD treated wastewater is discharged to the City under a POTW pretreatment permit. POTW discharge standards are typically 300 mg/l for total suspended solids and biological oxygen demand for both households and industry. The WWTP neutralizes acids and caustics to 100% efficiency and averages 140 mg/l or

less for both TSS and BOD parameters resulting in an overall pretreatment efficiency of 99.88%.

**Eligibility**

- ORS 468.155 (1)(a) The **principal purpose** of these two **wastewater treatment systems** is to control a substantial quantity of water pollution.
- ORS 468.155 (1)(a) The primary purpose of the following items is not pollution control. The purpose of the HVAC is to condition internal air space for a comfortable work environment. The primary purpose of the flow monitoring system is for billing and reporting. The primary purpose of the piping and drains is material handling within the process environment. The primary purpose of the heat tracing is to prevent the pipes from freezing. The purpose of Zyklon was not defined.
- ORS 468.155 (1)(b)(A) The wastewater treatment is accomplished by the elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468B.005. The HVAC, the flow monitoring system, Zyklon and process piping and process drains do not dispose of or eliminate industrial waste with the use of a treatment as defined in ORS 468B.005.

**Timeliness of Application**

The applicant claimed the facility was placed into operation a year before construction was completed.

<i>Application Received</i>	<u>12/29/1998</u>
<i>Application Substantially Complete</i>	<u>04/27/2000</u>
<i>Construction Started</i>	<u>01/01/1995</u>
<i>Applicant Claimed Construction Completed</i>	<u>01/01/1998</u>
<i>Applicant Claimed Placed In Operation</i>	<u>01/01/1997</u>

**Facility Cost**

<b>Claimed Cost</b>	<b>\$18,554,507</b>
<b>Non-Allowable Costs:</b>	
HVAC	- 35,620
Flow Monitoring System for billing & compliance purposes.	- 1,779,236
Non-Wastewater Plumbing	- 344,007
Wastewater Pipe Insulation	- 293,410
Process Drain – Oil and Seal Water Drain Piping	- 6,542
Heat Tracing – keeps pipes from freezing – (part of cost could be allowable if used in treatment plant.)	- 382,972
Zyklon – unknown contribution	- 223,653
General Contractor Costs Associated with Above	- 133,098
Process Building Drain Piping	- 2,680,918
Central Facilities Building Drain Piping	- 131,498
<b>Non-Allowable Costs</b>	<u><b>-6,010,954</b></u>
<b>Eligible Facility Cost</b>	<u><b>\$12,543,553</b></u>

The facility cost exceeds \$500,000. The reviewers analysed the facility cost on behalf of the department. A Combined Cost Report, prepared by Hoffman Construction, was provided to substantiate the claimed facility cost. Arthur Andersen LLP performed an

accounting review on behalf of Wacker. The reviewers analysed the facility costs on behalf of the department.

### ***Facility Cost Allocable to Pollution Control***

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the following factors listed were considered in determining the percentage of the facility cost allocable to pollution control.

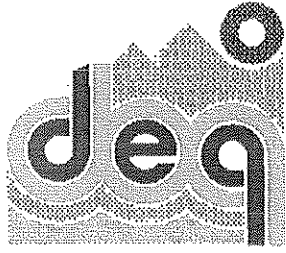
<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment calculation is 5 years. The applicant claimed zero gross annual revenues associated with the facility. Gross annual income includes operational savings that include the savings realized by discharging to the Willamette River. The applicant avoided a \$19,000,000 City of Portland systems development charge and an estimated \$4,400,000/year in discharge fees to the City of Portland.
ORS 468.190(1)(c) Alternative Methods	The applicant states no alternatives were considered.
ORS 468.190(1)(d) Savings or Increase in Costs	The application did not address any savings or increase in costs. The Department determined the cost savings of installing the treatment system instead of discharging to the City of Portland Treatment system. Based on a discharge rate of 2.7 million gallons per day, the one time hook-up costs would have been \$19,792,541. The estimated charges for volumetric flow would be \$369,107 per month (\$4,429,285 annually).
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

Based on the Return On Investment calculation, the percentage of the facility cost allocable to pollution control is **0.0%**.

### ***Compliance and Other Tax Credits***

The applicant states the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: NPDES individual permit, NPDES 1200-Z general industrial storm water permit; Air Contaminant Discharge Permit; Large Quantity Generator.

Reviewers: Maggie Vandehey, DEQ  
Elliot J. Zais, PhD, PE



# Tax Credit Review Report

EOC 0005

Director's Recommendation:	<b>APPROVE</b>
Applicant	<b>Balzer Pacific Equipment Co.</b>
Application No.	<b>5158</b>
Facility Cost	<b>\$93,023</b>
Percentage Allocable	<b>100%</b>
Useful Life	<b>7 years</b>

## Pollution Control Facility: Water Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation and is operating a **construction equipment fabrication, sales, service company**. The applicant's taxpayer identification number is 93-0475201 and their address is:

**2136 S.E. 8<sup>th</sup> Avenue  
Portland, OR 97214**

### *Facility Identification*

The certificate will identify the facility as:

#### **Wastewater Treatment System**

The applicant is the owner of the facility of the facility located at:

**2136 S.E. 8<sup>th</sup> Avenue  
Portland, OR 97214**

### *Technical Information*

The claimed facility consists of a wastewater treatment system used to treat wastewater from washing vehicles and construction equipment. The claimed facility includes the following components:

- Concrete wash pad and sedimentation chamber.
- Site excavation required to install the wash pad and equipment building.
- A sump pump to transfer the wastewater from the sedimentation chamber to the water washing equipment.
- A subsurface wastewater pipeline to route the collected water to the treatment equipment.
- Beckart Environmental Semi-Automatic "Water Washer" Wastewater Treatment System for pressure washing wastewater, SN-97070.
- A Kellogg air compressor, which supplies the air, required by the water washing equipment, SN-HY9K7037PKZ5.
- Equipment shed to house the equipment and air compressor.
- An automatic control system was installed to activate the water pump and air compressor.
- Electrical work required to provide power to the equipment.
- An supply water pipeline required for operation of the system.
- A wastewater discharge pipeline to connect to the existing sewer line.

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Wastewater from washing vehicles and construction equipment is collected on a concrete wash pad and channeled to a concrete sedimentation chamber. Heavy contaminants settle out of the wastewater in the chamber and are periodically removed from the site. The wastewater and suspended solids are pumped to a 1,150-gallon holding tank that is part of the Beckart system. A float control shuts off the transfer pump when the proper level is reached. A coagulant is added from a time-controlled air operated chemical feed pump to precipitate out emulsified solids. The pH is adjusted to between 6.5 and 10.0 by the addition of hydrated lime via the pH controller. The process pump recirculates the water, which adds micro bubbles in the water to aerate the floc. The floc formation is enlarged with the addition of polymer B-21 at a preset amount via a timer controlled feed pump. This traps air bubbles inside causing the floc to float to the water surface. The treated water is drained from the bottom tank through a filter tray that catches the sludge. The cleaned and filtered wastewater is collected in a holding tank before being discharged into the City of Portland sewer system. Safety-Kleen Corporation removes the collected sludge from the site for recycling or disposal.

Prior to the installation of this facility, there were no means of washing vehicles or equipment at the site.

**Eligibility**

- ORS 468.155 (1)(a)(A) The **principal purpose** of the **Beckart Environmental Equipment** is to comply with the Water Pollution Control Administrative Rules for industrial pretreatment for sewer discharge imposed by the City of Portland to prevent water pollution.
- ORS 468.155 (1)(b)(A) The prevention is accomplished by the elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468B.005.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received by DEQ</i>	<b>2/17/1999</b>
<i>Additional Information Requested</i>	<b>2/23/2000</b>
<i>Additional Information Received</i>	<b>3/9/2000</b>
<i>Application Substantially Complete</i>	<b>4/3/2000</b>
<i>Construction Started</i>	<b>12/3/1997</b>
<i>Construction Completed</i>	<b>3/20/1998</b>
<i>Facility Placed into Operation</i>	<b>3/9/1998</b>

**Facility Cost**

Claimed Facility Cost	<b>\$ 96,409</b>
Ineligible Costs	
Drain line to sewer	<b>(3,386)</b>
Eligible Facility Cost	<b>\$ 93,023</b>

The subsurface wastewater pipeline and discharge pipeline would have to be installed with or without the wastewater treatment. The facility cost is greater than \$50,000 but less than \$500,000. Therefore, **Talbot, Korvola & Warwick** performed an accountants review according to Department guidelines on behalf of the applicant. The reviewers analysed the facility cost as documented by copies of purchase orders and invoices. The applicant substantiated 100% of the claimed facility cost.

***Facility Cost Allocable to Pollution Control***

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were used to determine the percentage of the facility cost allocable to pollution control.

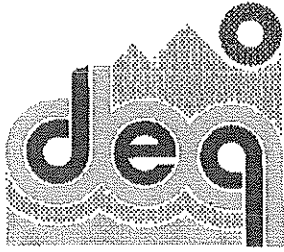
<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or usable commodity is produced.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 7 years. There is no gross annual revenue associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No other alternatives were investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	There are no savings; operating costs increase.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

***Compliance***

The applicant states the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: None

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers, Inc.  
Dennis E. Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ





# Tax Credit Review Report

EQC 0005

Director's Recommendation:	<b>APPROVE</b>
Applicant	<b>Zero Percent Allocable</b>
Application No.	<b>Deschutes Brewery</b>
<u>Claimed</u> Facility Cost	<b>5159</b>
Percentage Allocable	<b>\$ 681,777</b>
<u>Claimed</u> Useful Life	<b>0%</b>
	<b>25 years</b>

## Pollution Control Facility Tax Credit: Water Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation and is operating as a brewery. The tax payer's identification number 93-0972809. The applicant's address is:

**901 SW Simpson Avenue  
Bend, OR 97702**

### *Facility Identification*

The applicant claimed the following facility:

#### **An effluent pretreatment system**

The applicant is the owner of the facility located at:

**901 SW Simpson Avenue  
Bend, OR 97702**

### *Technical Information*

The claimed facility was installed to remove biochemical oxygen demand (BOD) from brewery wastewater prior to discharge to the city sewer system.

The claimed facility consists of a 3,800-gallon pump station and emergency storage tank, which receives the organic-rich brewery waste. The waste is then pumped through a 4-inch sewer line to an equalization/holding tank in the waste treatment building. (This portion of the claimed facility is not an eligible part of the system.)

The 12,000-gallon feedwater pH equalization/holding tank is equipped with a recirculating pump. A caustic addition pump and an acid addition pump maintain the pH level in the tank between 5 and 11. The raw pH stabilized wastewater is fed into a 33,000-gallon anaerobic reactor. This reactor serves to reduce the BOD, which is the amount of food present in a given sample that must be broken down by bacteria in the system before waste is discharged as effluent. Water passes from the reactor through a motorized valve into a 500 gallon holding tank and then into the city sewer system.

Prior to the installation of this facility, Deschutes Brewery was discharging pH-adjusted waste to the city sewer. The brewery employed waste segregation and land application of high strength waste. This method was time-consuming, inefficient, and costly. The effluent BOD was 4,000 to 8,000 milligrams per liter (mg/L).

The BOD of the brewery's anaerobically treated effluent is currently 80 to 200 mg/L, well within the City of Bend discharge permit requirements.

***Eligibility***

Waste Collection Storage Tank and Sewer Piping

ORS 468.155 (1)(a) The principal purpose of this new equipment is **not** to prevent, control or reduce a substantial quantity of water pollution because DEQ or the federal Environmental Protection Agency did not impose this is a requirement.

ORS 468.155 (1)(a) The sole purpose of this new equipment is **not** to prevent, control or reduce a substantial quantity of water pollution. The tank and piping system performs a material handling function because it conveys process waste to the holding tank.

Waste Neutralization and Pretreatment System

ORS 468.155 (1)(a) The **principal purpose** of this **new equipment** is to **reduce** a substantial quantity of water pollution.

ORS 468.155 (1)(b)(A) The reduction is accomplished by the **elimination** of **industrial waste** with the use of a treatment works for as defined in ORS 468B.005.

OAR-016-0025 (2)(g) Installation or construction of facilities will be used to detect, deter, or prevent spills or unauthorized releases.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>02/17/1999</b>
<i>Additional Information Requested</i>	<b>06/17/1999</b>
<i>Additional Information Received</i>	<b>10/15/1999</b>
<i>Application Substantially Complete</i>	<b>10/29/1999</b>
<i>Construction Started</i>	<b>03/15/1998</b>
<i>Construction Completed</i>	<b>04/01/1998</b>
<i>Facility Placed into Operation</i>	<b>04/01/1998</b>

***Facility Cost***

Facility Cost	<b>\$ 752,843</b>
Waste Collection Storage Tank & Sewer Piping	-\$31,066
Contractor Bonus	-\$40,000
Eligible Facility Cost	<b>\$ 681,777</b>

The eligible facility cost was not evaluated in detail because the reviewers determined the percentage of the facility cost allocable to pollution control was 0%. Copies of invoices substantiate the cost of the claimed facility. However, the costs associated with the waste collection storage tank and the sewer piping were not clearly identified. Donaca Battleson & Co., L.L.P. performed an accounting review on behalf of Deschutes Brewery.

***Facility Cost Allocable to Pollution Control***

According to ORS.190 (1), the facility cost exceeds \$50,000 and therefore, the following factors were used to determine the percentage of the facility cost allocable to pollution control.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	Methane gas is produced in the reactor and is used as a source of heat for the reactor and is also used to heat two gas water heaters. There is an excess of methane gas being produced at this time; however, options for utilizing this energy source at the brewery are under study. Some spent grains are used for agricultural purposes but are not a revenue source.
ORS 468.190(1)(b) Return on Investment	<p>The useful life of the facility used for the return on investment consideration is 25 years.</p> <p>The applicant claimed zero gross annual revenues associated with the facility. Gross annual income includes operational savings that included savings from the utilization of methane gas and savings from the reduced operating costs of treating the effluent.</p>
ORS 468.190(1)(c) Alternative Methods	The only method considered was to land apply the process effluent. The cost for this alternative was prohibitive.
ORS 468.190(1)(d) Savings or Increase in Costs	<p>The cost savings associated with installing this facility include the averaged \$5,700 per month to land apply the process effluent and \$2,800 per month for BOD high strength effluent charges to the City of Bend. With production expected to double, these savings would also be double over the next five years. (As shown in years 2 through 5 in the average annual cash flow below.)</p> <p>There were increases in costs associated with the system since there was no previous system. The applicant estimated to be \$55,000 with an additional 6% assumed salary increase per year.</p>
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

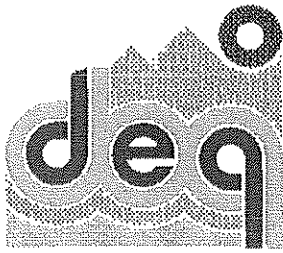
Considering these factors, the percentage of facility cost allocable to pollution control is 0% as described below:

Year	Gross Income (Savings)	Operating Expenses	Annual Cash Flow
Year 1 1998	\$102,000	\$55,000	\$47,000
Year 2 1999	\$127,500	\$57,040	\$70,460
Year 3 2000	\$153,000	\$59,418	\$93,582
Year 4 2001	\$178,500	\$62,117	\$116,383
Year 5 2002	\$204,000	\$65,122	\$138,878
<b>Totals:</b>	<b>\$765,000</b>	<b>\$298,697</b>	<b>\$466,303</b>
Average Annual Cash Flow =	\$466,303/5		\$93,261
Useful Life			25 years
Return on Investment Factor =	\$681,777/\$93,261		7.31
Facility ROI (Table 1)			13.00%
National ROI for 1998 (Table 2)			6.3%
Facility Cost Allocable to Pollution Control: (11.50% > 6.3%)			0.00%

### **Compliance**

The applicant states the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: None.

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers  
Dennis Cartier, Associate, SJO Consulting Engineers  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

## Pollution Control Facility Tax Credit: Air Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation manufacturing **silicon carbide furnace components**. Their taxpayer identification number 93-1197146.

And their address is:

**4375 NW 235<sup>th</sup> Avenue  
Hillsboro, OR 97124**

### *Technical Information*

The claimed facility includes fourteen dust collectors, two wet scrubbers, the connecting ductwork between process tools and the scrubbers, several small air cleaning devices, and a room air handler.

#### Dust Collectors and Wet Scrubbers

There are several grinding, machining and sandblasting operations that generate particulate. Each of these pieces of equipment is exhausted through an individual cartridge type dust collector. There are six units manufactured by AMANO Corporation. Each one has an approximate cfm of 3,190. There are five units manufactured by American Air Filter with capacities ranging from 750 cfm to 2,100 cfm. There are two Sinto units rated at 750 cfm. Finally, there is one LMC unit that has a capacity of approximately 3,000 cfm. All of these dust collectors have an efficiency of 99%.

Director's  
Recommendation: **APPROVE**

Applicant **AGPR, Inc.**  
Application No. **5161**  
Facility Cost **\$275,003**  
Percentage Allocable **100%**  
Useful Life **7 years**

### *Facility Identification*

The certificate will identify the facility as:

**Fourteen dust collectors and  
two wet scrubbers.**

The applicant is the owner of the facility located at:

**4375 NW 235<sup>th</sup> Avenue  
Hillsboro, OR 97124**

Plasticair, Inc. manufactured the two horizontal wet scrubbers. One is a model HS-300 with a flow rate of 2650 cfm; the other is a model HS-1400 with a flow rate of 14,000 cfm. Both units are mounted on the roof of the facility. Both scrubbers have packing and water recirculation. They serve to remove acid from the process exhaust with an approximate efficiency of 90%. The manufacturing process uses hydrofluoric acid and nitric acid for etching which generates acid fume. This process takes place in various hooded enclosures that are ducted to the scrubbers.

The applicant also installed a room air handler to provide fresh air into the rinse room process area. They also installed monitors, sensors and ductwork.

### ***Eligibility***

ORS 468.155 Dust Collectors and Wet Scrubbers

(1)(a)(A) The **principal purpose** of this **new equipment installation** is to comply with a requirement imposed by the applicants Air Contaminant Discharge Permit, #34-0016 to **control** particulate and acid fumes, which meet the definition of air pollution.

Smog Hogs, Room Air Handler, Monitors, Sensors, Line Flume and Ductwork, and Dust Collection Ductwork are not installed to comply with a requirement imposed by the DEQ, EPA, or regional air pollution authority to prevent, control or reduce air pollution. Their primary and most important purpose is not air pollution control. Also, their sole and "exclusive" purpose is not to prevent, control, or reduce a substantial quantity of air pollution to the atmosphere. Their purposes are either to improve indoor air quality or to convey contaminated process air to the dust collectors or wet scrubbers.

Both of the following items provide indoor air quality benefits but do not control air pollution to the atmosphere: Grooving Room Smog Hogs are small air-cleaning devices that remove oil mist from the surface grinders within the process environment. The Rinse Room Air Handlers provide the required air changes in the rinse room to meet Uniform Mechanical Code requirements and to prevent the buildup of flammable or toxic vapors.

Dust Collector Monitor and Ultra Sonic Sensors do not prevent, control, or reduce air pollution to the atmosphere. The applicant did not provide additional information when requested to describe how the dust collector monitor controls, prevents, or reduces air pollution.

Sample Line Flume & Accessories is a liquid-flow-measuring device and is not related to the reduction of air pollution.

Process Fume Exhaust Ductwork and the Additional Dust Collector Duct are material conveying systems that do not control, prevent or reduce air pollution to the atmosphere.

ORS 468.155 Dust Collectors and Wet Scrubbers

- (1)(b) The control is accomplished by the elimination of air contaminants and the use of a scrubber, which meets the definition in ORS 468A.005 of an air-cleaning device.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6). However, the additional information requested to determine if the dust collector monitors are actually used for air pollution control purposes was not provided within the 60 days required by rule.

<i>Application Received by DEQ</i>	<b>02/19/1999</b>
<i>Additional Information Requested</i>	<b>06/23/1999</b>
<i>Additional Information Received</i>	<b>08/18/1999</b>
<i>Additional Information Requested</i>	<b>07/07/1999</b>
<i>Additional Information Received</i>	<b>09/16/1999</b>
<i>Additional Information Requested</i>	<b>01/31/2000</b>
<i>Additional Information Received</i>	<b>02/07/2000</b>
<i>Application Substantially Complete</i>	<b>02/10/2000</b>
<i>Construction Started</i>	<b>10/11/1996</b>
<i>Construction Completed</i>	<b>09/01/1997</b>
<i>Facility Placed into Operation</i>	<b>09/01/1997</b>

***Facility Cost***

Claimed Facility Cost		<b>\$ 648,866</b>
Ineligible Costs:		
Grooving Room Smog Hogs	(\$ 38,212)	
Rinse Room Air Handlers	(60,332)	
Dust Collector Monitor	(13,780)	
Ultra Sonic Sensors	(2,622)	
Sample Line Flume & Accessories	(16,868)	
Process Fume Exhaust Ductwork	(238,789)	
Additional Dust Collector Duct	(3,260)	
	<b>Total Ineligible Costs (\$ 373,863)</b>	
Eligible Facility Cost		<b>\$ 275,003</b>

The claimed facility cost exceeds \$500,000. **Deloitte & Touche** prepared the application and performed an accounting review on behalf of AGPR. The reviewers performed the accounting review on behalf of the Department, analysing the facility cost by reviewing copies of invoices provided by the applicant.



***Facility Cost Allocable to Pollution Control***

According to ORS.190 (1), the facility cost exceeds \$50,000 and therefore, the following factors were used to determine the percentage of the facility cost allocable to pollution control.

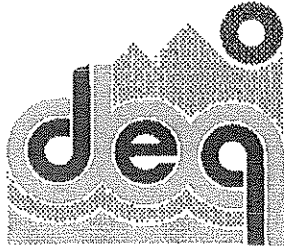
<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 7 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	The applicant did not list any alternative methods.
ORS 468.190(1)(d) Savings or Increase in Costs	Operating costs increase since there was no previous system. They are estimated to be between \$19,000 and \$27,000 per year.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors were provided.

Considering these factors, the percentage allocable to pollution control is 100% of the eligible facility cost.

***Compliance***

The applicant states that the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: Air Contaminant Discharge Permit Number 34-0016, Expiration Date August 8, 2006. Unified Sewerage Agency Permit number: 133224; Expiration Date: 12/15/2002.

Reviewers: Dennis Cartier, Associate, SJO Consulting Engineers  
Lois Payne, PE, SJO Consulting Engineers  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC0005

## Pollution Control Facility Tax Credit: Air Final Certification

ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation and they operate a **grass seed company**. Their taxpayer identification number is 93-0582395 and their address is:

**P.O. Box 239  
Tangent, OR 97389**

Director's  
Recommendation: **APPROVE**

Applicant **Barenbrug USA**  
Application No. **5210**  
Facility Cost **\$93,376**  
Percentage Allocable **100%**  
Useful Life **10 years**

### *Facility Identification*

The certificate will identify the facility as:

#### **Baghouse Dust Control System**

The applicant is the owner of the facility located at:

**33477 Hwy 99E  
Tangent, OR 97389**

### *Technical Information*

The claimed facility consists of four baghouses installed to filter, collect and contain dust particulate created by the blending and packaging process. The four baghouses are sized for a total of 32,500 cfm. This system eliminates 99.5% of the particulate matter created during grass seed processing. The four baghouses collect approximately 500 pounds of particulate per day when in full production. They collect approximately 500 pounds per week during the remaining part of the year. Sealed bags contain the particulate and they are disposed of without any emissions to the atmosphere.

Without this system, the particulate created would be ventilated out of the building, thereby causing pollution of the atmosphere. The system is considered the best available technology for this application.

### *Eligibility*

- ORS 468.155 (1)(a)(B) The **sole purpose** of this **installation of equipment** is to **prevent** a substantial quantity of air pollution.
- ORS 468.155 (1)(b)(B) The prevention is accomplished by **elimination of air pollution** and use of the baghouses which meet the air cleaning device definition in ORS 468A.005.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>05/24/1999</u>
<i>Additional Information Requested</i>	<u>06/25/1999</u>
<i>Additional Information Received</i>	<u>07/26/1999</u>
<i>Application Substantially Complete</i>	<u>1/4/2000</u>
<i>Construction Started</i>	<u>01/1998</u>
<i>Construction Completed</i>	<u>12/10/1998</u>
<i>Facility Placed into Operation</i>	<u>12/10/1998</u>

***Facility Cost***

Claimed Facility Cost	\$ 164,930
Ineligible Cost	
Ductwork	<u>(71,554)</u>
Eligible Facility Cost	<u>\$ 93,376</u>

The facility cost is greater than \$50,000, but less than \$500,000. Therefore, Brudvig, Baker, Johnson & Smith, LLC performed an accounting review according to Department guidelines on behalf of Barenbrug USA, Inc. Corporation. Copies of invoices were provided which substantiated the cost of the facility. The ductwork installed connecting the process equipment to the baghouses is an ineligible cost because it does not provide a pollution control benefit; it is used to convey materials.

***Facility Cost Allocable to Pollution Control***

According to ORS.190 (1), the facility cost exceeds \$50,000 and therefore, the following factors were used to determine the percentage of the facility cost allocable to pollution control.

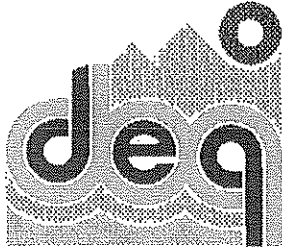
<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	There is no salable or usable commodity.
ORS 468.190(1)(b) Return on Investment	There is no return on investment.
ORS 468.190(1)(c) Alternative Methods	No other alternatives were evaluated.
ORS 468.190(1)(d) Savings or Increase in Costs	There are no savings. Operating costs increase.
ORS 468.190(1)(e) Other Relevant Factors	There are no other relevant factors.

Considering these factors, the percentage allocable to pollution control is 100%.

***Compliance***

The applicant states the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: Air Contaminant Discharge Permit No. 22-8035, issued September 28, 1999.

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers  
Dennis Cartier, Associate, SJO Consulting Engineers  
Maggie Vandehey, DEQ



Director's  
Recommendation: **APPROVE**

Applicant **Cascade General, Inc.**  
Application No. **5223**  
Facility Cost **\$1,996,920**  
Percentage Allocable **100%**  
Useful Life **10 years**

# Tax Credit Review Report

EQC 0005

## **Pollution Control Facility: Water Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**

Business: **ship repair and conversion**

Taxpayer ID: **93-0956534**

The applicant's address is:

**5555 N Channel Avenue  
Portland, OR 97217**

### ***Facility Identification***

The certificate will identify the facility as:

**Wastewater conveyance and treatment  
system.**

The applicant is the owner of the facility located  
at:

**5555 N Channel Avenue  
Portland, OR 97217**

### ***Technical Information***

The Port of Portland owns three Dry Docks (Dry Docks 1, 3 and 4) at the Portland Shipyard. Cascade General, Inc. operates the Dry Docks to perform ship repair and conversion under a lease agreement with the Port.

The claimed facility collects, conveys, stores and treats wastewater generated by the Dry Docks. The wastewater consists of process water and storm water. Process water is generated during the ship repair and maintenance operations of hydroblasting, pressure washing, and sandblasting. Storm water is generated from rainfall that falls on the open Dry Docks and mixes with the process water.

The collection system consists of walls and dams on the Dry Docks that direct wastewater to catchbasins at the landside end of the three Dry Docks. Two pumps are installed in each of the catchbasins to transfer the wastewater through dedicated piping to the treatment facility.

The treatment system is designed to remove suspended solids, oil and grease, and dissolved metals. The treatment processes consist of storage, inlet solids removal, chemical precipitation, clarification, and filtration. The treatment facility includes of the following components:

100,000 gallon holding tank: Provides storage and flow equalization for the peak daily wastewater flow of 100,000 gallons. Two feed pumps transfer the wastewater at 100 gallons per minute (gpm) to treatment.

Grit removal: A grit separator removes the majority of the suspended solids from the wastewater, comprised mainly of paint chips and sandblast grit. The separated solids are collected and sampled. In almost all instances, the solids have been found to be non-hazardous and have been recycled as either aggregate for asphalt or as an iron source for Portland cement. In the few instances where they have been found to be hazardous, the solids have been managed as a hazardous waste and have been sent to the hazardous waste landfill at Arlington.

Chemical treatment: Treatment is carried out in a 1,800 gallon, agitated tank. Dimethyldithiocarbamate (DTC) and Bentonite Clay are metered into the treatment tank. DTC converts the dissolved metals to insoluble salts that precipitate. Clay is added to absorb oil and some additional metals. The treated wastewater with the chemical precipitates overflows to the clarifier.

Clarification: The chemical precipitates are removed in a three-stage clarifier. The first stage of the clarifier is a rapid mixing of the wastewater with a polymer solution. The polymer binds the precipitates together into larger particles. In a second slowly mixed stage, the particles continue to grow in size and density. In the third stage, the wastewater enters a settling chamber, where the solids settle into an internal sludge holding tank. The clarified wastewater overflows to 1,000-gallon tank where it is pumped to a filter.

Filtration: The filter removes the residual solids that pass through the clarifier. The solids collected in the filter are returned to chemical treatment. The filtered wastewater is pumped to an existing outfall for discharge to the Willamette River.

Sludge Dewatering: The precipitated solids are periodically withdrawn from the clarifier and pumped to a sludge holding tank. When this tank is full, the sludge is pumped to a plate and frame filter press, where the solids and water are separated. The dewatered solids are collected and sampled. In all instances, the sludges have been found to be non-hazardous and have been disposed of as a special waste at the Hillsboro landfill. The water is returned to chemical treatment.

### ***Eligibility***

- ORS 468.155 (1)(a) The **principal purpose** of this **new installation of equipment, piping and building** is to prevent, control or reduce a substantial quantity of water pollution.
- ORS 468.155 (1)(b)(A) The disposal or elimination of or redesign to eliminate industrial waste and the use of treatment works for industrial waste as defined in ORS 468B.005
- OAR-016-0025 (2)(g) Installation or construction of facilities which will be used to detect, deter, or prevent spills or unauthorized releases.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>6/22/99</u>
<i>Additional Information Requested</i>	<u>10/15/99</u>
<i>Additional Information Provided</i>	<u>11/2/99</u>
<i>Application Substantially Complete</i>	<u>11/3/99</u>
<i>Construction Started</i>	<u>1/1/94</u>
<i>Construction Completed</i>	<u>10/1/97</u>
<i>Facility Placed into Operation</i>	<u>10/1/97</u>

***Facility Cost***

Facility Cost	<u>\$1,996,920</u>
Eligible Facility Cost	<u>\$1,996,920</u>

The facility cost exceeds \$500,000. The reviewers analysed the summary of facility costs and fully substantiated the claimed costs. The pollution control facility was constructed by a contractor using a design/build process. A management accounting report created by the Port of Portland provided cost information on direct and indirect internal labor, contracted professional and construction services, and other direct costs.

***Facility Cost Allocable to Pollution Control***

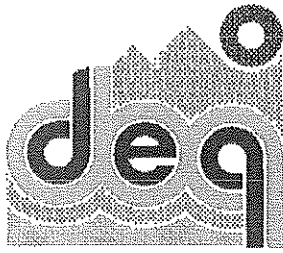
The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control. The percentage of the facility cost allocable to pollution control is 100%.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No alternative investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or increase in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statues and with the Federal Environmental Protection Agency rules. The following DEQ permits have been issued to the facility: NPDES Permit 101393, issued 5/8/98; Title V Operating Permit 26-3224, issued 7/2/989

Reviewers: Bill Carson, Carson Engineering  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Smurfit Newsprint Corporation**  
Application No. **5236**  
Facility Cost **\$24,184**  
Percentage Allocable **100%**  
Useful Life **10 years**

## **Pollution Control Facility: Air Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**  
Business: **manufacturer of particleboard**  
Taxpayer ID: **93-0361650**

### ***Facility Identification***

The certificate will identify the facility as:

**A enclosure around truck loading area**

The applicant's address is:

**427 Main Street  
Oregon City, OR 97045**

The applicant is the owner of the facility located  
at:

**1744 Main Street  
Sweet Home, OR 97384**

### ***Technical Information***

The claimed facility is the installation of two- (2) baghouse dust control systems, the removal of two- (2) cyclones and rearrangement of existing pneumatic conveyor piping, and the installation of two- (2) waste wood truck bins.

**Baghouse System:** The two-baghouse systems were added to collect the dust-laden air from a number of existing cyclones that are part of an existing pneumatic conveying system. Prior to this installation, these cyclones discharged directly to the atmosphere. The baghouse installations are required to prevent the air borne particulate discharge of the cyclones from becoming airborne and being deposited on the property of others (OAR 340-025-0310). Removal of two- (2) cyclones facilitated and simplified the installation of the baghouse system.

**Pneumatic conveying systems:** Material collected at the baghouses is conveyed by pneumatic conveying systems to the truck bins.

**Two- waste wood truck bins:** These bins are used to store waste wood material until a truck load volume is accumulated for shipment off-site. These bins are of bottom discharge design to bulk load



open-top trailers. The trailers are pulled into loading position and the bin bottom opens to discharge material from the bins.

**Trailer loading area:** The trailer loading area is entirely enclosed with roll-up doors at the entrance and exit openings to the loading area. These doors are closed during the loading process to prevent dust becoming airborne and escaping the plant property. The bin enclosure is solely designed to prevent dust from becoming airborne when the bins are being unloaded.

**Eligibility**

- ORS 468.155 (1)(a) **The sole purpose of this new baghouse equipment installation and truck bin enclosure is to prevent, control or reduce a substantial quantity of air pollution. The purpose of the pneumatic conveying systems and the two waste wood truck bins is not to prevent, control or reduce a substantial quantity of air pollution. Their purposes is to provide for material handling.**
- ORS 468.155 (1)(b)(B) **The control is accomplished by the elimination of air pollution and the use of the baghouse which meet the air cleaning device definition in ORS 468A.005. The pneumatic conveying systems and the two waste wood truck bins do not eliminate air pollution with the use of an air cleaning device as defined in ORS 468A.005.**

**Timeliness of Application**

The applicant's records indicate that major portions of the claimed facility were put into operation before the total facility construction was completed in 11/97. Those portions were **not** submitted within the timing requirements of ORS 468.165 (6). The applicant's depreciation ledger indicates that 92.4% of the claimed facility was in operational service more than two years before the Department received the application.

Application Received	7/26/99
Requested additional information	8/30/99
Received information	9/24/99
Requested additional information	10/7/99
Received letter from applicant's attorney w/o requested information	12/8/99
Application Substantially Complete	12/8/99
Construction Started	12/1/95
<u>Claimed</u> Construction Completed (from examination of applicant's ledger)	11/1/97
Majority of baghouse installation and piping, truck bins, major portion of pneumatic conveying system	9/96
Final portion of pneumatic conveying system,	3/97
Enclosure around truck bins	11/97
Placed into Operations (from examination of applicant's depreciation ledger)	
Majority of baghouse installation and piping, truck bins, major portion of pneumatic conveying system,	12/96
Final portion of pneumatic conveying system,	3/97
Enclosure around truck bins	11/97

**Cost Facility**

The claimed facility cost was greater than \$50,000 but less than \$500,000. Therefore, Ernst & Young LLP performed an accounting review according to Department guidelines on behalf of the applicant. Eligible facility costs represent the expenditures for construction of the enclosures around the waste wood truck bins.

Invoices (as entered in the applicant's accounting ledger) substantiated the cost of the enclosure.

**Facility Cost**

	<b>\$ 318,325</b>
Ineligible costs due to timeliness	(\$294,141)
Eligible Facility Cost	<u>\$24,184</u>

The claimed facility cost was greater than \$50,000 but less than \$500,000. Therefore, Ernst & Young LLP performed an accounting review according to Department guidelines on behalf of the applicant. Eligible facility costs represent the expenditures for construction of the enclosures around the waste wood truck bins.

Invoices (as entered in the applicant's accounting ledger) substantiated the cost of the enclosure

**Facility Cost Allocable to Pollution Control**

The facility cost does not exceed \$50,000. According to ORS 468.190 (3), the only factor used to determine the percentage of the facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. The percentage of time this facility is used for pollution control is **100%**.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	Sale of wood waste collected amounts to about 286 tons/year. This material is sold for \$6.56 /ton delivered. Transportation cost is \$15.73/ton, resulting in a net loss of <\$9.17>/ton. This is included in the increase-in-cost calculation below.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 23 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No alternative investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	Applicant's calculations indicate that the claimed facility increases the manufacturing plant's net annual operating cost by \$19,182 per year.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

***Compliance and Other Tax Credits***

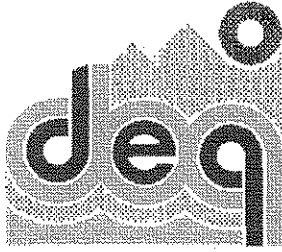
The facility is in compliance with Department rules and statutes and with EQC orders. Other certificates issued to applicant are:

App.No	Description of Facility	Claimed	Percent	Facility Location	Issue
4677	BAG HOUSE	\$245,846	100%	PHILOMATH	6/5/97
4676	Press vent wet scrubbing system installed to control emissions of particulate matter and formaldehyde.	\$366,710	100%	PHILOMATH	6/5/97
4101	ELECTRSTATIC PRECIPITATOR	\$3,668,754	100%	NEWBERG	12/10/93
2116	SLUDGE DE-WATERING SYSTEM	\$1,014,833	100%	OREGON CITY	11/4/88
2010	INSTALLATION OF A RADER 88"	\$74,978	100%	PHILOMATH	9/9/88

***DEQ permits issued to facility:***

Title V Operating Permit, 22-7137, Issued 5/14/98; Expires 7/01/02

Reviewers: Darrel Allison/HCMA Consulting Group  
Maggie Vandehey, DEQ



Director's  
Recommendation: **APPROVE**  
Applicant **Carson Oil Company**  
Application No. **5242**  
Facility Cost **\$138,278.00**  
Percentage Allocable **100%**  
Useful Life **10 years**

# Tax Credit Review Report

EQC 0005

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## **Pollution Control Facility: Water**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **an C corporation**

Business: **Petroleum bulk stations and  
terminals; primarily  
wholesale distributor**

Taxpayer ID: **93-0465110**

The applicant's address is:

**PO Box 10948  
Portland, OR 97296-0948**

### ***Facility Identification***

The certificate will identify the facility as:

**Storm Water Runoff System and Oil  
Storage Containment Facility**

The applicant is the owner of the facility located  
at:

**3125 NW 35<sup>th</sup> Avenue  
Portland, OR 97296-0948**

### ***Technical Information***

The claimed facility consists of two pollution control systems: a storm water runoff system and an oil storage containment facility.

#### Storm Water Runoff System

The storm water runoff system is a piping and valving system installed to allow uncontaminated storm water to discharge directly to the existing City of Portland storm water sewer, and contaminated water (soapy water from washing trucks) to discharge to the City of Portland sanitary sewer system. Prior to this installation, all site water discharge was collected and piped into the City of Portland sanitary sewer. The city sanitary sewer system cannot handle all this storm water and the City of Portland required Carson Oil to divert the unpolluted storm water directly to the City of Portland storm sewer. To accomplish this, the applicant installed a system of collection inlets, pipes and valves, and a Utility Vault Co. model #816-CPS oil/water separator. The system operates as follows: When no truck washing is being done, the valving system directs the storm water flow through the oil separator and then into the storm sewer system. During periods of truck washing the valves are switched and this polluted water goes to the sanitary sewer system.

Oil Storage Containment Facility

The project also included the construction of a concrete containment for five (5) existing above-ground oil storage tanks.

**Eligibility**

- ORS 468.155 The **principal purpose** of this **new installation** is to prevent, control or reduce a substantial quantity of water pollution. The facility was installed to comply with EPA, DEQ, and the City of Portland Code for Effluent discharges into the Publicly Owned Treatment Works (POTW).
  - (1)(a)
- ORS 468.155 The pollution control is accomplished by controlling industrial waste with the use of treatment works as defined in ORS 468B.005
  - (1)(b)(A)

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>7/27/99</b>
<i>Request for additional information</i>	<b>8/30/99</b>
<i>Additional information received</i>	<b>9/22/99</b>
<i>Request for additional information</i>	<b>12/22/99</b>
<i>Applicant Request for additional time to provide information</i>	<b>2/17/00</b>
<i>Additional information received</i>	<b>3/20/00</b>
<i>Application Substantially Complete</i>	<b>3/20/00</b>
<i>Construction Started</i>	<b>6/6/97</b>
<i>Construction Completed</i>	<b>7/31/98</b>
<i>Facility Placed into Operation</i>	<b>8/29/98</b>

**Facility Cost**

Facility Cost	<b>\$151,615</b>
Ineligible Costs	<b>(\$12,337)</b>
Eligible Facility Cost	<b>\$138,278</b>

The facility cost was greater than \$50,000 but less than \$500,000. Therefore, the accounting firm of Mack, Roberts & Co. performed an accounting review according to Department guidelines on behalf of the applicant. In addition, the reviewers performed an analysis of the cost data. The reviewer found ineligible items which the Applicant quantified as \$12,337.

***Facility Cost Allocable to Pollution Control***

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control. The percentage of the facility cost allocable to pollution control is **100%**.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No alternative investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or increase in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders.

DEQ permits issued to facility:

National Pollutant Discharge Elimination System (NPDES) Permit Number: 1200-Z;

Expiration Date: 6/30/2002

Reviewers: Vandehey-DEQ  
Darrel Allison, P.E. - HCMA Consulting Group



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Oregon Steel Mills, Inc.**  
Application No. **5262**  
Facility Cost **\$1,806,533**  
Percentage Allocable **100%**  
Useful Life **10 years**

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## **Pollution Control Facility: Water**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**

Business: **manufacturer of steel plates  
and coils**

Taxpayer ID: **94-0506370**

The applicant's address is:

**1000 SW Broadway, Suite 2200  
Portland, OR 97205-3003**

### ***Facility Identification***

The certificate will identify the facility as:

**Melt Shop Solid Contact Clarify  
System**

The applicant is the owner of the facility located  
at:

**14400 N. Rivergate Blvd  
Portland, OR 97203**

### ***Technical Information***

The applicant's plant on Rivergate Boulevard manufactures steel plates and coils from scrap steel. This pollution control facility is a solid contact clarify system designed to coagulate, flocculate and remove mullet, oil and grease, and colloidal materials from the mold sump wastewater effluent. The removed solids are dewatered and disposed of in a landfill. Prior to the installation of this facility the wastewater from the melt shop and the plate mill both were processed through a pressure filter plant, which was not designed to remove all the contaminants found in this combined waste water. Then the wastewater from the filter was pumped to a settling pond. With the addition of this facility for the mold shop waste, the original pressure filter system is now performing as designed.



**Eligibility**

ORS 468.155 (1)(a)(B) The **sole purpose** of this **new installation, building, device, structure, equipment and machinery** is to prevent, control or reduce a substantial quantity of water pollution.

The "exclusive" purpose of the restrooms, storage areas, locker rooms, process piping and the repair of the fire hydrant is not pollution control. They serve other puposes.

The applicant claimed the principal purpose facility was pollution control. However, DEQ or EPA did not impose the requirement to install this facility. The report prepared for the EPA did identify the mullite ponds as a solid waste management unit (SWMU 12 in the report) but concluded "the potential for release of hazardous constituents from these ponds to any of the media is low" and recommended no further corrective action required.

OAR 340-16-025(g)(B) **Replacement:** No tax credit was taken on the preexisting facility.

ORS 468.155 (1)(b)(A) The pollution control is accomplished by the disposal or elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468A.005

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>8/30/99</u>
<i>File Complete and Ready to Process</i>	<u>11/17/99</u>
<i>Construction Started</i>	<u>4/1/95</u>
<i>Construction Completed</i>	<u>12/31/97</u>
<i>Facility Placed into Operation</i>	<u>9/21/97</u>

**Facility Cost**

Claimed Cost	\$2,593,735
Insignificant Contribution ORS 468.155(2)(d)	
Removed by Applicant	
Restrooms, storage areas, locker room	(\$143,669)
Removed by Reviewer	
Process Piping, Repair Fire Hydrant	(\$ 60,956)
Unsubstantiated Facility Cost	<u>(\$ 582,577)</u>
Eligible Facility Cost	<u>\$1,806,533</u>

The facility cost was greater than \$500,000. Deloitte & Touche LLP performed the accounting statement on behalf of the applicant. The reviewers analysed the facility cost based upon the invoices submitted with the application. The reviewers were unable to substantiate \$582,577 of the claimed facility cost.

***Facility Cost Allocable to Pollution Control***

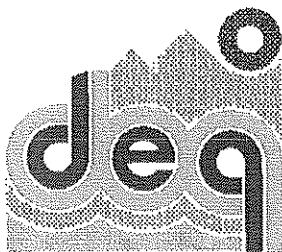
The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control. The percentage of the facility cost allocable to pollution control is **100%**.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	The applicant indicates that the new clarify system does have the capability of producing mullite cake that may be recyclable, but the applicant has not found any use or market for the material.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No alternative investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or increase in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: NPDES Permit No. 101007 File no. 64905

Reviewers: Darrel Allison, P.E. HCMA Consulting Group  
 Jeff Ament, P.E. HCMA Consulting Group  
 M.C. Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Portland General Electric**  
Application No. **5270**  
Facility Cost **\$146,409**  
Percentage Allocable **100%**  
Useful Life **10 years**

## **Pollution Control Facility: Water Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **C Corporation**

Business: **Supplier of Electrical Energy**

Taxpayer ID: **93-0256820**

The applicant's address is:

**121 SW Salmon Street  
Portland, OR 97204**

### ***Facility Identification***

The certificate will identify the facility as:

**A Fuel Oil Spill Containment Pad and  
Drainage Piping**

The applicant is the owner of the facility located  
at:

**200 Ullman Blvd  
Boardman, OR 97818**

### ***Technical Information***

The facility provides pollution protection during tank truck unloading of diesel fuel oil at PGE's Coyote Springs Thermal Electric Generating Plant. The facility consists of a large concrete pavement spill containment pad and drainage piping to a previously certified Oily Waste System for rainwater runoff. The facility protects against the possibility of diesel oil spilling when unloaded from the tanker trucks. Without the facility spilled diesel oil would contaminate soil and groundwater directly or when washed off the fuel unloading area with rainwater. The facility also includes the following components that are not allocable for tax credit: the driveway access pavement and the fuel oil unloading pump, fuel oil fill connection fittings, valves and piping that allow the tank truck to deliver fuel to the fuel oil storage tank.

**Eligibility**

- ORS 468.155 (1)(a)(A) The **principal purpose** of this **construction or installation** is to comply with a requirement imposed by the federal Environmental Protection Agency to **control** water pollution.
- ORS 468.155 (1)(a)(A) The **purpose** of the **fuel delivery system and the driveway access pavement** is not to reduce, eliminate or control water pollution. Its purpose is to supply fuel used to generate power, providing a benefit of economic value to the Coyote Springs power plant.
- ORS 468.155 (1)(b)(A) The **control** is accomplished with the use of treatment works for industrial waste as defined in ORS 468B.005.
- ORS 468.155 (1)(b)(A) The **fuel delivery system and the driveway access pavement** is not considered a treatment works for industrial waste as defined in ORS 468B.005.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6). Applicant supplied documentation indicating the facility construction start date and closing date, as well as a copy of the application fee receipt.

<i>Application Received</i>	<u>09/29/99</u>
<i>Filed Complete and Ready to Process</i>	<u>01/19/00</u>
<i>Construction Started</i>	<u>03/01/97</u>
<i>Construction Completed</i>	<u>10/01/97</u>
<i>Facility Placed into Operation</i>	<u>10/01/97</u>

Facility Cost	<b>\$232,396</b>
Non-allowable costs -- driveway access pavement and fuel delivery system	<b>(\$ 85,987)</b>
Eligible Facility Cost	<b>\$146,409</b>

Pricewaterhouse Coopers LLP provided an independent auditor's report. The reviewers performed the accounting review on behalf of the Department.

**Facility Cost Allocable to Pollution Control**

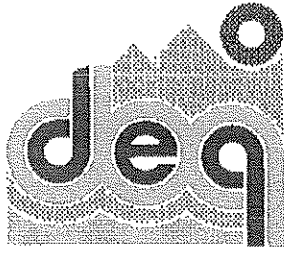
The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 25 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No alternative investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or increase in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

***Compliance and Other Tax Credits***

The applicant claims the facility is in compliance with Department rules and statutes. The applicant has a preexisting oil/water separator at the same location that has received a tax credit.

Reviewers: Mika Kaplan, Envirometrics, Inc.  
Michael G. Ruby, Ph.D., P.E., Envirometrics, Inc.  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant	<b>Portland General Electric</b>
Application No.	<b>5278</b>
Facility Cost	<b>\$14,099</b>
Percentage Allocable	<b>100%</b>
Useful Life	<b>7 years</b>

## Pollution Control Facility: Water Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation operating an **electric utility company**. The applicant's taxpayer identification number is 93-0256820 and their address is:

**121 SW Salmon Street  
Portland, OR 97204**

### *Facility Identification*

The applicant claimed the following facility:

#### **Three Oil/Water Separators**

The applicant is the owner of the facility of the facility located at:

**Wilsonville Line Crew Center  
9480 SW Boeckman  
Wilsonville, OR 97070**

### *Technical Information*

The claimed facility is located at a site used for fueling or washing company vehicles and storing or repairing transformers. It consists of:

1. A 4,000-gallon Oil/Water Separator Vault manufactured by Utility Vault, model #712-SA-3-24. In the event of an oil spill from the transformer storage area, oil will flow in the direction of the catch basin in the yard, which dumps into the oil water separator. The separator has an effluent quality of 100 ppm at a flow of 280 gpm.
2. A coalescing Oil/Water Separator manufactured by Utility Vault, model #660-CPS. The fuel tank area consists of two 5,000-gallon above ground fuel tanks. Catch basins at the drive slab of this area drain to the claimed oil water separator. The separator has an effluent quality of 100 ppm at a flow of 125 gpm.
3. A 1,500-gallon Oil/Water separator manufactured by Utility Vault, model #4686-SA. A covered vehicle wash facility has a catch basin which drains to this oil water separator and then to the sanitary sewer. The separator has an effluent quality of 100 ppm at a flow of 100 gpm.

The location of the claimed facility is approximately 0.6 miles East of Seely Ditch and 1.8 miles north of the Willamette River, at the Wilsonville Line Crew Center. The potential would exist for a maximum spill of 10,000 gallons of fuel to drain into the Seely Ditch or the Willamette River without the claimed facility.

**Eligibility**

- ORS 468.155 (1)(a)(B) The **sole purpose** of this **new equipment** is to prevent a substantial quantity of water pollution.
- ORS 468.155 (1)(b)(A) The pollution control is accomplished by the disposal or elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468A.005.
- OAR 340-016-0060 (4) (g) The facility is used to prevent spills or unauthorized releases.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>10/13/1999</b>
<i>Additional Information Requested</i>	<b>11/16/1999</b>
<i>Additional Information Received</i>	<b>1/14/2000</b>
<i>Application Substantially Complete</i>	<b>1/24/2000</b>
<i>Construction Started</i>	<b>10/23/1996</b>
<i>Construction Completed</i>	<b>10/13/1997</b>
<i>Facility Placed into Operation</i>	<b>10/13/1997</b>

**Facility Cost**

Claimed Cost	<b>\$ 14,099</b>
Non-Allowable Cost	<b>\$0</b>
Allowable Cost	<b>\$14,099</b>

The facility cost does not exceed \$50,000. An accounting review was not required. A copy of one invoice was provided which substantiated the claimed facility cost.

**Facility Cost Allocable to Pollution Control**

The facility cost does not exceed \$50,000. According to ORS 468.190 (3), the only factor used in determining the percentage allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore the percentage of the facility cost allocable to pollution control is 100%.

**Compliance**

The applicant states the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: None.

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers, Inc.  
Dennis E. Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ





# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Forrest Paint Co.**  
Application No. **5280**  
Facility Cost **\$19,604**  
Percentage Allocable **100%**  
Useful Life **7 years**

## Pollution Control Facility Tax Credit: Air Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is an S corporation. They are **manufacturers of powder coatings**. Their taxpayer identification number is 93-0612986. The applicant's address is:

**1011 McKinley  
Eugene, OR 97402**

### *Facility Identification*

The certificate will identify the facility as:

#### **A Baghouse**

The applicant is the owner of the facility located at:

**990 McKinley  
Eugene, OR 97402**

### *Technical Information*

The claimed facility consists of a jet-pulse baghouse, identified as CD-6/JP-2. It is installed to filter and control particulate created by the air classifying grinder process. The baghouse is sized for 1,000 acfm and has a rated efficiency of 99.9%.

Without this system, the particulate created would have been ventilated out of the building, thereby emitting approximately 4,643 pounds of particulate into the atmosphere in 1998. Approximately 4.7 pounds of particulate per year is being emitted with the baghouse installed. The system is considered the best available technology for this application.

### *Eligibility*

**ORS 468.155 (1)(a)(B)** The **principal purpose** of this **installation of equipment** is to **control** a substantial quantity of air pollution. This requirement is imposed by Lane Regional Air Pollution Authority under permit 202805 Rules 32-020 and 32-015. The most important purpose of the cyclone is material handling not pollution control.

**ORS 468.155** The control is accomplished by the elimination of air pollution and the use of the  
**(1)(b)(B)** baghouse which meet the air cleaning device definition in ORS 468A.005.

### ***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>10/13/99</u>
<i>Additional Information Requested</i>	<u>11/16/99</u>
<i>Additional Information Received</i>	<u>12/29/99</u>
<i>Application Substantially Complete</i>	<u>1/3/00</u>
<i>Construction Started</i>	<u>10/12/97</u>
<i>Construction Completed</i>	<u>10/15/97</u>
<i>Facility Placed into Operation</i>	<u>10/15/97</u>

### ***Facility Cost***

Claimed Cost	\$ 25,060
Non-allowable costs:	
Cyclone Collector	<u>(5,456)</u>
Allowable Cost	\$ 19,604

The facility cost does not exceed \$50,000. An independent accounting review was not required. Copies of invoices were provided which substantiated the claimed facility cost. The cyclone collector is an ineligible item because it's primary purpose is material handling not pollution control.

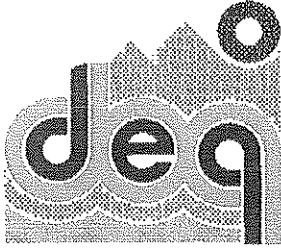
### ***Facility Cost Allocable to Pollution Control***

The facility cost does not exceed \$50,000. According to ORS 468.190 (3), the only factor used in determining the percentage allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is 100%.

### ***Compliance***

The applicant states the facility is in compliance with Department rules and statutes and with EQC orders. LRAPA permits issued to facility: Title V Operating Permit No. 202805.

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers  
Dennis Cartier, Associate, SJO Consulting Engineers  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Neo Leasing LLC.**  
Application No. **5284**  
Facility Cost **\$22,619**  
Percentage Allocable **100%**  
Useful Life **5 years**

## Reclaimed Plastic Products

### Final Certification

ORS 468.451 -- 468.491

OAR 340-017-0010 -- 340-017-0055

### *Applicant Identification*

Organized As: **a Corporation**

Business: **Equipment leasing for the  
recycling, repressing &  
manufacturering of post  
consumer & industrial  
plastics.**

Taxpayer ID: **93-1291873**

The applicant's address is:

**4427 NE 158<sup>th</sup>  
Portland, Oregon 97230**

### *Facility Identification*

The certificate will identify the facility as:

**Toyota forklift model 7FGU25, serial  
number 7FGU25-61011**

The applicant is the owner of the facility located  
at:

**4427 NE 158<sup>th</sup>  
Portland, Oregon 97230**

### *Technical Information*

This forklift truck is used to transport scrap plastic as part of the recycling process. Sorted plastic is eventually remelted and molded into reclaimed plastic pellets.

### *Eligibility*

ORS 468.461 (1). Any person may apply to the EQC for certification of an investment made to allow the person to collect, transport or process reclaimed plastic or to manufacture a reclaimed plastic product.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.461(6).

<i>Preliminary Application Received</i>	<u>10/06/1999</u>
<i>Preliminary approval granted</i>	<u>10/06/1999</u>
<i>Date of investment</i>	<u>02/15/2000</u>
<i>Final application received</i>	<u>03/23/2000</u>
<i>Application substantially complete</i>	<u>03/28/2000</u>

***Facility Cost***

Claimed Facility Cost	\$22,619
Ineligible Costs	
Eligible Facility Cost	<u>\$22,619</u>

Pursuant to OAR 340-017-0030 (1)(a), invoices substantiated the cost of the facility. The facility cost does not exceed \$50,000; therefore, an independent accounting review was not required.

***Facility Cost Allocable to Pollution Control***

Pursuant to ORS 468.486, the following factors were used to determine the percentage of the investment allocable to the collection, transportation or processing of reclaimed plastic or the manufacture of reclaimed plastic product.

<u>Factor</u>	<u>Applied to This Facility</u>
OAR 340-017-0030 (2)(a) Extent used to convert reclaimed plastic into a salable or usable commodity.	The equipment is used 100% of the time to for processing reclaimed plastic into a salable or useable commodity.
OAR 340-017-0030 (2)(b) The alternative methods, equipment and costs for achieving the same objective;	No alternative methods were considered.
OAR 340-017-0030 (2)(c) Other relevant factors used to establish portion of the cost allocable to collection, transportation or processing of reclaimed plastic or the manufacture of reclaimed plastic products.	No other factors were considered relevant.

Considering these factors, the percentage allocable to pollution control is 100%.

***Compliance***

The facility is in compliance with Department rules and statutes and with EQC orders. There are no DEQ permits issued to this facility:

Reviewers: William R Bree



# Tax Credit Review Report

EQC 0005

## Pollution Control Facility: Water Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation operating as an **electrochemical plant**. The taxpayer's identification number is 23-0960890. The applicant's address is:

**6400 N.W. Front Avenue  
Portland, OR 97210**

Director's  
Recommendation: **APPROVE**  
Applicant **Elf Atochem North America**  
Application No. **5285**  
Facility Cost **\$948,062**  
Percentage Allocable **100%**  
Useful Life **10 years**

### *Facility Identification*

The facility is identified as:

**Concrete secondary containment system  
and associated structural piling for a  
sodium hydroxide tank farm.**

The applicant is the **owner** of the facility located at:

**6400 N.W. Front Avenue  
Portland, OR 97210**

### *Technical Information*

The claimed facility consists of a large 8-inch thick concrete slab and walls which provides secondary containment for two sodium hydroxide tanks. It is 387 feet long and the width varies between 105 and 148.5 feet and keyed into a four-foot high perimeter concrete wall. The slab is sloped to three drainage sumps that hold stormwater runoff until it is tested to determine if it is safe to discharge to the Willamette River. Concrete foundations were constructed for each tank consisting of 156 auger cast pilings, 16 inches in diameter and 65 feet long. The tanks were moved into place after construction of the tank foundations. The tanks are located approximately 100 feet from the Willamette River.

The tank farm was originally constructed in 1979 and consisted of two 1,200,000-gallon steel tanks that had no structural foundation. The tank farm floor was soil with a four-foot high earthen berm around the perimeter. The tanks store 12% sodium hydroxide processed by evaporation to a 50% sodium hydroxide solution and sold.

The facility was designed to serve as a spill control facility and to hold 110% of the volume of the largest tank plus a 10 year, 24 hour rainfall event. Drainage from the system can either be pumped to the NPDES wastewater treatment system or to a caustic recovery system.

**Eligibility**

- ORS 468.155 The **sole purpose** of this **new installation** is to **prevent** a substantial quantity of  
 (1)(a) water pollution by providing spill containment.
- ORS 468.155 The control is accomplished by the elimination of industrial waste and the use of  
 (1)(b) treatment works for industrial waste as defined in ORS 468B.005.
- OAR 340-016- The facility functions to prevent spills or unauthorized releases.  
 0060 (4) (g)

**Timeliness of Application**

The application was not submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>10/20/1999</u>
<i>Additional Information Requested</i>	<u>12/10/1999</u>
<i>Additional Information Received</i>	<u>2/15/2000</u>
<i>Application Substantially Complete</i>	<u>4/3/2000</u>
<i>Construction Started</i>	<u>5/1996</u>
<i>Construction Completion</i>	<u>10/23/1997</u>
<i>Facility Placed into Operation</i>	<u>10/23/1997</u>

**Facility Cost**

Facility Cost	\$ 948,062
Ineligible Facility Cost	
Eligible Facility Cost	<u>\$948,062</u>

Copies of invoices and work orders were provided which substantiated 100% of the claimed facility cost. The reviewers performed an analysis of the facility cost on behalf of the department. Symonds, Evans & Larson, P.C. provided a certified public accountant's statement on behalf of the applicant.

**Facility Cost Allocable to Pollution Control**

According to ORS.190 (1), the facility cost exceeds \$50,000 and therefore, the following factors were used to determine the percentage of the facility cost allocable to pollution control.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues are associated with this facility.
ORS 468.190(1)(c) Alternative Methods	High density polyethylene plastic membrane was considered but would not provide any seismic stability..
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or increase in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

The applicant claimed the percentage of the facility cost allocable to pollution control as 100%. The Department did not verify this amount.

***Compliance***

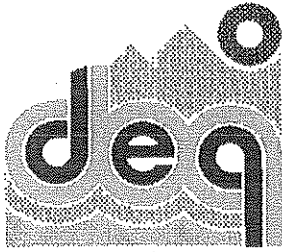
The applicant states the facility is in compliance with Department rules and statutes and with EQC orders.

The following DEQ permits have been issued to the facility:

NPDES #100752, expiration date 3/31/96, and

ACDP #26-2424, expiration date 4/1/2000.

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers  
Dennis Cartier, Associate, SJO Consulting Engineers  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant	<b>Portland General Electric</b>
Application No.	<b>5289</b>
Facility Cost	<b>\$220,632.00</b>
Percentage Allocable	<b>100%</b>
Useful Life	<b>10 years</b>

## **Pollution Control Facility: Water**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **C Corporation**

Business: **Supplier of Electrical Energy**

Taxpayer ID: **93-0256820**

The applicant's address is:

**121 SW Salmon Street  
Portland, OR 97204**

### ***Facility Identification***

The certificate will identify the facility as:

### **Lined Spill Containment and Drainage System**

The applicant is the owner of the facility located  
at:

**10697 SW Denny Rd  
Beaverton, OR 97008**

### ***Technical Information***

The facility is an oil spill containment system at the Denny Substation in Beaverton, Oregon. The substation transfers power from transmission lines to the distribution system using two transformers. The facility allows drainage from the two separate transformer areas using a lined containment system that drains to a shared lined pit, with the site graded such that any spilled transformer oil must go through the drainage system. The facility allows passage of water while stopping the flow of oil from an oil spill. The facility allows for storage of all spilled oil from the largest unit with adequate time for a cleanup crew to be dispatched to the site to begin pumping oil from the pit. The facility, which protects against spills from both transformers, is a redesign of an existing certified oil spill containment system that served only one of the transformers.



***Eligibility***

- ORS 468.155 (1)(a)(A) The **principal purpose** of this **construction or installation** is to comply with a requirement imposed by the federal Environmental Protection Agency to **prevent** water pollution.
- ORS 468.155 (1)(b)(A) The control is accomplished by **preventing industrial waste** with the use of treatment works for industrial waste as defined in ORS 468B.005.
- ORS 468.155 (2)(e) The portion of the facility surrounding the existing transformer is not eligible as a **replacement facility** since it is not a requirement imposed by the Department and it replaced a spill containment system certified on May 29, 1987 on Certificate No. 1928.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>10/25/99</u>
<i>Filed Complete and Ready to Process</i>	<u>01/19/00</u>
<i>Construction Started</i>	<u>07/23/97</u>
<i>Construction Completed</i>	<u>12/19/97</u>
<i>Facility Placed into Operation</i>	<u>12/19/97</u>

***Facility Cost***

Facility Cost	\$228,764
Other Tax Credits	
Replacement Cost	<u>(8,132)</u>
Eligible Facility Cost	\$220,632

Installation of the facility was performed while the transmission substation was energized. The excluded cost of the portion of the installation area that surrounds the existing transformer, which previously received a tax credit, was determined to be \$8,132.00. This value was calculated by multiplying the 406.6 square feet of excluded area by the loaded construction costs of \$20 per square foot.

Pricewaterhouse Coopers LLP provided an independent auditor's report. The facility cost does not exceed \$500,000, therefore an accounting review on behalf of the Department is not necessary.

***Facility Cost Allocable to Pollution Control***

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 44 years. No gross annual revenues were

ORS 468.190(1)(c) Alternative Methods

associated with this facility.

Barrier Walls were not used due to safety clearance for fire protection, maintenance on equipment and a higher cost to install.

ORS 468.190(1)(d) Savings or Increase in Costs

No savings or increase in costs.

ORS 468.190(1)(e) Other Relevant Factors

No other relevant factors.

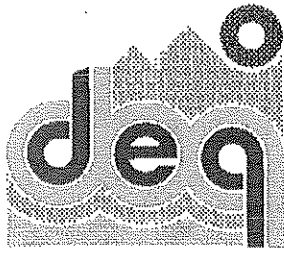
Considering these factors, the percentage allocable to pollution control is 100%.

***Compliance and Other Tax Credits***

The applicant claims the facility is in compliance with Department rules and statutes.

The application accounts for an existing facility for which the applicant was issued a tax credit in 1987 for \$15,143, certificate #1928, application #T-1874.

Reviewers:   Mika Kaplan, Envirometrics, Inc.  
                  Michael G. Ruby, Ph.D., P.E., Envirometrics, Inc.



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Willamette Industries, Inc.**  
Application No. **5298**  
Facility Cost **\$29,166**  
Percentage Allocable **100%**  
Useful Life **7 years**

## Pollution Control Facility: Water Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation operating as a **building products manufacturer**. The applicant's taxpayer identification number is 93-0312940 and their address is:

**1300 SW Fifth Avenue, Suite 3800  
Portland, OR 97201**

### *Facility Identification*

The certificate will identify the facility as:

#### **Wash Water Recycle System**

The applicant is the owner of the facility of the facility located at:

**22833 Vaughn Road  
Veneta, OR 97487**

### *Technical Information*

The claimed facility consists of a Landa CL304 Water Recycling system, a 20 foot by 30 foot concrete wash slab, a United #16-3X72 Trench Drain system, with walls around the system to contain overspray and protect the equipment. The facility provides a fully contained washing area that filters and recycles wash water used to clean mobile equipment. Oil, grease, dirt and other contaminants are filtered out of the water, eliminating the potential for direct run-off of contaminated water onto the ground.

### *Eligibility*

- ORS 468.155 The **principal purpose** of this **new equipment** is to comply with NPDES 1200-Z requirements imposed by DEQ to prevent water pollution.  
(1)(a)(A)
- ORS 468.155 The pollution control is accomplished by the disposal or elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468A.005  
(1)(b)(A)

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>11/1/99</u>
<i>Additional Information Requested</i>	<u>12/14/99</u>
<i>Additional Information Received</i>	<u>1/10/00</u>
<i>Application Substantially Complete</i>	<u>1/13/00</u>
<i>Construction Started</i>	<u>9/1/98</u>
<i>Construction Completed</i>	<u>2/28/99</u>
<i>Facility Placed into Operation</i>	<u>2/28/99</u>

***Facility Cost***

Claimed Facility Cost  
Eligible Facility Cost

\$ 29,166  
\$ 29,166

The facility cost does not exceed \$50,000. An independent accountants review was not required, however, the applicant provided an accountant's statement. A copy of the internal Project Accounting Transaction Detail Report, and copies of the Purchase Orders and invoices were provided which substantiated the claimed facility cost.

***Facility Cost Allocable to Pollution Control***

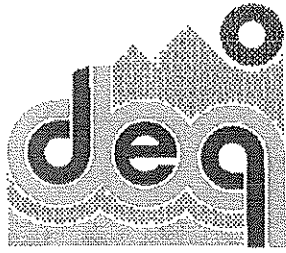
The facility cost does not exceed \$50,000. According to ORS 468.190 (3), the only factor used in determining the percentage allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is 100%.

***Compliance***

The applicant states the facility is in compliance with Department rules and statutes and with EQC orders.

DEQ permits issued to facility: NPDES Storm Water Discharge #1200-Z, issued 11/17/97.

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers, Inc.  
Dennis E. Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant	<b>Willamette Industries, Inc.</b>
Application No.	<b>5300</b>
Facility Cost	<b>\$100,280</b>
Percentage Allocable	<b>100%</b>
Useful Life	<b>7 years</b>

## Pollution Control Facility: Water Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation operating as a **manufacturer of linerboard, corrugating medium, and bag paper**. The applicant's taxpayer identification number is 93-0312940 and their address is:

**1300 SW Fifth Avenue  
Suite 3800  
Portland, OR 97201**

### *Technical Information*

The claimed facility consists of a concrete slab with walls and a sump system. It is designed to divert pile runoff from the Grits and Dregs Storage area to the effluent treatment system.

Grits and Dregs is a by-product that settles out of the green liquor from the recovery boiler with a pH of 11 or 12. It is dumped on the concrete slab. When the slab is full, it is removed and land applied. The pile of grits and dregs in a fairly small area makes the leachate concentration too high to be stored without containment. When the material is land applied, it is spread at a rate that reduces its concentration. The new facility allows leachate from the storage pile to be collected and neutralized in the mill's effluent system, eliminating any possibility of leachate contaminating the groundwater.

Previously the material was temporarily stored through the winter months on farmland where it was used as a soil amendment in the growing season. The storage method did not prevent leaching into the groundwater.

### *Facility Identification*

The certificate will identify the facility as:

**Grits and Dregs Concrete Storage  
Containment and Sump system**

The applicant is the owner of the facility of the facility located at:

**3251 Old Salem Road  
Albany, OR 97321**

**Eligibility**

- ORS 468.155 (1)(a)(A) The **principal purpose** of this **new equipment** is to comply with NPDES 1200-Z requirements imposed by DEQ to prevent water pollution.
- ORS 468.155 (1)(b)(A) The pollution control is accomplished by the disposal or elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468A.005.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>11/1/1999</u>
<i>Additional Information Requested</i>	<u>12/14/1999</u>
<i>Additional Information Received</i>	<u>1/17/2000</u>
<i>Application Substantially Complete</i>	<u>2/3/2000</u>
<i>Construction Started</i>	<u>3/1/1998</u>
<i>Construction Completed</i>	<u>6/30/1998</u>
<i>Facility Placed into Operation</i>	<u>6/30/1998</u>

**Facility Cost**

Claimed Facility Cost	<b>\$ 100,280</b>
Eligible Facility Cost	<b>\$ 100,280</b>

The facility cost is greater than \$50,000 but less than \$500,000. Therefore, **KPMG** performed an accounting on behalf of the applicant. The reviewers analysed the facility cost. Copies of purchase orders and invoices were provided which substantiated the claimed facility cost.

**Facility Cost Allocable to Pollution Control**

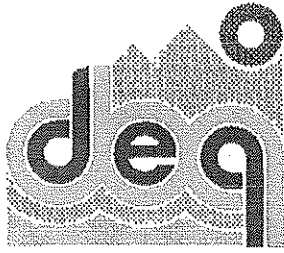
The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were used to determine the percentage of the facility cost allocable to pollution control.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or usable commodity is produced
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 7 years. There is no gross annual revenue associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No other alternatives were investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	There are no savings or operating costs increase.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

**Compliance**

The applicant states the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: NPDES Storm Water Discharge #1200-Z, issued 7/22/97.

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers, Inc.  
Dennis E. Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant	<b>Willamette Industries, Inc.</b>
Application No.	<b>5301</b>
Facility Cost	<b>\$169,065</b>
Percentage Allocable	<b>100%</b>
Useful Life	<b>7 years</b>

## Pollution Control Facility: Water Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation operating as a **manufacturer of linerboard, corrugating medium, and bag paper**. The applicant's taxpayer identification number is 93-0312940 and their address is:

**1300 SW Fifth Avenue  
Suite 3800  
Portland, OR 97201**

### *Facility Identification*

The certificate will identify the facility as:

#### **Six Aerators**

The applicant is the owner of the facility of the facility located at:

**Albany Paper Mill  
3251 Old Salem Road  
Albany, OR 97321**

### *Technical Information*

The claimed facility consists of four 25-horsepower Triton injection-style aerators and two 75-horsepower Turbo splash aerators installed in the mill aeration stabilization basin. Aeration increases dissolved oxygen, which lowers the biological oxygen demand (BOD); thereby improving the discharge quality of the water.

Increases in paper production and in the utilization of secondary fiber have resulted in higher BOD concentrations. Water discharge has increased approximately 10% and BOD loading has decreased approximately 13%.

### *Eligibility*

ORS 468.155 (1)(a)(A) The **principal purpose** of this **new equipment** is to comply with NPDES 101345 requirements imposed by DEQ to prevent water pollution.

ORS 468.155 (1)(b)(A) The prevention is accomplished by the elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468B.005.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>11/1/1999</b>
<i>Additional Information Requested</i>	<b>12/14/1999</b>
<i>Additional Information Received</i>	<b>1/24/2000</b>
<i>Additional Information Requested</i>	<b>2/8/2000</b>
<i>Additional Information Received</i>	<b>2/9/2000</b>
<i>Application Substantially Complete</i>	<b>2/24/2000</b>
<i>Construction Started</i>	<b>8/1/1998</b>
<i>Construction Completed</i>	<b>12/31/1998</b>
<i>Facility Placed into Operation</i>	<b>12/31/1998</b>

***Facility Cost***

Claimed Facility Cost	<b>\$ 169,065</b>
Eligible Facility Cost	<b>\$ 169,065</b>

The facility cost is greater than \$50,000 but less than \$500,000. Therefore, KPMG performed an accounting review according to Department guidelines on behalf of the applicant. Copies of purchase orders and invoices were provided which substantiated 100% of the claimed facility cost.

***Facility Cost Allocable to Pollution Control***

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were used to determine the percentage of the facility cost allocable to pollution control.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or usable commodity is produced
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 7 years. There is no gross annual revenue associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No other alternatives were investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	There are no savings or operating costs increase.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

***Compliance***

The applicant states the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: NPDES Storm Water Discharge #101345, issued 11/30/95.

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers, Inc.  
Dennis E. Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ





# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Willamette Industries, Inc.**  
Application No. **5302**  
Facility Cost **\$ 116,162**  
Percentage Allocable **100%**  
Useful Life **7 years**

## **Pollution Control Facility: Air Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

The applicant is a C corporation operating as a **plywood manufacturer**. The applicant's taxpayer identification number is 93-0312940 and their address is:

**1300 SW Fifth Avenue  
Suite 3800  
Portland, OR 97201**

### ***Facility Identification***

The certificate will identify the facility as:

#### **Model 542 Baghouse**

The applicant is the owner of the facility of the facility located at:

**611 E. Highway 20  
Sweet Home, OR 97386**

### ***Technical Information***

The claimed facility consists of a used Western Pneumatic secondary baghouse, BH-4, Model 542. The system includes the baghouse, a #80 fan with 125 hp motor, wiring and electrical components, the concrete foundation, ducting and related components. The baghouse is sized for 65,000 cfm, has a rated efficiency of 99.9%, and is used to control emissions from existing cyclones C-1, C-3, and a newly installed cyclone, C-13.

The two existing cyclones previously vented to the atmosphere but were in marginal compliance with opacity limits. Opacity is no longer an issue. PM & PM<sub>10</sub> emissions were 2.12 tons per year prior to the installation and there was concern particulate was leaving the property boundaries. Emissions are now negligible.

### ***Eligibility***

ORS 468.155 (1)(a)(A) The **principal purpose** of this **device** is to comply with the following requirements imposed by DEQ to prevent air pollution. The requirement is imposed by DEQ Title V Operating permit. The principal purpose of the cyclone is material handling not air pollution control.

ORS 468.155 The prevention is accomplished by elimination of air contamination sources and  
 (1)(b)(B) the use of an air cleaning device as defined in ORS 468A.005.

### ***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>11/1/1999</u>
<i>Additional Information Requested</i>	<u>12/14/1999</u>
<i>Additional Information Received</i>	<u>1/10/2000</u>
<i>Additional Information Requested</i>	<u>1/17/2000</u>
<i>Additional Information Received</i>	<u>1/27/2000</u>
<i>Application Substantially Complete</i>	<u>2/8/2000</u>
<i>Construction Started</i>	<u>9/4/1998</u>
<i>Construction Completed</i>	<u>1/4/1999</u>
<i>Facility Placed into Operation</i>	<u>12/18/1998</u>

### ***Facility Cost***

Claimed Facility Cost

**\$ 168,258**

Ineligible Costs:

Jeff King Contractors, Move and Install Cyclone 13	<b>(\$7,910)</b>
Jeff King Contractors, Modify cyclone foundation	<b>(275)</b>
Jeff King Contractors, Fire Main repair	<b>(294)</b>
Robert Pickett Contractors, Rock for cyclone foundation	<b>(929)</b>
Qualair Pneumatics, Cyclone 13 and feeder	<b>(28,479)</b>
Qualair Pneumatics, miscellaneous items	<b>(12,313)</b>
Miscellaneous Transportation Costs	<b>(1,598)</b>
CADD Advantage	<b>(298)</b>

Total Ineligible Costs

**\$(52,096)**

Eligible Facility Cost

**\$116,162**

The facility cost is greater than \$50,000 but less than \$500,000. Therefore KPMG Peat Marwick LLP performed an accounting review according to Department guidelines on behalf of the applicant. A copy of the internal Project Accounting Transaction Detail Report (PATDR) and copies of some purchase orders and invoices were provided which substantiated the claimed facility cost. The project costs included ineligible items which are described as follows:

- A portion of the work performed by Jeff King Contractor, Inc. included excavation and concrete work for both Cyclone 13 (C-13) and Baghouse 4 (BH-4). Cyclones are classified as material handling devices and do not qualify for pollution control tax credits. The ineligible amount is a proportion of the total cost based on the footprint of the equipment.
- A portion of the work performed by Jeff King Contractor, Inc. included modifying the cyclone foundation and repairing the fire main. Those items are ineligible because they do not make a significant contribution to pollution control.

- Rock used in the foundation of the cyclone and baghouse was included. The ineligible amount is a proportion of the total cost based on the footprint of the equipment. This work was performed by Robert Pickett Contractor.
- A portion of the work performed by Qualair Pneumatics included the cost of relocating and installing C-13, BH-4, and one feeder, and installing the ductwork between each of the three cyclones and BH-4. The ineligible amount is 1/3 of the total cost based on an estimate that 1/3 of the work is related to the cyclone and ineligible ductwork.
- A portion of the work performed by Qualair Pneumatics was not eligible. Those items included modifying a pressure line and a dump gate on the cyclone.
- Half of the freight charges were estimated to be for baghouse equipment and half for cyclone equipment.
- Half of the CADD Advantage Engineering and Design charges were estimated to be half of the total claimed cost is ineligible.

### ***Facility Cost Allocable to Pollution Control***

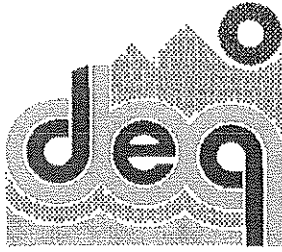
According to ORS.190 (1), the facility cost exceeds \$50,000 and therefore, the following factors were used to determine the percentage of the facility cost allocable to pollution control.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	The baghouse does not produce any salable or usable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 7 years. There is no gross annual revenue associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No other alternatives were investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings and operating costs increase.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

### ***Compliance***

The applicant states the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: Title V #22-3010, issued 11/24/98.

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers, Inc.  
Dennis E. Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **The Ridge Company**  
Application No. **5303**  
Facility Cost **\$107,099**  
Percentage Allocable **100%**  
Useful Life **7 years**

## **Pollution Control Facility: Air Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

The applicant is an S corporation. They **manufacturer wood and tile building products**. Their taxpayer identification number is 93-1018510. The applicant's address is:

**PO Box 1-A  
Eugene, OR 97440**

### ***Facility Identification***

The certificate will identify the facility as:

**Western Pneumatics Model #200  
Primary Cyclonic Filter**

The applicant is the owner of the facility located at:

**83624 N. Pacific Highway  
Creswell, OR 97426**

### ***Technical Information***

The claimed facility consists of a Western Pneumatics baghouse, Model Number 200, with an IAP Model #365 high efficiency fan rated for 100 hp and 21,000 cfm. The baghouse has an overall efficiency of 99.7%. The equipment controls particulate emissions generated by the applicant's wood processing equipment. It captures approximately 15 cubic yards per day, which is then hauled away.

Previously the company used two smaller cyclone dust collection units, however they were undersized and ineffective for this application. The emissions after the installation of the claimed facility are negligible.

### ***Eligibility***

- ORS 468.155 (1)(a)** The **principal purpose** of this **new equipment** is to comply with the applicants air permit to control air pollution.
- ORS 468.155 (1)(b)(B)** The **elimination of air contaminants** is accomplished with the installed baghouse which meets the definition in ORS 468A.005 of an air cleaning device.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>11/1/1999</u>
<i>Additional Information Requested</i>	<u>1/20/1999</u>
<i>Additional Information Received</i>	<u>1/31/2000</u>
<i>Application Substantially Complete</i>	<u>2/9/2000</u>
<i>Construction Started</i>	<u>1/1998</u>
<i>Construction Completed</i>	<u>6/22/1998</u>
<i>Facility Placed into Operation</i>	<u>7/1/1998</u>

***Facility Cost***

Facility Cost	<b><u>\$107,099</u></b>
Eligible Facility Cost	<b><u>\$107,099</u></b>

The facility cost was greater than \$50,000 but less than \$500,000. A request for a waiver of the independent CPA's audit was submitted with the application and the eligible facility cost was documented in eleven invoices.

***Facility Cost Allocable to Pollution Control***

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 7 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No other alternatives were considered.
ORS 468.190(1)(d) Savings or Increase in Costs	There are no savings from this facility and operating costs were about the same. The applicant pays to have the sawdust hauled away from the plant.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

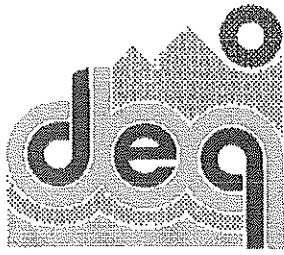
Considering these factors, the percentage allocable to pollution control is 100%.

***Compliance and Other Tax Credits***

The applicant claims the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility:

ACDP 207077 issued December 18, 1996

Reviewers: Dennis Cartier, Associate, SJO Consulting Engineers  
Lois Payne, P.E., SJO Consulting Engineers  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Hewlett-Packard Company**  
Application No. **5304**  
Facility Cost **\$4,476,238.00**  
Percentage Allocable **100.00%**  
Useful Life **10 years**

## Pollution Control Facility: Air Final Certification

ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

Organized As: **a C corporation**  
Business: **manufacturer of inkjet printer  
pens**  
Taxpayer ID: **94-1081436**

The applicant's address is:

**3000 Hanover St. MS 20BF  
Palo Alto, CA 94304**

### *Facility Identification*

The certificate will identify the facility as:

**Installation of three (3) Viron acid-fume  
scrubbing systems**

The applicant is the owner of the facility located  
at:

**1000 NE Circle Blvd.  
Corvallis, OR 97330**

### *Technical Information*

The claimed facility is the installation of three scrubbing systems to remove various acid fumes and gases from a manufacturing building air exhaust stream prior to discharge to the atmosphere. Viron International supplied the systems. Gases removed include sulfuric, nitric, phosphoric, hydrochloric and hydrofluoric acids as well as chlorine gas. Air is continuously exhausted from the manufacturing areas to protect the workers in certain areas from these fumes. Prior to the installation of the claimed equipment, these fumes were exhausted from the manufacturing area by three fans connected to a system of inlet ductwork and hoods. Fumes from two of three fans exhausted directly to the atmosphere. The third fan had an existing scrubber that was inefficient and at the end of its operating life. The existing ductwork system in the internal areas of the manufacturing building were retained and re-used with the new scrubber system. Physical plant constraints dictated the location of the scrubber installation and it was not possible to tie the claimed facility into the existing ductwork system without additional interconnecting inlet and outlet ductwork.

Each scrubber system consists of new fans, a packed-bed scrubber module, a closed-loop treatment chemical and water misting system, a sump blow-down system and the necessary monitoring

instruments and controls. The monitoring/control system assures that the treatment solutions are maintained at the proper pH for efficient system operation. As the air stream passes through the scrubber, the chemical treatment solution is sprayed as a mist into a chamber containing impingement modules (the packed-bed). These modules increase the contact surface area exposed to the airstream. The net effect of this is to optimize the time the airstream is exposed to the chemical treatment solution and is a major factor in determining the efficiency of the scrubber. When the concentration of the removed gases in the chemical treatment water exceeds design concentrations, sump water is blown-down to pre-existing water treatment facilities.

Design parameters for the scrubber system specified a scrubber efficiency of at least 90% in removing the hydrochloric and hydrofluoric acids and to meet the efficiency required by Hewlett-Packard's DEQ ACDP permit. CH2M HILL performed an independent efficiency study to evaluate the actual performance of the scrubbers after the scrubbers became operational. This study (performed in early May 1998) tested the efficiency of the scrubbers at rated design airflow and with "spike" inlet concentrations of chlorine compounds. At design airflows into the scrubber, actual fume removal efficiency easily exceeded the 90% designed efficiency.

### **Eligibility**

ORS 468.155 (1)(a) The **principal purpose** of this **new scrubber equipment installation** is to prevent, control or reduce **air pollution** as required by DEQ (ACDP permit #02-0005.)  
The primary purpose of **new interconnecting ductwork** is material handling within the process and to provide a safe work environment to prevent, control or reduce a substantial quantity of air pollution but to provide.

ORS 468.155 (1)(b)(B) The scrubbers are air cleaning devices, which **control** air pollution by **disposing** of the **air contaminants**.

### **Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6)

<i>Application Received</i>	<b>11/03/99</b>
<i>Requested additional information</i>	<b>12/22/99</b>
<i>Applicant requested extension</i>	<b>12/29/99</b>
<i>Received cost information</i>	<b>01/21/00</b>
<i>Requested additional information</i>	<b>01/25/00</b>
<i>Received requested information</i>	<b>02/25/00</b>
<i>Application Substantially Complete</i>	<b>02/25/00</b>
<i>Construction Started</i>	<b>03/01/97</b>
<i>Construction Completed</i>	<b>03/01/98</b>
<i>Facility Placed into Operation</i>	<b>03/01/98</b>

**Facility Cost**

Facility Cost	<b>\$ 4,806,238.00</b>
Ineligible costs	<u>(\$ 330,000.00)</u>
Eligible Facility Cost	<b>\$4,476,238.00.</b>

The cost of the claimed facility exceeds \$500,000. The applicant provided an independent auditor's report (by Merina, McCoy & Co.) that the facility cost claimed on the application for final certification is eligible and allocable as set forth in OAR 340-016-0070. The reviewers performed an accounting review of the auditors working papers and method of cost review. The reviewer found ineligible costs represented by the interconnecting ductwork for the inlet and exhaust of the scrubber systems. Based on an acceptable engineering estimate the ineligible costs were estimated at \$110,000 per scrubber system, or \$330,000 for the entire claimed facility.

**Facility Cost Allocable to Pollution Control**

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the five factors below are used to determine the percentage of the facility cost allocable to pollution control. The percentage of the facility cost allocable to pollution control is **100%**.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	The claimed facility does not recover a useable or saleable product.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No alternative investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or claimed increases in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

**Compliance and Other Tax Credits**

The facility is in compliance with Department rules and statutes and with EQC orders.

DEQ permits issued to facility:

- ACDP #02-0005 issued 08/29/96
- AQ #02-7010 issued 08/08/97
- NPDES #0200-J issued 01/08/98
- NPDES #1200-Z issued 08/11/97
- NPDES #100-J issued 01/31/97

Reviewers: Darrel Allison/HCMA Consulting Group  
Maggie Vandehey, DEQ





Director's  
Recommendation: **APPROVE**  
Applicant **Neo Leasing LLC**  
Application No. **5311**  
Facility Cost **\$18,000**  
Percentage Allocable **100%**  
Useful Life **5 years**

# Tax Credit Review Report

EQC 0005

## Reclaimed Plastic Products Final Certification

ORS 468.451 -- 468.491  
OAR 340-017-0010 -- 340-017-0055

### *Applicant Identification*

Organized As: **a Corporation**  
Business: **Equipment leasing for the  
recycling, repressing &  
manufacturering of post  
consumer & industrial  
plastics.**

Taxpayer ID: **93-1291873**

The applicant's address is:

**4427 NE 158<sup>th</sup>  
Portland, Oregon 97230**

### *Facility Identification*

The certificate will identify the facility as:

**6" X 30:1 extruder barrel with x102  
inlay and threaded flange**

The applicant is the owner of the facility located  
at:

**4427 NE 158<sup>th</sup>  
Portland, Oregon 97230**

### *Technical Information*

This new barrel is used in an existing plastic extrusion machine to manufacture plastic pellets from reclaimed plastic.

### *Eligibility*

ORS 468.461 (1) Any person may apply to the EQC for certification of an investment made to allow the person to collect, transport or process reclaimed plastic or to manufacture a reclaimed plastic product.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.461(6).

<i>Preliminary Application Received</i>	<u>11/02/1999</u>
<i>Preliminary approval granted</i>	<u>11/02/1999</u>
<i>Date of investment</i>	<u>12/01/1999</u>
<i>Final application received</i>	<u>03/23/2000</u>
<i>Application substantially complete</i>	<u>03/28/2000</u>

***Facility Cost***

Claimed Facility Cost	\$18,000
Ineligible Costs	
Eligible Facility Cost	<u>\$18,000</u>

Pursuant to OAR 340-017-0030 (1)(a), invoices substantiated the cost of the facility. The facility cost does not exceed \$50,000; therefore, an independent accounting review was not required.

***Facility Cost Allocable to Pollution Control***

Pursuant to ORS 468.486, the following factors were used to determine the percentage of the investment allocable to the collection, transportation or processing of reclaimed plastic or the manufacture of reclaimed plastic product.

<u>Factor</u>	<u>Applied to This Facility</u>
OAR 340-017-0030 (2)(a) Extent used to convert reclaimed plastic into a salable or usable commodity.	The equipment is used 100% of the time to for processing reclaimed plastic into a salable or useable commodity.
OAR 340-017-0030 (2)(b) The alternative methods, equipment and costs for achieving the same objective;	No alternative methods were considered.
OAR 340-017-0030 (2)(c) Other relevant factors used to establish portion of the cost allocable to collection, transportation or processing of reclaimed plastic or the manufacture of reclaimed plastic products.	No other factors were considered relevant.

Considering these factors, the percentage allocable to pollution control is 100%.

***Compliance***

The facility is in compliance with Department rules and statutes and with EQC orders. There are no DEQ permits issued to this facility:

Reviewers: William R Bree



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**  
Applicant **Neo Leasing LLC**  
Application No. **5321**  
Facility Cost **\$4,995**  
Percentage Allocable **100%**  
Useful Life **5 years**

## Reclaimed Plastic Products

### Final Certification

ORS 468.451 -- 468.491

OAR 340-017-0010 -- 340-017-0055

### *Applicant Identification*

Organized As: **a Corporation**

Business: **Equipment leasing for the  
recycling, repressing &  
manufacturing of post  
consumer & industrial  
plastics.**

Taxpayer ID: **93-1291873**

The applicant's address is:

**4427 NE 158<sup>th</sup>  
Portland, Oregon 97230**

### *Facility Identification*

The certificate will identify the facility as:

**Zwick 5102 pendulum impact tester**

The applicant is the owner of the facility located  
at:

**4427 NE 158<sup>th</sup>  
Portland, Oregon 97230**

### *Technical Information*

This impact tester is used to test the impact energy, strength, and notched impact strength of recycled plastic. It is used 100% for testing recycled material.

### *Eligibility*

ORS 468.461 (1) Any person may apply to the EQC for certification of an investment made to allow the person to collect, transport or process reclaimed plastic or to manufacture a reclaimed plastic product.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.461(6).

<i>Preliminary Application Received</i>	<u>09/11/1999</u>
<i>Preliminary approval granted</i>	<u>09/11/1999</u>
<i>Date of investment</i>	<u>12/31/1999</u>
<i>Final application received</i>	<u>03/23/2000</u>
<i>Application substantially complete</i>	<u>03/28/2000</u>

***Facility Cost***

Claimed Facility Cost	\$4,995
Ineligible Costs	
Eligible Facility Cost	<u>\$4,995</u>

Pursuant to OAR 340-017-0030 (1)(a), invoices substantiated the cost of the facility. The facility cost does not exceed \$50,000; therefore, an independent accounting review was not required.

***Facility Cost Allocable to Pollution Control***

Pursuant to ORS 468.486, the following factors were used to determine the percentage of the investment allocable to the collection, transportation or processing of reclaimed plastic or the manufacture of reclaimed plastic product.

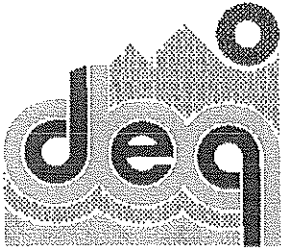
<b>Factor</b>	<b>Applied to This Facility</b>
OAR 340-017-0030 (2)(a) Extent used to convert reclaimed plastic into a salable or usable commodity.	The equipment is used 100% of the time to for processing reclaimed plastic into a salable or useable commodity.
OAR 340-017-0030 (2)(b) The alternative methods, equipment and costs for achieving the same objective;	No alternative methods were considered.
OAR 340-017-0030 (2)(c) Other relevant factors used to establish portion of the cost allocable to collection, transportation or processing of reclaimed plastic or the manufacture of reclaimed plastic products.	No other factors were considered relevant.

Considering these factors, the percentage allocable to pollution control is 100%.

***Compliance***

The facility is in compliance with Department rules and statutes and with EQC orders. There are no DEQ permits issued to this facility:

Reviewers: William R Bree



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Eagle Foundry Company**  
Application No. **5326**  
Facility Cost **\$232,902**  
Percentage Allocable **100%**  
Useful Life **10 years**

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## **Pollution Control Facility: Air Final Certification**

ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

The applicant is a C corporation and is operating a **foundry**. Their taxpayer identification number is 93-0634858. The applicant's address is:

**PO Box 250  
23123 SE Eagle Creek Road  
Eagle Creek, OR 97022**

### ***Facility Identification***

The certificate will identify the facility as:

**Two Donaldson baghouses, Model  
484RFW-10 A/W**

The applicant is the owner of the facility located at:

**23123 SE Eagle Creek Road  
Eagle Creek, OR 97022**

### ***Technical Information***

The claimed facility consists of two baghouses manufactured by Donaldson, Model Number 484RFW AW, each rated for 50,000 cfm. Each baghouse system is equipped with a New York Blower 20hp fan used to clean the filter modules. In addition to the dust collectors, the claimed facility includes two belt-driven Acoustifoil fans with 75 hp motors, a foundation, exterior ductwork, a screw conveyor for dust discharge, associated electrical work, and engineering services.

The baghouse cleans the exhaust air to 0.005 grains particulate per cubic foot before discharging to the atmosphere. The emissions are generated in the foundry building and consist of fine silica particles. Approximately two-yards per week is collected and disposed of on site, in accordance with the applicants' permit. Without the claimed facility, the particulate would exhaust to atmosphere.

**Eligibility**

- ORS 468.155** The **principal purpose** of this **new equipment** is to comply with the requirements imposed by the applicants air permit to control air pollution.
- (1)(a)(A)**
- ORS 468.155** The control is accomplished by the elimination of air contaminants and the use of the baghouse which meets the definition in ORS 468A.005 of an air cleaning device.
- (1)(b)(B)**

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>11/1/1999</u>
<i>Additional Information Requested</i>	<u>1/25/2000</u>
<i>Additional Information Received</i>	<u>2/11/2000</u>
<i>Application Substantially Complete</i>	<u>2/11/2000</u>
<i>Construction Started</i>	<u>9/15/1997</u>
<i>Construction Completed</i>	<u>12/15/1997</u>
<i>Facility Placed into Operation</i>	<u>12/15/1997</u>

**Facility Cost**

Claimed Cost		<b>\$243,273</b>
Ineligible Costs:		
Take down lunchroom	\$2,115	
Guard Rail	770	
Repair foundry and baghouse	1,530	
Pump, tees and elbows	117	
	<u>Total Ineligible Cost</u>	<b>(\$10,371)</b>
Eligible Cost		<u><b>\$ 232,902</b></u>

The reviewers analysed the facility cost that were substantiated by copies of invoices. Some of the claimed costs were found to be ineligible because they make an insignificant contribution to pollution control. Woodburn & Landers P.C. performed an accounting review on behalf of the applicant.

***Facility Cost Allocable to Pollution Control***

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below are considered in determining the percentage of the facility cost allocable to pollution control. The percentage of the facility cost allocable to pollution control is **100%**.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 15 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	Other alternatives were not considered.
ORS 468.190(1)(d) Savings or Increase in Costs	There are no savings from this facility and operating costs were about the same.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

Considering these factors, the percentage allocable to pollution control is 100%.

***Compliance and Other Tax Credits***

The applicant claims the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility: ACDP 03-2631, issued January 13, 1999.

Reviewers: Dennis Cartier, Associate, SJO Consulting Engineers  
Lois Payne, P.E., SJO Consulting Engineers  
Maggie Vandehey, DEQ



Director's  
Recommendation: **APPROVE**

Applicant **Smith Seed Services**  
Application No. **5327**  
Facility Cost **\$133,047**  
Percentage Allocable **100%**  
Useful Life **10 years**

# Tax Credit Review Report

EQC 0005

## **Pollution Control Facility: Air Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

The applicant is a partnership. They conduct a **commercial seed cleaning operation**. Their taxpayer identification number is 93-0666692. The applicant's address is:

**26890 Powerline Road  
Halsey, OR 97348**

### ***Facility Identification***

The certificate will identify the facility as:

**Two baghouses**

The applicant is the owner of the facility located at:

**26890 Powerline Road  
Halsey, OR 97348**

### ***Technical Information***

The claimed facility consists of two pulse jet baghouse filters, Model CSL16-6VBR and CSL 81-10RQO, the associated fans, motors, air compressor and discharge conveyor system. Model 16-6VBR, rated for 830 cfm, has 150 square feet of polyester filter media. Model CSL 81-10RQO, rated for a maximum capacity of 10,000 cfm, has 1272 square feet of polyester filter media. Both filters have 99.99% effectiveness rating for an incoming seed load of 1-micron particle size and larger.

An airlift cyclone (not part of the claimed facility) removes dirt and dust from the grass seed. The dirty air off the cyclone is routed to one baghouse through exterior carbon steel ductwork. Debris and other small particles are separated from the seed in a screening process and routed to the second baghouse through exterior carbon steel ductwork. The dust and screening particulate are dumped from each of the two baghouses into an enclosed conveying system, which moves it to a bucket elevator, then to a screening bunker. When the screening bunker is full, the waste is hauled away to Smuckers Pellet Mill for use as animal feed. Approximately 700 tons of screening material is hauled away annually.



Previously, the emission rate was 112,000 pounds per year. This system has reduced emissions to an estimated 750 pounds per year. Previously, the screenings were vented to the screening bunker and the dust was released into the atmosphere.

**Eligibility**

- ORS 468.155 The **principal purpose** of this **new equipment** is to comply with the applicants  
(1)(a) air permit to control air pollution.  
ORS 468.155 The elimination of air contaminants is accomplished with the installed baghouses  
(1)(b)(B) which meet the definition in ORS 468A.005 of an air cleaning device.

**Timeliness of Application**

The application was submitted	<i>Application Received</i>	<u>11/1/1999</u>
within the timing requirements of	<i>Additional Information Requested</i>	<u>2/11/2000</u>
ORS 468.165 (6).	<i>Additional Information Received</i>	<u>2/22/2000</u>
	<i>Application Substantially Complete</i>	<u>2/22/2000</u>
	<i>Construction Started</i>	<u>5/1/1998</u>
	<i>Construction Completed</i>	<u>7/1/1998</u>
	<i>Facility Placed into Operation</i>	<u>7/1/1998</u>

**Facility Cost**

Claimed Cost		\$ 142,320
Non-allowable Costs:		
Replace Hammertek elbows	\$ 2,573	
Disconnects and starters for future motors	4,770	
Pull wire and provide disconnects for future motors	700	
Install miscellaneous outlets and lighting	1,230	
	Total Non-allowable Costs	<u>(\$ 9,273)</u>
Eligible Facility Cost		\$ 133,047

The facility cost was greater than \$50,000 but less than \$500,000. Therefore, Greg Storms, P.C. performed an accounting review on behalf of the applicant. The reviewers analysed the claimed facility cost as documented with copies of invoices.

***Facility Cost Allocable to Pollution Control***

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	The screening particulate is used for animal feed. In previous years, this byproduct was worth as much as \$20 per ton. Due to changes in the market, it has no value and does not provide an income although it does become a valuable commodity when mixed with other ingredients.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No other alternatives were considered.
ORS 468.190(1)(d) Savings or Increase in Costs	There are no savings from this facility and operating costs are slightly higher. There is an increased electrical load although the equipment is more efficient. The applicant pays to have the screening debris hauled away from the plant as they did before the installation of this facility.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

Considering these factors, the percentage allocable to pollution control is 100%.

***Compliance and Other Tax Credits***

The applicant claims the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility:

ACDP 22-3525 issued December 17, 1980

Reviewers: Dennis Cartier, Associate, SJO Consulting Engineers  
Lois Payne, P.E., SJO Consulting Engineers  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Portland General Electric Company**  
Application No. **5335**  
Facility Cost **\$31,323**  
Percentage Allocable **100%**  
Useful Life **10 years**

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## **Pollution Control Facility: Water Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **an C corporation**

Business: **Electric utility providing  
electrical services**

Taxpayer ID: **93-0256820**

The applicant's address is:

**121 SW Salmon St.  
Portland, OR 97204**

### ***Facility Identification***

The certificate will identify the facility as:

**Two doublewall aboveground fuel  
storage tanks, fuel leak detection  
system with overfill alarm, and two  
(2) oil/water separators**

The applicant is the owner of the facility located  
at:

**Sunset Line Crew Center  
4950 NW 235<sup>th</sup> Ave.  
Hillsboro, OR 97124**

### ***Technical Information***

The claimed facility consists of two (2) systems: a fuel leakage prevention system, and a system to collect and treat stormwater runoff.

#### **Fuel Leak Detection System with Overfill Alarm**

This portion of the claimed facility is comprised of two (2) aboveground, double-walled fuel storage tanks with high level/leak alarms for both tanks. The double-walled fuel tank system is designed to prevent fuel leakage from the tank by constructing the inner fuel tank within an outer tank wall that provides secondary containment. The monitoring system continuously checks the dead space between the inner and outer walls for leakage from the inner tank.

**Storm Water Runoff**

One of the new oil/separators (Utility Vault model #660CPS) captures any spills or other leakage from the fuel tank system that may occur during refueling operations. The other oil/separator (Utility Vault model #712SA) treats runoff from a transformer storage area. The two oil/water separators discharge into an existing stormwater sewer outfall.

**Eligibility**

- ORS 468.155 (1)(a) The **principal purpose** of this **new installation** is to prevent, control or reduce a substantial quantity of water pollution as required by the DEQ and EPA.
- ORS 468.155 (1)(b)(A) The disposal or elimination of or redesign to eliminate the use of treatment works for industrial waste as defined in ORS 468B.005 and is installed to comply with EPA, DEQ, and the City of Beaverton Code for Effluent discharges into the Publicly Owned Treatment Works (POTW).

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received at DEQ</i>	<u>11/30/99</u>
<i>Request for Additional Information</i>	<u>02/08/00</u>
<i>Additional Information Received</i>	<u>03/27/00</u>
<i>Application Substantially Complete</i>	<u>02/08/00</u>
<i>Construction Started</i>	<u>10/23/96</u>
<i>Construction Completed</i>	<u>12/01/97</u>
<i>Facility Placed into Operation</i>	<u>12/01/97</u>

**Facility Cost**

Facility Cost	<u>\$31,323</u>
Eligible Facility Cost	<u>\$31,323</u>

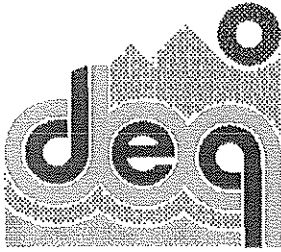
**Facility Cost Allocable to Pollution Control**

Since the facility cost does not exceed \$50,000, according to ORS.190 (3) the only factor used to determine the percentage of the facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. The percentage of time this facility is used for pollution control is **100%**.

**Compliance and Other Tax Credits**

The facility is in compliance with Department rules and statutes and with EQC orders.

Reviewers: Darrel Allison, P.E. - HCMA Consulting Group  
Barbara Anderson, DEQ  
M.C. Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

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## **Pollution Control Facility: Water**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

Organized As: **an C corporation**

Business: **Electric utility providing  
electrical services**

Taxpayer ID: **93-0256820**

The applicant's address is:

**121 SW Salmon St.  
Portland, OR 97204**

### *Facility Identification*

The certificate will identify the facility as:

**Two doublewall aboveground fuel  
storage tanks, fuel leak detection  
system with overfill alarm, three (3)  
oil/water separators and storm water  
discharge swale.**

The applicant is the owner of the facility located  
at:

**Beaverton Line CrewCenter  
2213 SW 153<sup>rd</sup> Drive  
Beaverton, OR 97006**

### *Technical Information*

The claimed facility consists of three (3) systems: a fuel leakage prevention and detection system, a system to collect and treat stormwater runoff, and a system to collect and treat contaminated water destined for the sanitary sewer system.

#### Fuel Leak Detection System with Overfill Alarm

This portion of the claimed facility is comprised of two (2) aboveground, double-walled fuel storage tanks with high level/overfill alarms for both tanks. The double-walled fuel tank system is designed to prevent fuel leakage from the tank by constructing the inner fuel tank within a secondary containment outer tank wall. The monitoring system continuously checks the dead space between the inner and outer walls for leakage from the inner tank.

Storm Water Runoff

One of the new oil/separators (Utility Vault model #660CPS) captures any spills or other leakage from the fuel tank system that may occur during refueling operations. One of the other two oil/separators (Utility Vault model #712SA) treats runoff from a transformer storage area. The two oil/water separators discharge into to a newly constructed stormwater quality swale used as a bio-filter. This swale or broad shallow trench is lined with organic plants/grasses that remove any pollutants that are carried over from the oil/separators. The swale discharges into the stormwater sewer outfall.

Sanitary Sewer Discharge

The third oil separator (Utility Vault model # 4686SA) collects runoff from mobile equipment/vehicles wash bay. This unit collects and treats all the water resulting from wash bay activities and discharges the treated water into the sanitary sewer. A containment vault (isolated from the sanitary sewer system by a valve) collects any spillage from a vehicle maintenance area used for fluid storage. This containment/valve system provides 100% containment of any spills from this area. Any polluting fluids are pumped from the vault and disposed of off-site. The valve allows draining the vault (to the sanitary sewer) if it should fill with non-polluted water; for example, if the automatic fire sprinkler system is triggered.

***Eligibility***

- ORS 468.155 The **principal purpose** of this **new installation** is to prevent, control or reduce a  
 (1)(a) substantial quantity of water pollution. The facility is installed to comply with EPA, DEQ, and the City of Beaverton Code for Effluent discharges into the Publicly Owned Treatment Works (POTW).
- ORS 468.155 The facility controls industrial waste with the use of a treatment works as  
 (1)(b)(A) defined in ORS 468B.005

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received at DEQ</i>	<u>11/30/99</u>
<i>Requested Additional Information</i>	<u>02/08/00</u>
<i>Additional information Received</i>	<u>03/27/00</u>
<i>Application Substantially Complete</i>	<u>02/08/00</u>
<i>Construction Started</i>	<u>5/19/97</u>
<i>Construction Completed</i>	<u>3/27/98</u>
<i>Facility Placed into Operation</i>	<u>3/27/98</u>

***Facility Cost***

Facility Cost	<b><u>\$49,090.00</u></b>
Eligible Facility Cost	<b><u>\$49,090.00</u></b>

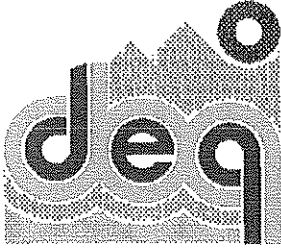
***Facility Cost Allocable to Pollution Control***

Since the facility cost does not exceed \$50,000, according to ORS.190 (3) the only factor used to determine the percentage of the facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. The percentage of time this facility is used for pollution control is **100%**.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders.

Reviewers: Darrel Allison, P.E. - HCMA Consulting Group  
Barbara Anderson, DEQ  
M.C. Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

## **Pollution Control Facility: USTs**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

Organized As: **a C Corporation**

Business: **Retail Gas station & Carwash**

Taxpayer ID: **97-0757213**

The applicant's address is:

**2929 NW 29<sup>th</sup>**

**Portland OR 97210-1705**

### *Technical Information*

The applicant installed pollution control equipment to meet EPA requirements for underground storage tanks.

Director's

Recommendation: **APPROVE**

Applicant

**WSCO Petroleum Corp.**

Application No.

**5348**

Eligible Facility Cost

**\$138,618**

Percentage Allocable

**88%**

Useful Life

**10 years**

### *Facility Identification*

The certificate will identify the facility as:

**Three doublewall fiberglass-clad steel underground storage tanks, doublewall flexible plastic piping, spill containment basins, automatic tank gauge system, turbine leak detectors, overfill alarm, sumps, oil/water separator, automatic shutoff valves, stage I vapor recovery and stage II vapor recovery piping.**

The applicant is the owner of **DEQ Facility ID 211**, located at:

**Astro #211**

**525 N. Central**

**Medford, OR 97501**



**Eligibility**

- ORS 468.155 (1)(a) The **principal purpose** of this **installation** is to prevent, control or reduce a substantial quantity of air and water pollution.
- ORS 468.155 (1)(b)(A) The pollution control is accomplished by the disposal or elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468A.005.
- ORS 468.155 (1)(b)(B) The control is accomplished by the elimination of air pollution and the use of the baghouse which meet the air cleaning device definition in ORS 468A.005.
- OAR-016-0025 (2)(g) Installation or construction of facilities which will be used to detect, deter, or prevent spills or unauthorized releases.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).	<i>Application Received</i>	<u>12/14/99</u>
	<i>Application Complete and Ready to Process</i>	<u>01/26/00</u>
	<i>Construction Started</i>	<u>09/01/97</u>
	<i>Construction Completed</i>	<u>01/28/98</u>
	<i>Facility Placed into Operation</i>	<u>01/28/98</u>

**Facility Cost**

	<b>Claimed</b>	\$139,453
Less Ineligible Costs – Portion of tank gauge system not used for pollution control (10%).		(\$835)
	<b>Eligible</b>	<u>\$138,618</u>

The department approved the applicant's waiver of an independent accounting review because invoices or canceled checks substantiated the cost of the facility.

**Facility Cost Allocable to Pollution Control**

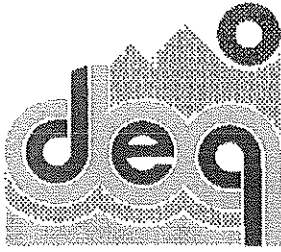
The facility cost exceeds \$50,000. According to ORS 468.190(1), the following factor was considered in determining the percentage of the facility cost allocable to pollution control.

The cost for non-corrosion protected portion of tank and/or piping system costs is \$16,892. Therefore, 12% of the eligible facility cost is not allocable to pollution control leaving the remaining 88% allocable.

**Compliance and Other Tax Credits**

The facility is in compliance with Department rules and statutes and with EQC orders, especially, Underground Storage Tank requirements under OAR Chapter 340, Division 150.

Reviewers: Barbara J Anderson



# Tax Credit Review Report

EQC0005

Director's  
Recommendation: **APPROVE**

Applicant **Deschutes Valley Equipment Inc.**  
Application No. **5350**  
Eligible Facility Cost **\$11,834**  
Percentage Allocable **100%**  
Useful Life **10 years**

**Pollution Control Facility: USTs**  
**Final Certification**  
ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

## *Applicant Identification*

Organized As: **a Corporation**  
Business: **Heavy equipment sales**  
Taxpayer ID: **93-0771055**

The applicant's address is:

**P O Box 538**  
**Redmond OR 97756**

## *Facility Identification*

The certificate will identify the facility as:

**Doublewall aboveground storage tank  
with an overfill alarm and automatic  
shutoff valve.**

The applicant is the owner of **DEQ Facility ID  
1664**, located at:

**710 F Avenue**  
**Terrebonne, OR 97760**

## *Technical Information*

The applicant installed pollution control equipment to meet EPA requirements.

## *Eligibility*

- ORS 468.155 (1)(a) The **principal purpose** of this **installation** is to prevent, control or reduce a substantial quantity of air and water pollution.
- ORS 468.155 (1)(b)(A) The pollution control is accomplished by the disposal or elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468A.005.
- ORS 468.155 (1)(b)(B) The control is accomplished by the elimination of air pollution and the use of the baghouse which meet the air cleaning device definition in ORS 468A.005.

OAR-016-0025 Installation or construction of facilities which will be used to detect, deter, or  
(2)(g) prevent spills or unauthorized releases.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>12/20/99</u>
<i>Application Complete and Ready to Process</i>	<u>02/15/00</u>
<i>Construction Started</i>	<u>11/05/98</u>
<i>Construction Completed</i>	<u>04/02/99</u>
<i>Facility Placed into Operation</i>	<u>04/02/99</u>

***Facility Cost***

<b>Claimed</b>	\$11,834
<b>Eligible</b>	<u>\$11,834</u>

The facility cost does not exceed \$50,000. An independent accounting review was not required. However, invoices or canceled checks substantiated the cost of the facility.

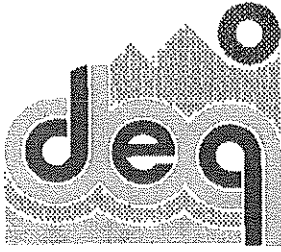
***Facility Cost Allocable to Pollution Control***

The facility cost does not exceed \$50,000. According to ORS 468.190(3), the only factor used in determining the percentage allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders, especially, Underground Storage Tank requirements under OAR Chapter 340, Division 150.

Reviewers: Barbara J Anderson



# Tax Credit Review Report

EQC 0005

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## **Pollution Control Facility: Solid Waste**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

Organized As: **an S corporation**

Business: **a garbage collection and recycling company**

Taxpayer ID: **93-0554178**

The applicant's address is:

**1726 S. E. Highway 101  
Lincoln City, OR 97367**

### *Facility Identification*

The certificate will identify the facility as:

**One new 22' fabricated drop box trailer, license # 54600.**

The applicant is the owner of the facility located at:

**1726 S. E. Highway 101  
Lincoln City, OR 97367**

### *Technical Information*

The above referenced trailer is used by the applicant to transport recyclable materials to end use markets. The trailer is loaded with a drop box and is hauled behind a drop box truck. Recyclable material such as glass, cans, newspaper, cardboard, scrap paper, and metal are collected from residential and commercial customers. Some of this material is then reloaded into drop boxes and transported to market.

### *Eligibility*

ORS 468.155 (1)(a) The **sole purpose** of this **new equipment** is to prevent, control or **reduce** a substantial quantity of **solid waste**. The applicant claims that the trailer will not be used for any purpose other than the transportation or collection of source separated recyclable materials. The applicant uses a different type of vehicle to transport solid waste for disposal.

Director's  
Recommendation: **APPROVE**

Applicant **Dunn & LeBlanc, Inc.**  
Application No. **5355**  
Facility Cost **\$6,750**  
Percentage Allocable **100%**  
Useful Life **7 years**

- OAR 340-16-025(g)(B) **Replacement:** This type of equipment is new for the applicant and does not replace any existing equipment.
- ORS 468.155 (1)(b)(D) This trailer is used as part of a material recovery process which obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005

### ***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>01/03/00</u>
<i>Application Substantially Complete</i>	<u>01/06/00</u>
<i>Construction Started</i>	<u>12/31/98</u>
<i>Construction Completed</i>	<u>12/31/98</u>
<i>Facility Placed into Operation</i>	<u>12/31/98</u>

### ***Facility Cost***

Facility Cost	\$ 6,750
Insignificant Contribution ORS 468.155(2)(d)	
Eligible Facility Cost	<u>\$ 6,750</u>

The facility cost does not exceed \$50,000. Anderson, Searcy, Magedarz & Crowe, LLC, an independent accounting firm, provided certification of the cost of the claimed facility.

### ***Facility Cost Allocable to Pollution Control***

According to ORS 468.190 (3), since the facility cost does not exceed \$50,000, the only factor used in determining the percentage allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

### ***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to facility.

Reviewer: William R Bree



# Tax Credit Review Report

EQC0005

## **Pollution Control Facility: USTs**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a Sole Proprietorship**

Business: **Retail Gas station**

Taxpayer ID: **93-0326271**

The applicant's address is:

**415 8<sup>th</sup> Street**

**Myrtle Point OR 97458**

### ***Technical Information***

The applicant installed pollution control equipment to meet EPA requirements for underground storage tanks.

Director's

Recommendation: **APPROVE**

Applicant **Roland J. Schmidt**

Application No. **5356**

Eligible Facility Cost **\$30,040**

Percentage Allocable **100%**

Useful Life **10 years**

### ***Facility Identification***

The certificate will identify the facility as:

**Galvanic cathodic protection on steel underground storage tanks and piping and an automatic tank gauge system with an overfill alarm.**

The applicant is the owner of **DEQ Facility ID 8512**, located at:

**Myrtle Point Chevron**

**415 8<sup>th</sup> Street**

**Myrtle Point, OR 97458**

**Eligibility**

- ORS 468.155 (1)(a) The **principal purpose** of this **installation** is to prevent, control or reduce a substantial quantity of air and water pollution.
- ORS 468.155 (1)(b)(A) The pollution control is accomplished by the disposal or elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468A.005.
- ORS 468.155 (1)(b)(B) The control is accomplished by the elimination of air pollution and the use of the baghouse which meet the air cleaning device definition in ORS 468A.005.
- OAR-016-0025 (2)(g) Installation or construction of facilities which will be used to detect, deter, or prevent spills or unauthorized releases.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>01/03/00</u>
<i>Application Complete and Ready to Process</i>	<u>01/31/00</u>
<i>Construction Started</i>	<u>01/25/99</u>
<i>Construction Completed</i>	<u>03/05/99</u>
<i>Facility Placed into Operation</i>	<u>03/07/99</u>

**Facility Cost**

Claimed	\$30,040
Eligible	<u>\$30,040</u>

The facility cost does not exceed \$50,000. An independent accounting review was not required. However, invoices or canceled checks substantiated the cost of the facility.

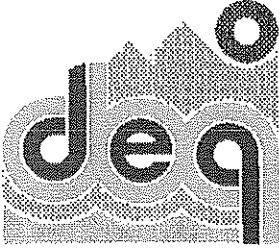
**Facility Cost Allocable to Pollution Control**

The facility cost does not exceed \$50,000. According to ORS 468.190(3), the only factor used in determining the percentage allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

**Compliance and Other Tax Credits**

The facility is in compliance with Department rules and statutes and with EQC orders, especially, Underground Storage Tank requirements under OAR Chapter 340, Division 150.

Reviewers: Barbara J Anderson



# Tax Credit Review Report

EQC 0005

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## **Pollution Control Facility: Solid Waste**

### **Final Certification**

ORS 468.150 through 468.190

OAR 340-016-0005 through 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**

Business: **Solid waste collection and  
recycling facility**

Taxpayer ID: **93-11197641**

The applicant's address is:

**1890 16<sup>th</sup> Street S.E.  
Salem, OR 97302**

### ***Technical Information***

The truck referenced above will be used solely to collect old cardboard containers from commercial waste collection accounts in the City of Salem and in Marion County. This truck will service front load collection containers provided to customers and used exclusively for cardboard recycling.

### ***Eligibility***

ORS 468.155 (1)(a)

The **sole purpose** of this **new equipment** is to prevent, control or reduce a substantial quantity of **solid waste**. It will be used solely for collecting recyclable material.

Director's  
Recommendation: **APPROVE**

Applicant: **Capitol Recycling & Disposal, Inc.**  
Application No.: **5360**  
Facility Cost: **\$156,043**  
Percentage Allocable: **100%**  
Useful Life: **5 years**

### ***Facility Identification***

The certificate will identify the facility as:

**One 1999 Volvo truck, model WX64, serial  
number 4VMDCMPE4XN768132 and one  
Wittke 40-yd front loading system.**

The applicant is the owner of the facility located at:

**1890 16<sup>th</sup> Street S.E.  
Salem, OR 97302**



OAR 340-16-025(g)(B) **Replacement:** This new truck is used for expanded recycling service. The vehicle previously providing cardboard recycling service was not replaced and remains in limited operation. This new vehicle does **not** replace a previously certified vehicle

ORS 468.155 The use of this truck, to collect old cardboard containers, is part of a **material recovery process** which obtains useful material from material that would otherwise be "solid waste" as defined in ORS 459.005.

### ***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>01/06/00</u>
<i>Application Substantially Complete</i>	<u>01/12/00</u>
<i>Construction Started</i>	<u>07/01/98</u>
<i>Construction Completed</i>	<u>10/30/98</u>
<i>Facility Placed into Operation</i>	<u>11/10/98</u>

### ***Facility Cost***

Facility Cost	\$ 156,043
Insignificant Contribution ORS 468.155(2)(d)	
Eligible Facility Cost	<u>\$ 156,043</u>

The facility cost exceeds \$50,000. Theodore R. Ahre, CPA, provided certification of the cost of the claimed facility. The applicant also provided copies of the invoice and check employed in the purchase of this truck.

### ***Facility Cost Allocable to Pollution Control***

According to ORS 468.190(1), since the facility cost exceeds \$50,000, the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control. The percentage of the facility cost allocable to pollution control is **100%**.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	This truck is used to collect recyclable material that is subsequently processed into a salable and useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is five years. The calculated return on investment for this truck is 0%. The portion of cost allocable to pollution control is 100%.
ORS 468.190(1)(c) Alternative Methods	No alternative methods were investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	All costs and savings were included in the

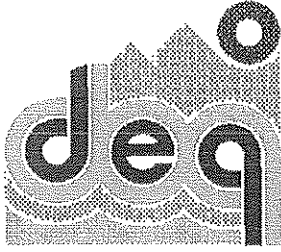
ORS 468.190(1)(e) Other Relevant Factors

calculation of the return on investment.  
No other relevant factors were considered.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders.  
There were no DEQ permits issued to facility.

Reviewer: William R. Bree



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Environmental Waste Systems, Inc.**  
Application No. **5362**  
Facility Cost **\$32,350**  
Percentage Allocable **100%**  
Useful Life **10 years**

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## **Pollution Control Facility: Solid Waste**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**  
Business: **Solid waste collection and  
recycling facility**  
Taxpayer ID: **93-0938511**

The applicant's address is:

**P O Box 1002  
St. Helens, OR 97051**

### ***Facility Identification***

The certificate will identify the facility as:

**One Excel EX62 horizontal baler**

The applicant is the owner of the facility located at:

**58597 Old Portland Road  
St. Helens, OR 97051**

### ***Technical Information***

This baler will be used solely to process source separated cardboard and other paper collected from both residential and commercial waste collection accounts in St. Helens and Columbia County. The paper processed in this baler will be sent to a recycling paper mill where it will be converted into a product of real economic value.

### ***Eligibility***

- ORS 468.155 (1)(a) The **sole purpose** of this **new equipment** is to prevent, control or reduce a substantial quantity of **solid waste**. This baler will be used solely for processing source separated recyclable paper.
- OAR 340-16-025(g)(B) **Replacement:** This new baler replaces two small downstroke balers. The salvage value of these balers has been subtracted from the cost of the claimed facility. These old balers were not certified for tax credit so this new baler does **not** replace any previously certified equipment.
- ORS 468.155 (1)(b)(D) This baler is used to process source separated paper and is part of a **material recovery process** which obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005.

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***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>01/21/00</u>
<i>Application Substantially Complete</i>	<u>01/27/00</u>
<i>Construction Started</i>	<u>12/07/99</u>
<i>Construction Completed</i>	<u>12/07/99</u>
<i>Facility Placed into Operation</i>	<u>12/07/99</u>

***Facility Cost***

Facility Cost	\$36,350
Salvage Value	(4,000)
Insignificant Contribution ORS 468.155(2)(d)	
Eligible Facility Cost	<u>\$32,350</u>

The facility cost does not exceed \$50,000. The applicant provided a copy of the invoice and check for purchase of the baler.

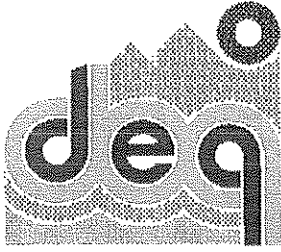
***Facility Cost Allocable to Pollution Control***

The facility cost does not exceed \$50,000. According to ORS 468.190 (3), the only factor used in determining the percentage allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to facility.

Reviewers: William R Bree



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant: **Environmental Waste Systems, Inc.**  
Application No.: **5364**  
Facility Cost: **\$23,000**  
Percentage Allocable: **100%**  
Useful Life: **5 years**

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## **Pollution Control Facility: Solid Waste**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**  
Business: **Solid waste collection and recycling facility**  
Taxpayer ID: **93-0938511**

The applicant's address is:

**P O Box 1002  
St. Helens, OR 97051**

### ***Facility Identification***

The certificate will identify the facility as:

**One 1990 White Automated Recycling  
Truck. VIN 4V2DAFAD8LN629142**

The applicant is the owner of the facility located at:

**58597 Old Portland Road  
St. Helens, OR 97051**

### ***Technical Information***

This truck is used solely to collect co-mingled recyclables from both residential and commercial waste collection accounts in St. Helens and Columbia County. The recyclables are delivered to a sorting facility and then after sorting are sent to recycling mills where they are converted into products of real economic value.

### ***Eligibility***

- ORS 468.155 (1)(a) The **sole purpose** of this **new equipment** is to prevent, control or reduce a substantial quantity of **solid waste**. This truck will be used solely for collecting co-mingled recyclable materials.
- OAR 340-16-025(g)(B) **Replacement:** This truck is used to provide a new service and does not replace an existing vehicle. This new truck does **not** replace any previously certified equipment.
- ORS 468.155 This truck is used to collect co-mingled recyclable material and is part of a

(1)(b)(D) **material recovery process** that obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<b>01/25/00</b>
<i>Application Substantially Complete</i>	<b>01/27/00</b>
<i>Construction Started</i>	<b>02/06/98</b>
<i>Construction Completed</i>	<b>02/06/98</b>
<i>Facility Placed into Operation</i>	<b>05/01/99</b>

***Facility Cost***

Facility Cost	<b>\$23,000</b>
Insignificant Contribution ORS 468.155(2)(d)	
Eligible Facility Cost	<b>\$23,000</b>

The facility cost does not exceed \$50,000. The applicant provided copies of the invoice and check for purchase of the truck.

***Facility Cost Allocable to Pollution Control***

In accordance with ORS 468.190 (3), Since the facility cost does not exceed \$50,000, the only factor used in determining the portion of facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to this facility.

Reviewer: William R Bree

State of Oregon  
Department of Environmental Quality

TAX RELIEF APPLICATION REVIEW REPORT  
POLLUTION PREVENTION PILOT PROGRAM

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1. Applicant Mailing Address

Philip B. Park  
Classic Cleaners  
8602 SW Terwilliger Blvd.  
Portland, Oregon 97219

Same

The applicant owns and operates a dry-cleaning shop located at 8602 SW Terwilliger Blvd. Portland, Oregon.

Application was made for tax credit for an air pollution prevention facility.

2. Description of Facility

The claimed facility is a Satec model B440 Hydro Carbon dry-cleaning machine which was installed as a replacement for a Hoffman 2010 percholoroethylene (perc) dry-cleaning machine. The replacement machine uses Exxon DF 2000 solvent instead of perc and therefore eliminates the emissions of perc to the atmosphere.

Claimed Facility Cost: \$ 68,800

3. Procedural Requirements

The facility is governed by ORS 468A.095 through 468A.098, and by OAR Chapter 340, Division 16.

The facility met all regulatory deadlines in that:

Installation of the pollution prevention facility was substantially completed on December 31, 1999. The application for final certification was received by the Department on February 1, 2000. The application was found to be complete when processed on February 16, 2000, within one year of installation of the facility.

4. Evaluation of Application

Rationale For Eligibility

- (1) The pollution prevention facility is eligible because it meets the requirement of avoiding the requirements of the National Emission Standard for Hazardous Air Pollutants (NESHAP), specifically 40 CFR 63.320 to 63.325 national perchloroethylene air emissions standard for dry cleaning facilities.

The replacement for the dry-cleaning facility was installed between January 1, 1996 and December 31, 1999.

The facility does not qualify for a pollution control tax credit under ORS 468.165 and 468.170.

- (2) The owner installed equipment which resulted in the elimination of perchloroethylene use and is in-turn not subject to the NESHAP.
- (3) The dry cleaning facility was registered under the Clean Air Act Title III National Emissions Standards for Hazardous Air Pollutants.

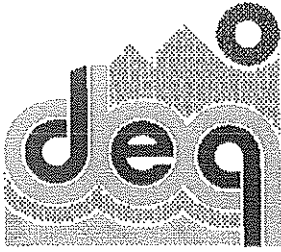
5. Summation

- a. The pollution prevention facility was constructed in accordance with all regulatory deadlines.
- b. The facility is eligible for final tax credit certification in that it meets the definition of a pollution prevention facility for this pilot program.
- c. The applicant indicated that the tax credit program was not a determining factor in installing this equipment.

6. Director's Recommendation

Based upon these findings, it is recommended that a Pollution Prevention Facility Certificate bearing the cost of \$ 68,800 be issued for the facility claimed in Tax Credit Application No. 5366.





Director's  
Recommendation: **APPROVE**

Applicant **PMD Fuel LLC**  
Application No. **5367**  
Eligible Facility Cost **\$129,128**  
Percentage Allocable **91%**  
Useful Life **7 years**

# Tax Credit Review Report

EQC 0005

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## **Pollution Control Facility: USTs**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

Organized As: a **Limited Liability  
Corporation**

Business: **Retail Gas station**

Taxpayer ID: **93-1236430**

The applicant's address is:

**497 Oakway Rd., Suite 220  
Eugene OR 97401**

### *Facility Identification*

The certificate will identify the facility as:

**One doublewall fiberglass  
underground storage tank (with  
two compartments), doublewall  
flexible plastic piping, spill  
containment basins, automatic tank  
gauge system, turbine leak  
detectors, overfill alarm, sumps,  
monitoring well, oil/water  
separator, automatic shutoff valves  
and Stage I vapor recovery.**

The applicant is the owner of **DEQ Facility  
ID 11756**, located at:

**Shell Food Mart  
1025 Greenacres Rd.  
Eugene, OR 97401**

### *Technical Information*

The applicant installed pollution control equipment to meet EPA requirements for underground storage tanks.

**Eligibility**

- ORS 468.155 (1)(a) The **principal purpose** of this **installation** is to prevent, control or reduce a substantial quantity of air and water pollution.
- ORS 468.155 (1)(b)(A) The pollution control is accomplished by the disposal or elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468A.005.
- ORS 468.155 (1)(b)(B) The control is accomplished by the elimination of air pollution and the use of the baghouse which meet the air cleaning device definition in ORS 468A.005.
- OAR-016-0025 (2)(g) Installation or construction of facilities which will be used to detect, deter, or prevent spills or unauthorized releases.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>01/28/00</u>
<i>Application Complete and Ready to Process</i>	<u>02/29/00</u>
<i>Construction Started</i>	<u>09/01/97</u>
<i>Construction Completed</i>	<u>02/01/98</u>
<i>Facility Placed into Operation</i>	<u>02/01/98</u>

**Facility Cost**

	<b>Claimed</b>	\$129,824
Less Ineligible Costs – Portion of tank gauge system not used for pollution control (10%).		(\$696)
	<b>Eligible</b>	<u>\$129,128</u>

The facility cost was greater than \$50,000 but less than \$500,000. Therefore, Guyer, Lindley, Bailey & Martin, a CPA firm, performed an accounting review according to Department guidelines on behalf of the applicant.

**Facility Cost Allocable to Pollution Control**

The facility cost exceeds \$50,000. According to ORS 468.190(1), the following factor was considered in determining the percentage of the facility cost allocable to pollution control.

The cost for non-corrosion protected portion of tank and/or piping system costs is \$11,820. Therefore, 9% of the eligible facility cost is not allocable to pollution control leaving the remaining 91% allocable.

**Compliance and Other Tax Credits**

The facility is in compliance with Department rules and statutes and with EQC orders, especially, Underground Storage Tank requirements under OAR Chapter 340, Division 150.

Reviewers: Barbara J Anderson



# Tax Credit Review Report

EQC 0005

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## **Pollution Control Facility: Solid Waste**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**

Business: **Solid waste collection and  
recycling facility**

Taxpayer ID: **93-0924002**

The applicant's address is:

**P O Box 17669  
Salem, OR 97305**

Director's  
Recommendation: **APPROVE**

Applicant: **Pacific Sanitation, Inc.**  
Application No.: **5368**  
Facility Cost: **\$29,772**  
Percentage Allocable: **100%**  
Useful Life: **7 years**

### ***Facility Identification***

The certificate will identify the facility as:

**Forty-six 6 yd. and twenty-five 4 yd.  
expanded metal front load containers,  
serial numbers 163284 to 163354.**

The applicant is the owner of the facility located  
at:

**3475 Blossom Drive NE  
Salem, OR 97305**

### ***Technical Information***

These collection containers are used solely to collect old cardboard containers from commercial waste collection accounts in Salem and Marion County. The recyclables are delivered to a processing facility and subsequently sent to recycling mills where they are converted into products of real economic value.

### ***Eligibility***

ORS 468.155 (1)(a) The **sole purpose** of this **new equipment** is to prevent, control or reduce a Substantial quantity of **solid waste**. These containers are used solely for collecting source separated recyclable materials.

OAR 340-16-025(g)(B) **Replacement:** These containers are used to provide a new service and only replace a few existing containers. The salvage value of those containers has been subtracted from the total facility cost. These new containers do **not** replace any previously certified equipment.

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ORS 468.155 These containers are used to collect source separated recyclable material and  
 (1)(b)(D) are part of a **material recovery process** that obtains useful material from  
 material that would otherwise be solid waste as defined in ORS 459.005.

### ***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<u>02/04/00</u>
<i>Application Substantially Complete</i>	<u>02/09/00</u>
<i>Construction Started</i>	<u>10/27/99</u>
<i>Construction Completed</i>	<u>12/03/99</u>
<i>Facility Placed into Operation</i>	<u>12/03/99</u>

### ***Facility Cost***

Facility Cost	\$ 29,853
Salvage Value	131
Insignificant Contribution ORS 468.155(2)(d)	
Eligible Facility Cost	<u>\$ 29,722</u>

The claimed facility cost does not exceed \$50,000 in value. Therefore, an independent accountant's review was not required. The applicant provided copies of the invoice and check for purchase of the containers.

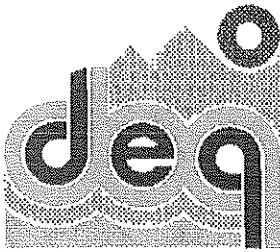
### ***Facility Cost Allocable to Pollution Control***

According to ORS 468.190 (3), since the facility cost does not exceed \$50,000, the only factor used in determining the percentage allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

### ***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to facility.

Reviewer: William R. Bree



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Tokai Carbon USA, Inc.**  
Application No. **5369**  
Facility Cost **\$57,938**  
Percentage Allocable **100%**  
Useful Life **7 years**

## **Pollution Control Facility: Air Final Certification**

ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **C Corporation**  
Business: **Metal Coating Facility**  
Taxpayer ID: **1197500**

The applicant's address is:

**4495 NW 235<sup>th</sup> Ave  
Hillsboro, OR 97124**

### ***Facility Identification***

The certificate will identify the facility as:

**HCl Scrubber #1**

The applicant is the owner of the facility located at:

**4495 NW 235<sup>th</sup> Ave  
Hillsboro, OR 97124**

### ***Technical Information***

Tokai Carbon coats electrical components with silicon carbide using a chemical vapor deposition (CVD) process. They have installed a new process, called Carbon Crucible Purification (CCP) at their CZ facility. In this process the parts to be CVD treated are placed in a furnace. After the parts are placed in the furnace, the furnace is evacuated and heated to 3000 F, and methyltrichlorosilane and hydrogen gases are injected into the furnace. After one day the resulting hydrochloric acid (HCl) is vented to an emission control system. The control system applied for here is a venturi wet-scrubber on the new CCP process backed up with a packed section. It is estimated to be more than 99.99% efficient on HCl vapors and 99% efficient on <2 micrometer particulate matter. This control system is estimated to remove approximately 6,750 pounds of HCl per year at 100% capacity operation levels. If justified by demand, Tokai Carbon intends to install a second such system in the future and has already received air permit authority to do so.

### ***Eligibility***

ORS 468.155 The **principal purpose** of this **new pollution control device** is to prevent,  
(1)(a) control or reduce a substantial quantity of air pollution.

ORS 468.155 The control is accomplished by the elimination of air pollution and the use of a  
 (1)(b)(B) scrubber, which meet the air cleaning device definition in ORS 468A.005.

### ***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6). Applicant supplied documentation indicating the facility construction start date and closing date, as well as a copy of the application fee receipt.

<i>Application Received</i>	<u>02/18/00</u>
<i>Filed Complete and Ready to Process</i>	<u>02/18/00</u>
<i>Construction Started</i>	<u>04/01/96</u>
<i>Construction Completed</i>	<u>04/30/98</u>
<i>Facility Placed into Operation</i>	<u>05/15/98</u>

### ***Facility Cost***

Facility Cost	<u>\$57,938</u>
Eligible Facility Cost	<u>\$57,938</u>

Tokai Carbon applied to ODEQ for a waiver of the Independent Accountant's Statement. The reviewers performed an accounting review on behalf of the department. The applicant thoroughly documented the cost of the facility by providing copies of purchase orders, bills of lading and contractor's affirmations. Tokai Carbon submitted an accounting statement with the tax credit application.

### ***Facility Cost Allocable to Pollution Control***

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 7 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No alternatives were investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or increase in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

Considering these factors, the percentage allocable to pollution control is 100%.

### ***Compliance and Other Tax Credits***

The applicant claims the facility is in compliance with Department rules and statutes. The facility operates under ODEQ Air Permit #ADCP 34-0013, issued 11/14/96.

Reviewers: Michael G. Ruby, Ph.D., P.E., Envirometrics, Inc.  
 Mika Kaplan, Envirometrics, Inc.



Director's  
Recommendation: **APPROVE**

Applicant **United Disposal Services, Inc.**  
Application No. **5370**  
Facility Cost **\$4,250**  
Percentage Allocable **100%**  
Useful Life **10 years**

# Tax Credit Review Report

EQC 0005

## **Pollution Control Facility: Solid Waste Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**  
Business: **Solid waste collection and  
recycling facility**  
Taxpayer ID: **93-06250022**

The applicant's address is:

**2215 N. Front Street  
Woodburn, OR 97071**

### ***Facility Identification***

The certificate will identify the facility as:

**One thousand 14 gallon recycling bins**

The applicant is the owner of the facility located  
at:

**2215 N. Front Street  
Woodburn, OR 97071**

### ***Technical Information***

These bins are used solely to collect source separated recyclable materials from residential collection customers in Woodburn and Marion County. The recyclables are delivered to a processing facility where they are further sorted and subsequently sent to recycling mills where they are converted into products of real economic value.

### ***Eligibility***

ORS 468.155  
(1)(a)

The **sole purpose** of this **new equipment** is to prevent, control or reduce a substantial quantity of **solid waste**. These containers are used solely for collecting source separated recyclable materials.

OAR 340-16-  
025(g)(B)

**Replacement:** These bins are used to provide a new service and do not replace existing bins. There is no salvage value associated with these bins. These new bins do **not** replace any previously certified equipment.

ORS 468.155  
(1)(b)(D)

These bins are used to collect source separated recyclable material and are part of a **material recovery process** that obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<u>02/04/00</u>
<i>Application Substantially Complete</i>	<u>02/10/00</u>
<i>Construction Started</i>	<u>10/01/99</u>
<i>Construction Completed</i>	<u>11/09/99</u>
<i>Facility Placed into Operation</i>	<u>11/30/99</u>

***Facility Cost***

Facility Cost	<b>\$4,250</b>
Insignificant Contribution ORS 468.155(2)(d)	
Eligible Facility Cost	<u><b>\$4,250</b></u>

The facility cost does not exceed \$50,000. The applicant provided a copy of the invoice and check for purchase of the containers.

***Facility Cost Allocable to Pollution Control***

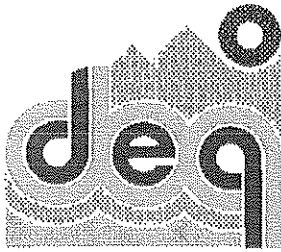
The facility cost does not exceed \$50,000. According to ORS 468.190(3), the only factor used in determining the percentage allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to this facility.

Reviewer: William R Bree





# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **United Disposal Services, Inc.**  
Application No. **5371**  
Facility Cost **\$4,570**  
Percentage Allocable **100%**  
Useful Life **10 years**

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## **Pollution Control Facility: Solid Waste**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**

Business: **Solid waste collection and  
recycling facility**

Taxpayer ID: **93-06250022**

The applicant's address is:

**2215 N. Front Street  
Woodburn, OR 97071**

### ***Facility Identification***

The certificate will identify the facility as:

**One thousand 14 gallon recycling bins**

The applicant is the owner of the facility located at:

**2215 N. Front Street  
Woodburn, OR 97071**

### ***Technical Information***

These bins are used solely to collect source separated recyclable materials from residential collection customers in the city of Woodburn and Marion County. The recyclables are delivered to a processing facility where they are further sorted and subsequently sent to recycling mills where they are converted into products of real economic value.

### ***Eligibility***

ORS 468.155  
(1)(a)

The **sole purpose** of this **new equipment** is to prevent, control, or reduce a substantial quantity of **solid waste**. These bins are used solely for collecting source separated recyclable material.

OAR 340-16-  
025(g)(B)

**Replacement:** These bins are used to provide a new service and do not replace existing bins. There is no salvage value associated with the purchase of these bins. These new bins do **not** replace any previously certified equipment.

ORS 468.155  
(1)(b)(D)

These bins are used to collect source separated recyclable material and are part of a **material recovery process** that obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<u>02/04/00</u>
<i>Application Substantially Complete</i>	<u>02/10/00</u>
<i>Construction Started</i>	<u>11/15/99</u>
<i>Construction Completed</i>	<u>11/25/99</u>
<i>Facility Placed into Operation</i>	<u>12/15/99</u>

***Facility Cost***

Facility Cost	\$4,570
Insignificant Contribution ORS 468.155(2)(d)	
Eligible Facility Cost	<u>\$4,570</u>

The facility cost does not exceed \$50,000. The applicant provided copies of the invoice and check for purchase of the containers.

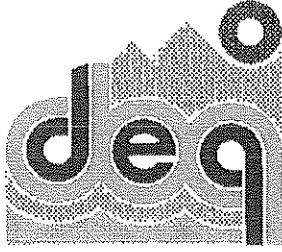
***Facility Cost Allocable to Pollution Control***

. According to ORS 468.190(3), since the facility cost does not exceed \$50,000, the only factor used in determining the percentage allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to this facility.

Reviewer: William R Bree



Director's  
Recommendation: **APPROVE**

Applicant: **Albany-Lebanon Sanitation, Inc.**  
Application No.: **5372**  
Facility Cost: **\$10,242**  
Percentage Allocable: **100%**  
Useful Life: **10 years**

# Tax Credit Review Report

EQC 0005

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## **Pollution Control Facility: Solid Waste**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**  
Business: **Solid waste collection and  
recycling facility**  
Taxpayer ID: **93-0593828**

The applicant's address is:

**PO Box 1929  
Albany, OR 97321**

### ***Facility Identification***

The certificate will identify the facility as:

**Twenty 2 yd recycling containers,  
serial numbers 153142 – 153161, ten 2  
yd. recycling containers without serial  
numbers and one storage shed.**

The applicant is the owner of the facility located  
at:

**1214 SE Montgomery St.  
Albany, OR 97321**

### ***Technical Information***

These containers and storage shed are used solely to collect source separated recyclable materials from commercial collection customers in the cities of Albany and Lebanon and Linn County. The storage shed is used for the temporary storage of confidential records prior to collection and shredding. The recyclables are collected and delivered to a processing facility where they are further sorted and subsequently sent to recycling mills where they are converted into products of real economic value.

### ***Eligibility***

ORS 468.155 (1)(a) The **sole purpose** of this **new equipment** is to prevent, control, or reduce a substantial quantity of **solid waste**. These containers and storage shed are used exclusively for collecting source separated recyclable material.

- OAR 340-16-025(g)(B) **Replacement:** These containers are used to provide a new service and do not replace existing containers. There is no salvage value associated with installation of these containers. These new containers do **not** replace any previously certified equipment.
- ORS 468.155(1)(b)(D) These containers and storage building are used to collect source separated recyclable material and are part of a **material recovery process** that obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005.

### ***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<u>02/10/00</u>
<i>Additional Information Requested</i>	<u>02/15/00</u>
<i>Additional Information Received</i>	<u>02/18/00</u>
<i>Application Substantially Complete</i>	<u>02/22/00</u>
<i>Construction Started</i>	<u>03/31/98</u>
<i>Construction Completed</i>	<u>10/31/98</u>
<i>Facility Placed into Operation</i>	<u>11/31/98</u>

### ***Facility Cost***

Facility Cost	\$10,242
Insignificant Contribution ORS 468.155(2)(d)	
Eligible Facility Cost	<u>\$10,242</u>

The facility cost does not exceed \$50,000. The applicant provided copies of the invoices and checks for purchase of the containers and shed.

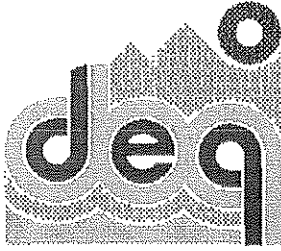
### ***Facility Cost Allocable to Pollution Control***

In accordance with ORS 468.190(3), since the facility cost does not exceed \$50,000, the only factor used in determining the portion of the claimed facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

### ***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to this facility.

Reviewer: William R Bree



# Tax Credit Review Report

EQC 0005

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## **Pollution Control Facility: USTs**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **S Corporation** (Blue Dog Farm)

**S Corporation** (True Grit Ent.)

Business: **Farm**

Taxpayer ID: **93-1223952** (Blue Dog Farms)

**93-1224016** (True Grit Ent.)

The applicant's address is:

**15234 Butsch Lane, NE**

**Mt. Angel OR 97362**

### ***Technical Information***

The applicant installed pollution control equipment to meet EPA requirements for underground storage tanks.

Director's

Recommendation: **APPROVE**

Applicant

**Blue Dog Farms, Inc. and**

**True Grit Enterprises**

Application No. **5374**

Eligible Facility Cost **\$96,297**

Percentage Allocable **90%**

Useful Life **10 years**

### ***Facility Identification***

The certificate will identify the facility as:

**One doublewall fiberglass-clad steel underground storage tank (with three compartments), doublewall flexible plastic piping, spill containment basins, automatic tank gauge system, overfill alarm, line leak detectors, sumps and automatic shutoff valves.**

The applicant is the owner of **DEQ Facility ID 7529**, located at:

**4 B Farms**

**15234 Butsch Lane, NE**

**Mt. Angel, OR 97362**

**Eligibility**

- ORS 468.155 (1)(a) The **principal purpose** of this **installation** is to prevent, control or reduce a substantial quantity of air and water pollution.
- ORS 468.155 (1)(b)(A) The pollution control is accomplished by the disposal or elimination of industrial waste and the use of treatment works for industrial waste as defined in ORS 468A.005.
- ORS 468.155 (1)(b)(B) The control is accomplished by the elimination of air pollution and the use of the baghouse which meet the air cleaning device definition in ORS 468A.005.
- OAR-016-0025 (2)(g) Installation or construction of facilities which will be used to detect, deter, or prevent spills or unauthorized releases.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>02/07/00</b>
<i>Application Complete and Ready to Process</i>	<b>02/15/00</b>
<i>Construction Started</i>	<b>02/02/98</b>
<i>Construction Completed</i>	<b>02/25/99</b>
<i>Facility Placed into Operation</i>	<b>03/01/99</b>

**Facility Cost**

	<b>Claimed</b>	\$97,015
Less Ineligible Costs – Portion of tank gauge system not used for pollution control (10%).		(\$718)
	<b>Eligible</b>	<b>\$96,297</b>

The facility cost was greater than \$50,000 but less than \$500,000. Therefore, Earl A. Doman, a certified public accountant, performed an accounting review according to Department guidelines on behalf of the applicant.

**Facility Cost Allocable to Pollution Control**

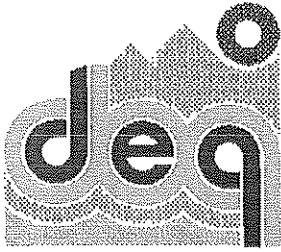
The facility cost exceeds \$50,000. According to ORS 468.190(1), the following factor was considered in determining the percentage of the facility cost allocable to pollution control.

The cost for non-corrosion protected portion of tank and/or piping system costs is \$9,161. Therefore, **10%** of the eligible facility cost is not allocable to pollution control leaving the remaining **90%** allocable.

**Compliance and Other Tax Credits**

The facility is in compliance with Department rules and statutes and with EQC orders, especially, Underground Storage Tank requirements under OAR Chapter 340, Division 150.

Reviewers: Barbara J Anderson



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant **Bruce Pac**  
Application No. **5375**  
Facility Cost **\$111,329**  
Percentage Allocable **100%**  
Useful Life **10 years**

## Pollution Control Facility: Water Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

Organized As: **S Corporation**

Business: **Food Processor and  
Distributor of Meat Products**

Taxpayer ID: **93-0587968**

The applicant's address is:

**12264 Hwy 214  
Aumsville, OR 97325**

### *Facility Identification*

The certificate will identify the facility as:

**Dissolved Air Floatation Wastewater  
Treatment System**

The applicant is the owner of the facility located  
at:

**12264 Hwy 214  
Aumsville, OR 97325**

### *Technical Information*

Bruce Pac produces approximately 15,000 to 30,000 gallons per day of wastewater resulting from meat processing activities and equipment washdown. Prior to installation of the facility, wastewater was pumped through a grease trap to a settling tank, then pumped to a treatment/storage lagoon and later disposed of on a 20-acre irrigation site. The claimed facility is a "Microfloat" dissolved air floatation wastewater treatment system, which separates grease, oils, fats and suspended solids from wastewater placed between the existing settling tank and lagoon.

### *Eligibility*

ORS 468.155 (1)(a)(B) The **sole purpose** of this **construction or installation** is to **reduce** a substantial quantity of water pollution.

ORS 468.155 (1)(b)(A) The reduction is accomplished by the **use of treatment works** for industrial waste as defined in ORS 468B.005.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>2/4/00</u>
<i>Filed Complete and Ready to Process</i>	<u>2/18/00</u>
<i>Construction Started</i>	<u>10/1/97</u>
<i>Construction Completed</i>	<u>2/5/98</u>
<i>Facility Placed into Operation</i>	<u>2/12/98</u>

***Facility Cost***

Facility Cost	<b>\$111,329</b>
Other Tax Credits	
Ineligible Costs (Like-for-like replacement cost)	
Eligible Facility Cost	<u><b>\$111,329</b></u>

Bruce Pac applied to ODEQ for a waiver of the Independent Accountant's Statement for the following reasons: the facility cost can be thoroughly documented by less than twenty invoices or canceled checks, the facility is not part of a larger construction project, and the facility consists of a single pollution control process. Bruce Pac prepared an accounting statement on their own behalf. The reviewers analyzed the facility cost on behalf of the Department.

***Facility Cost Allocable to Pollution Control***

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No alternatives were recommended by the water treatment consulting company.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or increase in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

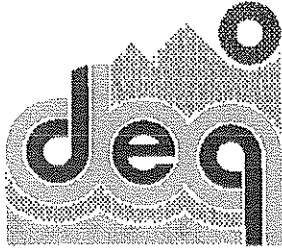
Considering these factors, the percentage allocable to pollution control is 100%.

***Compliance and Other Tax Credits***

The applicant claims the facility is in compliance with Department rules and statutes.

Reviewers:   Mika Kaplan, Envirometrics, Inc.  
                  Michael G. Ruby, Ph.D., P.E., Envirometrics, Inc.  
                  Maggie Vandehey, DEQ





# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant: **United Disposal Services, Inc..**  
Application No.: **5376**  
Facility Cost: **\$46,603**  
Percentage Allocable: **100%**  
Useful Life: **5 years**

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## Pollution Control Facility: Solid Waste Final Certification

ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

Organized As: **a C corporation**  
Business: **Solid waste collection and  
recycling facility**  
Taxpayer ID: **93-0625022**

The applicant's address is:

**2215 N. Front Street  
Woodburn, OR 97071**

### *Facility Identification*

The certificate will identify the facility as:

**One 1999 International truck model  
4700 LP; vin 1HTSLAAL7XH614797;  
Engine, DT466E; serial number:  
001128232**

The applicant is the owner of the facility located  
at:

**2215 Front Street  
Woodburn, OR 97071**

### *Technical Information*

This truck is used to collect source separated recyclable materials from residential and commercial on-route collection service customers in the city of Woodburn and Marion County. The recyclables are collected and delivered to a processing facility where they are further sorted and subsequently sent to recycling mills where they are converted into products of real economic value.

### *Eligibility*

- ORS 468.155 (1)(a) The **sole purpose** of this **new equipment** is to prevent, control, or reduce a substantial quantity of **solid waste**. This truck is used solely for collecting source separated recyclable material.
- OAR 340-16-025(g)(B) **Replacement:** This truck is used to provide a new and expanded service. It replaced a 1988 Ford pickup truck. There is no salvage value associated with the replaced vehicle. The new truck did **not** replace any previously certified equipment.

ORS 468.155 (1)(b)(D) This truck is used to collect source separated recyclable material and is part of a **material recovery process** that obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<u>02/18/00</u>
<i>Application Substantially Complete</i>	<u>02/23/00</u>
<i>Construction Started</i>	<u>06/30/98</u>
<i>Construction Completed</i>	<u>10/13/98</u>
<i>Facility Placed into Operation</i>	<u>2/01/99</u>

***Facility Cost***

Facility Cost	\$46,603
Insignificant Contribution ORS 468.155(2)(d)	
Eligible Facility Cost	<u>\$46,603</u>

The facility cost does not exceed \$50,000. The applicant provided copies of the invoices and checks for purchase of the truck.

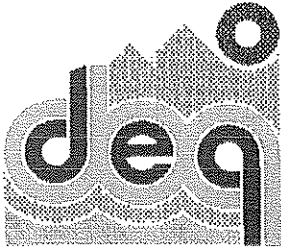
***Facility Cost Allocable to Pollution Control***

In accordance with ORS 468.190(3), since the facility cost does not exceed \$50,000, the only factor used in determining the portion of the claimed facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to this facility.

Reviewer: William R Bree



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant: **United Disposal Services, Inc.**  
Application No.: **5377**  
Facility Cost: **\$18,220**  
Percentage Allocable: **100%**  
Useful Life: **5 years**

## **Pollution Control Facility: Solid Waste Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**  
Business: **Solid waste collection and  
recycling facility**  
Taxpayer ID: **93-0625022**

The applicant's address is:

**2215 N. Front Street  
Woodburn, OR 97071**

### ***Facility Identification***

The certificate will identify the facility as:

**Twenty 8 yard front load containers,  
serial numbers 163722 to 163731 and  
163830 to 163839 and twenty 4 yard  
front load containers w/o serial  
numbers.**

The applicant is the owner of the facility located  
at:

**2215 N. Front Street  
Woodburn, OR 97071**

### ***Technical Information***

These containers are used solely to collect source separated cardboard from commercial on-route collection service customers in the city of Woodburn and Marion County. The cardboard is collected and delivered to a processing facility where it is further sorted, baled and subsequently sent to a recycling mill where it is converted into products of real economic value.

### ***Eligibility***

ORS 468.155 (1)(a) The **sole purpose** of this **new equipment** is to prevent, control or reduce a substantial quantity of **solid waste**. These containers are used solely for collecting source separated recyclable material.

OAR 340-16-025(g)(B) **Replacement:** These containers are used to provide a new and expanded service. These containers did not replace any other cardboard collection containers so there is no salvage value associated with them. The new containers did **not** replace any previously certified equipment.

ORS 468.155 (1)(b)(D) These containers are used to collect source separated recyclable material and are part of a **material recovery process** that obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<u>02/24/2000</u>
<i>Application Substantially Complete</i>	<u>03/01/2000</u>
<i>Construction Started</i>	<u>12/01/1999</u>
<i>Construction Completed</i>	<u>12/22/1999</u>
<i>Facility Placed into Operation</i>	<u>01/03/2000</u>

***Facility Cost***

Facility Cost	\$18,220
Insignificant Contribution ORS 468.155(2)(d)	
Eligible Facility Cost	<u>\$18,220</u>

The facility cost does not exceed \$50,000. The applicant provided copies of the invoices and checks for purchase of these containers.

***Facility Cost Allocable to Pollution Control***

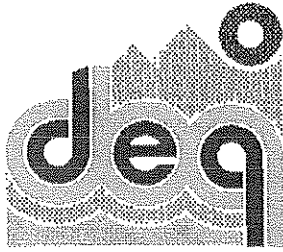
In accordance with ORS 468.190(3), since the facility cost does not exceed \$50,000, the only factor used in determining the portion of the claimed facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to this facility.

Reviewer: William R Bree

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Director's  
Recommendation: **APPROVE**

Applicant **Willamette Egg Farms LLC**  
Application No. **5378**  
Facility Cost **\$189,732**  
Percentage Allocable **100%**  
Useful Life **10 years**

# Tax Credit Review Report

EQC 0005

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## **Pollution Control Facility: Water Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **Limited Liability Corporation**

Business: **Egg Processing Plant**

Taxpayer ID: **93-1159899**

The applicant's address is:

**31348 S. Hwy 170  
Canby, OR 97013**

### ***Facility Identification***

The certificate will identify the facility as:

**Wastewater Treatment Lagoon**

The applicant is the owner of the facility located at:

**31348 S. Hwy 170  
Canby, OR 97013**

### ***Technical Information***

The facility is a lined, aerated wastewater treatment lagoon. Willamette Egg Farms generates wastewater resulting primarily from wash waters associated with the processing of whole eggs into a variety of products.

Prior to construction of the facility, the wastewater was screened and collected, then spray irrigated on approximately 35 acres of adjacent cropland. Due to the high nutrient load in the wastewater, the biological oxygen demand (BOD) exceeded the soil's capacity to properly treat the water. This resulted in the risk of water with high BOD eventually entering into nearby waterways.

The claimed facility, including a lined lagoon, aerators and a calcium feeder, settles particulate materials as a waste sludge and allows bacteria to convert dissolved degradable organic compounds into carbon dioxide. As a result of the facility, the BOD of the wastewater going to the spray irrigation field has been reduced to levels that can be successfully handled by the field.

**Eligibility**

- ORS 468.155 (1)(a)(B) The **sole purpose** of this **construction or installation** is to **reduce, eliminate or control** a substantial quantity of water pollution.
- ORS 468.155 (1)(a)(B) The purpose of the piping and sprinklers is to irrigate cropland, providing a benefit of economic value not to reduce, eliminate or control water pollution..
- ORS 468.155 (1)(b)(A) For the lagoon, the **control** is accomplished with the use of **treatment works** for industrial waste as defined in ORS 468B.005.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>2/24/00</u>
<i>Filed Complete and Ready to Process</i>	<u>3/14/00</u>
<i>Construction Started</i>	<u>3/27/98</u>
<i>Construction Completed</i>	<u>3/15/99</u>
<i>Facility Placed into Operation</i>	<u>6/23/99</u>

**Facility Cost**

Applicant Defined: Capitalized Interest	<b>\$207,075</b>
Department Defined:	<b>(\$4,076)</b>
Irrigation Piping & Sprinklers	<b>(\$13,267)</b>
Eligible Facility Cost	<u><b>\$189,732</b></u>

The reviewers analyzed the facility cost on behalf of the department. Moss Adams LLP provided an independent auditor's report.

**Facility Cost Allocable to Pollution Control**

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 10 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No alternatives were recommended by the water treatment consulting company.

ORS 468.190(1)(d) Savings or Increase in Costs

The wastewater pumped from the facility is used as a fertilizer for the crop (hay) grown on the spray irrigation field. However, the wastewater has less value as a fertilizer now than it had prior to installation of the facility. No bottom sludge from the facility is available as a fertilizer.

ORS 468.190(1)(e) Other Relevant Factors

No other relevant factors.

Considering these factors, the percentage of the allowed facility allocable to pollution control is 100%.

***Compliance and Other Tax Credits***

The applicant claims the facility is in compliance with Department rules and statutes. The applicant is operating under DEQ Water Permit #101689, issued 6/23/99 and modified on 10/14/99.

Reviewers:   Mika Kaplan, Envirometrics, Inc.  
                  Michael G. Ruby, Ph.D., P.E., Envirometrics, Inc.  
                  Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

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## **Pollution Control Facility: Air Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

Organized As: **C Corporation**

Business: **Metal Casting Foundry**

Taxpayer ID: **93-0605811**

The applicant's address is:

**13963 Fir Street  
Oregon City, OR 97045**

### *Facility Identification*

The certificate will identify the facility as:

**Flash Fire Furnace Upgrade**

The applicant is the owner of the facility located at:

**13963 Fir Street  
Oregon City, OR 97045**

### *Technical Information*

PED Manufacturing uses the investment casting or lost wax process to produce metal castings. Some of the wax is recovered, however, a portion has the potential to be ignited, leading to smoke emissions in addition to the standard furnace emissions. Prior to installation of the upgrade, the flash fire furnace could not maintain appropriate pressures and seals and did not have additional features to effectively minimize emissions such as smoke. The upgrade of the existing flash fire furnace includes the following:

- An afterburner system upgrade to achieve VOC and particulate emissions reduction of 99%, at a minimum wax recovery of 80% and a maximum wax load of 142 pounds,
- Installation of an automatic pressure damper to adjust the pressure such that emissions can not escape,
- Inert gas system upgrade and an extinguishing chamber addition to prevent the ignition of hot wax and control smoke emissions, and
- Replacement of the car bed to provide the proper seal of the car to the furnace to reduce emissions.

Director's

Recommendation: **APPROVE**

Applicant

**PED Manufacturing, Ltd**

Application No.

**5380**

Facility Cost

**\$27,272**

Percentage Allocable

**100%**

Useful Life

**10 years**



**Eligibility**

- ORS 468.155 (1)(a)(B) The **sole purpose** of the **installation** of the afterburner, inert gas systems and the extinguishing chamber is to prevent, control or reduce a substantial quantity of air pollution.
- ORS 468.155 (1)(a)(B) The purpose of the stack and ductwork is to transport effluent air from the furnace system to the exterior of the building. These components contribute insignificantly to the purpose of preventing pollution to the atmosphere. These components do not have an exclusive purpose of controlling a substantial quantity of air pollution to the atmosphere.
- ORS 468.155 (1)(b)(B) The **prevention, control or reduction** is accomplished by the **redesign** to eliminate air contaminants using **air cleaning devices** as defined in ORS 468A.005.
- ORS 468.155 (1)(b)(B) The stack and ductwork are not considered air cleaning devices to eliminate air contaminants as defined in ORS 468A.005.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6). Applicant supplied documentation indicating the facility construction start date and closing date, as well as a copy of the application fee receipt.

<i>Application Received</i>	<u>02/28/00</u>
<i>Filed Complete and Ready to Process</i>	<u>03/07/00</u>
<i>Construction Started</i>	<u>11/08/99</u>
<i>Construction Completed</i>	<u>11/12/99</u>
<i>Facility Placed into Operation</i>	<u>11/15/99</u>

**Facility Cost**

Facility Cost	<b>\$28,511.50</b>
Non-allowable costs	<b><u>(\$ 1,240.00)</u></b>
Eligible Facility Cost	<b>\$27,271.50</b>

The upgrade also included the following items that are not eligible for tax credit: the stack and ductwork that are used to transport air effluent outside of the building. According to the application materials, \$1,240.00 was spent on a stack and ductwork, which do not satisfy the sole purpose requirement for tax credit or the definition of air cleaning devices. The \$1,240.00, which includes materials and labor, is listed in the non-allowable costs above.

An independent accounting review was not required because the facility cost does not exceed \$50,000. However, Perrin, McMillan & Miller did provide an independent auditor's report.

***Facility Cost Allocable to Pollution Control***

The facility cost does not exceed \$50,000. Therefore, the only factor used to determine the percentage of the facility allocable to pollution control is the percentage of time the facility is used for pollution control. The facility is used 100% of the time for pollution control. ORS 468.190 (3)

***Compliance and Other Tax Credits***

The applicant claims the facility is in compliance with Department rules and statutes. The facility operates under ODEQ Air Permit #ADCP 03-2505, issued 2/16/95, and Storm Water Permit #1200Z File #101827, issued 10/30/97.

Reviewers:   Mika Kaplan, Envirometrics, Inc.  
                  Michael G. Ruby, Ph.D., P.E., Envirometrics, Inc.  
                  Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant: **KE Enterprises, Inc.**  
Application No.: **5381**  
Facility Cost: **\$286,543**  
Percentage Allocable: **100%**  
Useful Life: **7 years**

## **Pollution Control Facility: Solid Waste/WQ**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**

Business: **Management and financing of  
solid waste service and  
equipment companies**

Taxpayer ID: **93-1070314**

The applicant's address is:

**PO Box 509  
McMinnville, OR 97128**

### ***Facility Identification***

The certificate will identify the facility as:

**3.75 acres of asphalt paving liner for a  
yard debris processing and composting  
facility.**

The applicant is the owner of the facility located  
at:

**2200 NE Orchard Ave.  
McMinnville, OR 97128**

### ***Technical Information***

This composting site liner was installed as part of a source separated yard debris composting operation that processes yard debris from residential and commercial sources in the City of McMinnville and Yamhill and Clatsop Counties. This liner is part of the environmental protection equipment associated with a process where yard debris is converted into a product of real economic value. The liner is used to protect ground water under the areas where the yard debris is received, stored, processed, and composted, and where composted material is aged, blended, and stored. The liner is required to prevent liquids from the yard debris and composted material from escaping into the surface or ground water. The liner is composed of the following layers: geotextile fabric sub base, crushed rock base, compacted asphalt, and an asphalt seal coating. The full facility area has been graded such that liquids collected on the liner are directed to a constructed bioswale, catch basin and sedimentation pond.

**Eligibility**

- ORS 468.155 (1)(a) This liner is part of a process that composts source separated yard debris. The **principal purpose** of this **liner** is to prevent, control, or reduce a substantial quantity of **solid waste by providing water pollution prevention at a DEQ permitted composting facility**. Protection of surface and ground water from pollution is a requirement of the facility's composting general permit, SW Permit #C2-008 and OAR 340-096-0028(2)(b).
- OAR 340-16-025(g)(B) **Replacement:** This is a liner and does not replace any existing equipment. Therefore, no salvage value was associated with its purchase. This liner does **not** replace any previously certified equipment.
- ORS 468.155 (1)(b)(D) This liner is part of a **material recovery process** that obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<b>02/28/2000</b>
<i>Application Substantially Complete</i>	<b>03/21/2000</b>
<i>Construction Started</i>	<b>08/31/1998</b>
<i>Construction Completed</i>	<b>09/27/1999</b>
<i>Facility Placed into Operation</i>	<b>09/27/1999</b>

**Facility Cost**

Facility Cost	<b>\$286,543</b>
Insignificant Contribution ORS 468.155(2)(d)	
Eligible Facility Cost	<b>\$286,543</b>

The facility cost exceeds \$50,000. The applicant has requested a waiver of the independent accountants review. The applicant has provided documentation of the facility cost in the form of two invoices and checks.

**Facility Cost Allocable to Pollution Control**

In accordance with ORS 468.190(1), since the facility cost exceeds \$50,000, the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control. The percentage of the facility cost allocable to pollution control is **100%**.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	This liner is part of a facility that processes yard debris into compost, a salable and useable commodity.

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ORS 468.190(1)(b) Return on Investment

The useful life of the liner, used for the return on investment consideration, is 7 years. The applicant used the return on investment for the complete composting operation the calculated return on investment for the liner. This figure is negative, therefore the portion of cost allocable to pollution control is 100%.

ORS 468.190(1)(c) Alternative Methods

No alternative investigated.

ORS 468.190(1)(d) Savings or Increase in Costs

All savings and costs were incorporated into the calculation of the return on investment.

ORS 468.190(1)(e) Other Relevant Factors

No other relevant factors were considered.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders.

This composting facility operates in compliance with DEQ permits, NPDES #110280 and SW Permit # C2-008.

Reviewer: William R Bree  
Maggie Vandehey, DEQ

# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant: **KE Enterprises, Inc.**  
Application No.: **5382**  
Facility Cost: **\$211,440**  
Percentage Allocable: **100%**  
Useful Life: **7 years**

## **Pollution Control Facility: Solid Waste**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**

Business: **Management and financing of  
solid waste service and  
equipment companies**

Taxpayer ID: **93-1070314**

The applicant's address is:

**PO Box 509  
McMinnville, OR 97128**

### ***Facility Identification***

The certificate will identify the facility as:

**A Komatsu 380-3L wheeled loader,  
serial number A50303.**

The applicant is the owner of the facility located  
at:

**2200 NE Orchard Ave.  
McMinnville, OR 97128**

### ***Technical Information***

This loader is used as part of a source separated yard debris composting operation that processes yard debris collected from residential customers in the City of McMinnville and Yamhill and Clatsop Counties. This loader is an essential tool in the composting process where yard debris is converted into compost, a product of real economic value. The loader is necessary to move fresh and processed material to and from receiving, processing, composting, and storage areas.

### ***Eligibility***

- ORS 468.155 (1)(a) The sole **purpose** of this **new equipment** is to prevent, control, or reduce a substantial quantity of **solid waste as an essential part of a DEQ permitted composting facility**. This loader is used to handle source separated compostable yard debris.
- OAR 340-16-025(g)(B) **Replacement:** This is a new loader and does not replace any existing equipment. Therefore, no salvage value was associated with its purchase. This loader does **not** replace any previously certified equipment.
- ORS 468.155 This loader is part of a **material recovery process** that obtains useful material

(1)(b)(D) from material that would otherwise be solid waste as defined in ORS 459.005. Yard debris is processed and composted into compost, a commodity of real economic value.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<b>02/28/2000</b>
<i>Application Substantially Complete</i>	<b>03/21/2000</b>
<i>Construction Started</i>	<b>11/30/1998</b>
<i>Construction Completed</i>	<b>11/30/1998</b>
<i>Facility Placed into Operation</i>	<b>11/30/1998</b>

***Facility Cost***

Facility Cost	<b>\$211,440</b>
Eligible Facility Cost	<b>\$211,440</b>

The facility cost exceeds \$50,000. The applicant has requested a waiver of the independent accountant's review. The applicant has provided documentation of the facility cost in the form of an invoice and check.

***Facility Cost Allocable to Pollution Control***

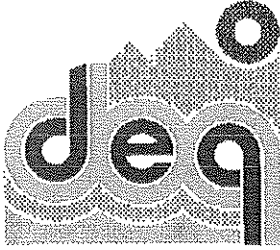
In accordance with ORS 468.190(1), since the facility cost exceeds \$50,000, the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control. The percentage of the facility cost allocable to pollution control is **100%**.

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	This loader is part of a facility that processes yard debris into compost, a salable and useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the loader, used for the return on investment consideration, is 7 years. The return on investment for the loader is 0%. Therefore, the portion of cost allocable to pollution control is 100%.
ORS 468.190(1)(c) Alternative Methods	No alternative investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	All savings and costs were incorporated into the calculation of the return on investment.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors were considered.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes, and with EQC orders. This composting facility operates in compliance with DEQ permits, NPDES #110280 and SW Permit # C2-008.

Reviewer: William R Bree



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant: **KE Enterprises, Inc..**  
Application No.: **5383**  
Facility Cost: **\$35,000**  
Percentage Allocable: **100%**  
Useful Life: **3 years**

## **Pollution Control Facility: Solid Waste Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**

Business: **Management and financing of  
solid waste service and  
equipment companies.**

Taxpayer ID: **93-1070314**

The applicant's address is:

**P O Box 509  
McMinnville, Woodburn, OR 97128**

### ***Facility Identification***

The certificate will identify the facility as:

**Scat 483B windrow turner**

The applicant is the owner of the facility located  
at:

**2200 NE Orchard Ave.  
McMinnville, OR 97128**

### ***Technical Information***

The windrow turner is used to process source-separated yard-debris collected from commercial and residential on-route collection service customers in the city of McMinnville and Yamhill County. The yard-debris is processed into products of real economic value.

### ***Eligibility***

ORS 468.155 (1)(a) The **sole purpose** of this **new equipment** is to prevent, control, or reduce a substantial quantity of **solid waste**. This turner is used solely for processing a collecting source separated recyclable material.

OAR 340-16-025(g)(B) **Replacement:** This turner is used to provide a new service. It did not replace previously certified equipment.

ORS 468.155 (1)(b)(D) This turner is is used to process source-separated recyclable material and is part of a **material recovery process** that obtains useful material from material that



would otherwise be solid waste as defined in ORS 459.005.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<u>02/28/2000</u>
<i>Application Substantially Complete</i>	<u>03/01/2000</u>
<i>Construction Started</i>	<u>04/22/1998</u>
<i>Construction Completed</i>	<u>04/22/1998</u>
<i>Facility Placed into Operation</i>	<u>04/22/1998</u>

***Facility Cost***

Facility Cost	<u>\$35,000</u>
Eligible Facility Cost	<u>\$35,000</u>

The facility cost does not exceed \$50,000. The applicant provided copies of the invoices and checks for purchase of the turner.

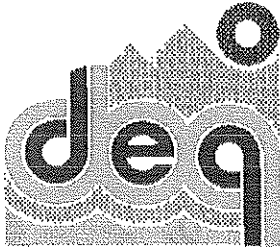
***Facility Cost Allocable to Pollution Control***

In accordance with ORS 468.190(3), since the facility cost does not exceed \$50,000, the only factor used in determining the portion of the claimed facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to this facility.

Reviewer: William R Bree



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**

Applicant: **Pacific Sanitation, Inc.**  
Application No.: **5385**  
Facility Cost: **\$33,244**  
Percentage Allocable: **100%**  
Useful Life: **7 years**

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## **Pollution Control Facility: Solid Waste**

### **Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**

Business: **Solid waste collection and  
recycling facility**

Taxpayer ID: **93-0924002**

The applicant's address is:

**3475 Blossom Drive NE**

**Salem, OR 97305**

### ***Facility Identification***

The certificate will identify the facility as:

**Eighty 2-yard and twenty-five 3-yard  
cardboard collection containers, serial  
numbers: 163478 –163599, 163433 –  
163452, 163968, and 163753 – 163768,  
163840 – 163848.**

The applicant is the owner of the facility located  
at:

**3475 Blossom Drive NE**

**Salem, OR 97305**

### ***Technical Information***

These containers are used to collect source-separated cardboard from commercial on-route collection service customers in the city of Salem and Marion County. The cardboard is collected and delivered to a processing facility where it is further sorted, baled, and subsequently sent to a recycling mill, where it is converted into products of real economic value.

### ***Eligibility***

ORS 468.155 (1)(a) The **sole purpose** of this **new equipment** is to prevent, control, or reduce a substantial quantity of **solid waste**. These containers are not used for any purpose other than collecting source separated recyclable material.

OAR 340-16-025(g)(B) **Replacement:** These containers are used to provide a new and expanded service. These containers did not replace any other cardboard collection containers or any previously certified equipment.

ORS 468.155 (1)(b)(D) These containers are used to collect source separated recyclable material and are part of a **material recovery process** that obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<u>03/02/2000</u>
<i>Application Substantially Complete</i>	<u>03/07/2000</u>
<i>Construction Started</i>	<u>11/22/1999</u>
<i>Construction Completed</i>	<u>12/23/1999</u>
<i>Facility Placed into Operation</i>	<u>12/23/2000</u>

***Facility Cost***

Facility Cost	<u>\$33,244</u>
Eligible Facility Cost	<u>\$33,244</u>

The facility cost does not exceed \$50,000. The applicant provided copies of the invoices for purchase of these containers.

***Facility Cost Allocable to Pollution Control***

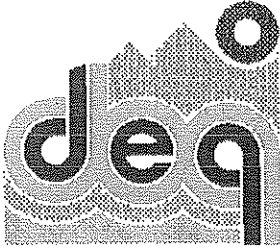
In accordance with ORS 468.190(3), since the facility cost does not exceed \$50,000, the only factor used in determining the portion of the claimed facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to this facility.

Reviewer: William R Bree

100



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**  
Applicant **Denton Plastic, Inc.**  
Application No. **5396**  
Facility Cost **\$14,050**  
Percentage Allocable **100%**  
Useful Life **5 years**

## Reclaimed Plastic Products

### Final Certification

ORS 468.451 -- 468.491

OAR 340-017-0010 -- 340-017-0055

### *Applicant Identification*

Organized As: **a Partnership**

Business: **Equipment leasing for the recycling, repressing & manufacturing of post consumer & industrial plastics.**

Taxpayer ID: **93-0852298**

The applicant's address is:

**4427 NE 158<sup>th</sup>  
Portland, Oregon 97230**

### *Facility Identification*

The certificate will identify the facility as:

**Bobcat 753 skid loader with 36.3 cubic foot grapple bucket.**

The applicant is the owner of the facility located at:

**4427 NE 158<sup>th</sup>  
Portland, Oregon 97230**

### *Technical Information*

This Bobcat loader is used to load recycled plastic into processing equipment. The reclaimed plastic is then re-melted and extruded into reclaimed plastic pellets.

### *Eligibility*

ORS 468.461 (1) Any person may apply to the EQC for certification of an investment made to allow the person to collect, transport or process reclaimed plastic or to manufacture a reclaimed plastic product.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.461(6).

<i>Preliminary Application Received</i>	<b>01/14/2000</b>
<i>Preliminary approval granted</i>	<b>01/18/2000</b>
<i>Date of investment</i>	<b>01/18/2000</b>
<i>Final application received</i>	<b>03/23/2000</b>
<i>Application substantially complete</i>	<b>03/28/2000</b>

***Facility Cost***

Claimed Facility Cost	<b>\$14,050</b>
Ineligible Costs	
Eligible Facility Cost	<b>\$14,050</b>

Pursuant to OAR 340-017-0030 (1)(a), invoices substantiated the cost of the facility. The facility cost does not exceed \$50,000; therefore, an independent accounting review was not required.

***Facility Cost Allocable to Pollution Control***

Pursuant to ORS 468.486, the following factors were used to determine the percentage of the investment allocable to the collection, transportation or processing of reclaimed plastic or the manufacture of reclaimed plastic product.

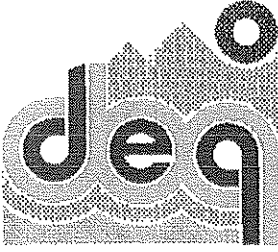
<b>Factor</b>	<b>Applied to This Facility</b>
OAR 340-017-0030 (2)(a) Extent used to convert reclaimed plastic into a salable or usable commodity.	The equipment is used 100% of the time to for processing reclaimed plastic into a salable or useable commodity.
OAR 340-017-0030 (2)(b) The alternative methods, equipment and costs for achieving the same objective;	No alternative methods were considered.
OAR 340-017-0030 (2)(c) Other relevant factors used to establish portion of the cost allocable to collection, transportation or processing of reclaimed plastic or the manufacture of reclaimed plastic products.	No other factors were considered relevant.

Considering these factors, the percentage allocable to pollution control is 100%.

***Compliance***

The facility is in compliance with Department rules and statutes and with EQC orders. There are no DEQ permits issued to this facility:

Reviewers: William R Bree



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **APPROVE**  
Applicant **Neo Leasing LLC**  
Application No. **5398**  
Facility Cost **\$87,751**  
Percentage Allocable **100%**  
Useful Life **5 years**

## Reclaimed Plastic Products

### Final Certification

ORS 468.451 -- 468.491

OAR 340-017-0010 -- 340-017-0055

### *Applicant Identification*

Organized As: **a Corporation**

Business: **Equipment leasing for the  
recycling, repressing &  
manufacturering of post  
consumer & industrial  
plastics.**

Taxpayer ID: **93-1291873**

The applicant's address is:

**4427 NE 158<sup>th</sup>  
Portland, Oregon 97230**

### *Facility Identification*

The certificate will identify the facility as:

**Production Engineering model 100  
pulverizing system.**

The applicant is the owner of the facility is  
located at:

**4427 NE 158<sup>th</sup>  
Portland, Oregon 97230**

### *Technical Information*

This pulverizing system is used to process scrap plastic into small pieces that can be fed into an extruder. Scrap plastic is processed into reclaimed plastic pellets. .

### *Eligibility*

ORS 468.461 (1) Any person may apply to the EQC for certification of an investment made to allow the person to collect, transport or process reclaimed plastic or to manufacture a reclaimed plastic product.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.461(6).

<i>Preliminary Application Received</i>	<u>02/25/1999</u>
<i>Preliminary approval granted</i>	<u>12/29/1999</u>
<i>Date of investment</i>	<u>03/06/2000</u>
<i>Final application received</i>	<u>03/23/2000</u>
<i>Application substantially complete</i>	<u>03/28/2000</u>

***Facility Cost***

Claimed Facility Cost	\$87,751
Ineligible Costs	
Eligible Facility Cost	<u>\$87,751</u>

The facility cost exceeded \$50,000. The applicant requested a waiver of the independent accountant's review. In accordance with OAR 340-017-0030 they provided a single invoice for this investment to substantiated the cost of the facility.

***Facility Cost Allocable to Pollution Control***

Pursuant to ORS 468.486, the following factors were used to determine the percentage of the investment allocable to the collection, transportation or processing of reclaimed plastic or the manufacture of reclaimed plastic product.

<u>Factor</u>	<u>Applied to This Facility</u>
OAR 340-017-0030 (2)(a) Extent used to convert reclaimed plastic into a salable or usable commodity.	The equipment is used 100% of the time to for processing reclaimed plastic into a salable or useable commodity.
OAR 340-017-0030 (2)(b) The alternative methods, equipment and costs for achieving the same objective;	No alternative methods were considered.
OAR 340-017-0030 (2)(c) Other relevant factors used to establish portion of the cost allocable to collection, transportation or processing of reclaimed plastic or the manufacture of reclaimed plastic products.	No other factors were considered relevant.

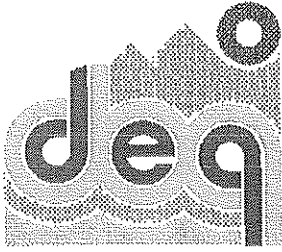
Considering these factors, the percentage allocable to pollution control is 100%.

***Compliance***

The facility is in compliance with Department rules and statutes and with EQC orders. There are no DEQ permits issued to this facility:

Reviewers: William R Bree

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# Tax Credit Review Report

EQC 2000

Director's  
Recommendation: **APPROVE**

Applicant: **Environmental Waste Systems, Inc.**  
Application No.: **5403**  
Facility Cost: **\$5,947**  
Percentage Allocable: **100%**  
Useful Life: **5 years**

## **Pollution Control Facility: Solid Waste Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

Organized As: **a C corporation**  
Business: **Solid waste collection and  
recycling facility**  
Taxpayer ID: **93-0938511**

The applicant's address is:

**P O Box 1002  
St. Helens, OR 97051**

### *Facility Identification*

The certificate will identify the facility as:

**Fifteen 2 yard rear load containers,  
serial numbers 163171 to 163175,  
162430 to 162431, 158653 to 158655,  
and 156986 to 156990.**

The applicant is the owner of the facility located  
at:

**58597 Old Portland Rd.  
St. Helens, OR 97051**

### *Technical Information*

These containers are used to collect source separated cardboard from commercial facilities that receive on-route collection service in the city of St. Helens and Columbia County. The cardboard is collected and delivered to a processing facility where it is further sorted, baled and subsequently sent to a recycling mill where it is converted into products of real economic value.

### *Eligibility*

ORS 468.155 (1)(a) The **sole purpose** of this **new equipment** is to prevent, control or reduce a substantial quantity of **solid waste**. These containers are used for collecting source separated recyclable material.

OAR 340-16- **Replacement:** These containers are used to provide a new and expanded



- 025(g)(B) service. These containers did not replace any other cardboard collection containers so there is no salvage value associated with them. The new containers did **not** replace any previously certified equipment.
- ORS 468.155 These containers are used to collect source separated recyclable material and are (1)(b)(D) part of a **material recovery process** that obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<b>03/29/2000</b>
<i>Application Substantially Complete</i>	<b>04/04/2000</b>
<i>Construction Started</i>	<b>12/22/1998</b>
<i>Construction Completed</i>	<b>11/30/1999</b>
<i>Facility Placed into Operation</i>	<b>11/30/1999</b>

***Facility Cost***

Facility Cost	<b>\$5,947</b>
Salvage Value	
Government Grants	\$ -
Other Tax Credits	\$ -
Insignificant Contribution ORS 468.155(2)(d)	\$ -
Eligible Facility Cost	<b>\$5,947</b>

The facility cost does not exceed \$50,000. The applicant provided copies of the invoices and checks for purchase of these containers.

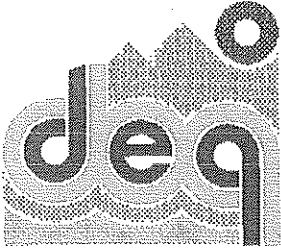
***Facility Cost Allocable to Pollution Control***

In accordance with ORS 468.190(3), since the facility cost does not exceed \$50,000, the only factor used in determining the portion of the claimed facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to this facility.

Reviewer: William R Bree



# Tax Credit Review Report

EQC 2000

Director's  
Recommendation: **APPROVE**

Applicant: **Environmental Waste Systems, Inc.**  
Application No.: **5404**  
Facility Cost: **\$45,504**  
Percentage Allocable: **100%**  
Useful Life: **5 years**

## Pollution Control Facility: Solid Waste Final Certification

ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

Organized As: **a C corporation**  
Business: **Solid waste collection and  
recycling facility**  
Taxpayer ID: **93-0938511**

The applicant's address is:

**P O Box 1002  
St. Helens, OR 97051**

### *Facility Identification*

The certificate will identify the facility as:

**One thousand one hundred fifty two  
65 gallon collection carts serial  
numbers 1 to 1152.**

The applicant is the owner of the facility located  
at:

**58597 Old Portland Rd.  
St. Helens, OR 97051**

### *Technical Information*

These carts are used to collect co-mingled recyclable materials from residential on-route collection service customers in the city of St. Helens and Columbia County. The recyclable materials are collected and delivered to a processing facility where they are sorted and subsequently sent to a recycling mills where they are converted into products of real economic value.

### *Eligibility*

ORS 468.155 (1)(a) The **sole purpose** of this **new equipment** is to prevent, control or reduce a substantial quantity of **solid waste**. These carts are used for collecting source separated recyclable material.

OAR 340-16-025(g)(B) **Replacement:** These carts are used to provide a new and expanded service. These carts did not replace any other collection containers so there is no salvage

value associated with them. The new carts did **not** replace any previously certified equipment.

ORS 468.155 (1)(b)(D) These containers are used to collect source separated recyclable material and are part of a **material recovery process** that obtains useful material from material that would otherwise be solid waste as defined in ORS 459.005.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165(6).

<i>Application Received</i>	<b>03/29/2000</b>
<i>Application Substantially Complete</i>	<b>04/04/2000</b>
<i>Construction Started</i>	<b>03/26/1999</b>
<i>Construction Completed</i>	<b>03/26/1999</b>
<i>Facility Placed into Operation</i>	<b>05/01/1999</b>

***Facility Cost***

Facility Cost	<b>\$45,504</b>
Salvage Value	
Government Grants	\$ -
Other Tax Credits	\$ -
Insignificant Contribution ORS 468.155(2)(d)	\$ -
Eligible Facility Cost	<b>\$45,504</b>

The facility cost does not exceed \$50,000. The applicant provided copies of the invoices and checks for purchase of these containers.

***Facility Cost Allocable to Pollution Control***

In accordance with ORS 468.190(3), since the facility cost does not exceed \$50,000, the only factor used in determining the portion of the claimed facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. Therefore, the percentage of the facility cost allocable to pollution control is **100%**.

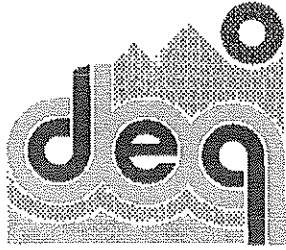
***Compliance and Other Tax Credits***

The facility is in compliance with Department rules and statutes and with EQC orders. There were no DEQ permits issued to this facility.

Reviewer: William R Bree

# ***Attachment C***

## ***Denials***



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **DENY – Ineligible Facility**

Applicant	<b>Willamette Industries, Inc.</b>
Application No.	<b>5167</b>
<u>Claimed</u> Facility Cost	<b>\$38,267</b>
<u>Claimed</u> Percentage Allocable	<b>100%</b>
Useful Life	<b>7 years</b>

## Pollution Control Facility: Air Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation operating as a softwood veneer and plywood manufacturer and planing mill taking tax relief under taxpayer identification number 93-0312940. The applicant's address is:

**Dalles Division  
1300 SW Fifth Ave., Suite 3800  
Portland, OR 97201**

### *Facility Identification*

The applicant claimed the following facility:

**One 1991 Pelican three-wheel sweeper, s/n P715D**

The applicant is the owner of the facility located at:

**1551 S.E. Lyle Street  
Dallas, OR 97338**

### *Technical Information*

The claimed facility consists of a 1991 Pelican three-wheel sweeper, s/n P715D, which is used to clean the vehicular areas of the plant site. The applicant claims the new sweeper allows a continuous schedule of dust and debris removal as well as immediate clean-up after emptying bins. The applicant also claims the volume of airborne fugitives and contamination of stormwater runoff has been minimized.

### *Eligibility*

ORS 468.155 (1)(a)(A) The applicant claims the **principal** purpose of this **new equipment** is to comply with a requirement imposed by the DEQ to prevent, control or reduce air pollution. The applicant claims their new Title V permit requires that road dust and debris not be allowed to accumulate on the property or to leave the property. The applicant claims their previous ACDP allowed for periodic sweeping, however, road dust and debris accumulated between sweepings.

The department considers the sweeper's **primary purpose** is **not** for pollution control. It's primary purpose is to clean up the work environment. They agree that a continuous schedule of sweeping minimizes the volume of wood

particulate and dirt in and around the plant. This is part of general maintenance practices required at the site.

The Title V permit, page 5 of 28, section 4, states that reasonable precautions must be taken to "prevent particulate matter from becoming airborne in accordance with OAR 340-021-0060 (2) including the following: 4.a. Treating and/or cleaning vehicular areas of the plant site under the control of the permittee as needed." OAR 340-021-0060 (2) does not include any reference to the use of a sweeper.

- ORS 468.155 (1)(a)(B) The **sole purpose** is **not** to prevent, control, or reduce a substantial quantity of air pollution. It's other purpose is for cleaning the work site. It is the departments position that sweepers are not a required piece of equipment for pollution control and are not deemed eligible for tax credit certification.
- OAR 340-016 -0070(3)(p) Ineligible costs include but are not limited to maintenance, operation, or repair of a facility, including spare parts.

***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>2/25/99</u>
<i>Application Substantially Complete</i>	<u>7/19/99</u>
<i>Construction Started</i>	<u>5/21/98</u>
<i>Construction Completed</i>	<u>5/31/98</u>
<i>Facility Placed into Operation</i>	<u>5/31/98</u>

***Facility Cost***

Facility Cost	\$ 38,267
Ineligible Costs: OAR 340-016 -0070(3)(p)	(\$38,267)
Eligible Facility Cost	<u>\$0</u>

***Facility Cost Allocable to Pollution Control***

According to ORS 468.190 (3), the only factor that would have been used to determine the percentage of the facility cost allocable to pollution control is the percentage of time the facility is used for pollution control. The applicant submitted an affidavit stating that the sweeper would be used 100% of the time for pollution control.

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***Compliance***

The applicant states that the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to the Willamette Industries Dallas Division site:

Title V permit #27-0177, issued 10/1/98  
NPDES 1200-Z issued 11/17/97.

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers, Inc.  
Dennis E. Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ



Director's  
Recommendation: **DENY -Lack of Data**  
Applicant **Fujitsu Microelectronics Inc.**  
Application No. **5232**  
Claimed Facility Cost **\$809,813**  
Claimed Percentage Allocable **100%**  
Useful Life **0 years**

# Tax Credit Review Report

EQC0005

## **Pollution Control Facility: Noise Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

Organized As: **a C corporation**

Business: **manufacturers integrated  
circuits**

Taxpayer ID: **94-2602121**

The applicant's address is:

**21015 SE Stark Street  
Gresham, OR 97030**

### ***Facility Identification***

The certificate will identify the facility as:

**noise pollution control systems**

The applicant is the owner of the facility  
located at:

**21015 SE Stark Street  
Gresham, OR 97030**

### ***Technical Information***

Fujitsu Microelectronics Inc. erected a solid partition screenwall around the rooftop and installed acoustical louvers on certain wall penetrations to nominally reduce the amount of sound reaching neighboring properties. The installation was to be in accordance with Environmental Designated Noise Abatement (EDNA) regulations per OAR 340-0035-0035. The rooftop equipment consists of ventilation fans, fumes scrubbers, air handling units, and other unspecified equipment. The wall penetrations lead to UN-specified internal equipment. The screenwall are made up of steel panels supported by tubular and formed steel structures in heights of up to an estimated 12 feet above the roof surfaces. The screenwalls on the Energy building completely surrounds the equipment located on the north end of the building. The screenwall on the Fabrication Building (FAB-2) is mainly confined to the central area of the roof surface on an East to West line with the screenwalls on the north, west, and south sides, and partially open on the east side.



Fujitsu did not disclose an acoustical baseline to establish an acoustical benchmark prior to construction of the facility. Similarly, Fujitsu did not present any data concerning the present operating sound levels either at the sources or at the nearest fence line located southeast of the Utilities Building.

**Eligibility**

- ORS 468.155 (1)(a) The **principal purpose** of this **new structure** is stated to reduce a substantial quantity of noise pollution impacting a residential neighborhood southeast of the manufacturing site. The basis for the screenwall installation could not be separated from the esthetic benefits provided by the visual barrier.
- ORS 468.155 (1)(b)(C) The department could not determine if the stated structures caused a substantial reduction in the noise pollution or noise emission from sources as defined by rule of the commission due a lack of data to evaluate compliance. Statements by plant personnel indicated the existence of site measurements that were not made available. The measurement station is now deactivated.

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<b>July 15, 1999</b>
<i>Application Substantially Complete</i>	
<i>Requested Additional Information</i>	<b>August 11, 1999</b>
<i>Additional Information (Letter: unable to provide data.)</i>	<b>October 29, 1999</b>
<i>Construction Started</i>	<b>1995</b>
<i>Construction Completed</i>	<b>October, 1997</b>
<i>Facility Placed into Operation</i>	<b>October, 1997</b>

**Facility Cost**

Facility Cost	<b>\$809,813</b>
Ineligible Facility Cost	<b><u>(\$809,813)</u></b>
<b>Eligible</b>	<b>\$0</b>

The facility cost exceeds \$500,000. Therefore, KPMG performed an accounting review on behalf of the applicant.

**Facility Cost Allocable to Pollution Control**

The facility cost exceeds \$50,000. According to ORS 468.190 (1), the factors listed below were considered in determining the percentage of the facility cost allocable to pollution control. The percentage of the facility cost allocable to pollution control is indeterminate.

Factor	Applied to This Facility
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 39.5

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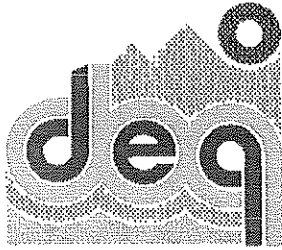
ORS 468.190(1)(c) Alternative Methods  
ORS 468.190(1)(d) Savings or Increase in Costs  
ORS 468.190(1)(e) Other Relevant Factors

years. No gross annual revenues were associated with this facility.  
No alternative investigated.  
No savings or increase in costs.  
No other relevant factors.

***Compliance and Other Tax Credits***

The facility is in unknown compliance with Department rules and statutes and with EQC orders.

Reviewers: Alan Werner, Carson Engineering  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **DENY**

Applicant	<b>Teledyne Industries, Inc.</b>
Application No.	<b>5276</b>
<u>Claimed</u> Facility Cost	<b>\$132,705</b>
<u>Claimed</u> Percentage Allocable	<b>100%</b>
Useful Life	<b>5 years</b>

## Pollution Control Facility: Water Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation operating as a zirconium, hafnium, tantalum, titanium, and niobium production plant. The applicant's taxpayer identification number is 95-23-16679-WA and their address is:

**1600 N.E. Old Salem Road  
Albany, Oregon 97321-0460**

### *Facility Identification*

The applicant claimed the following facility:

#### **Hafnium Pickle Slab**

The applicant is the owner of the facility located at:

**1600 N.E. Old Salem Road  
Albany, Oregon 97321-0460**

### *Technical Information*

The claimed facility consists of the following:

- 3,250 square feet concrete Hafnium Pickle Slab, 14 inches thick;
- A concrete sump, catch basin, trenches, FRP liner, six foot by six foot four inch thick steel knock-out plate, and mats;
- Chem proof permaflox epoxy coating, 1/8 inch thick; and a
- Acid washing transfer system consisting of: acid storage tanks, Penn Valley model 2" double-disc pump, and piping.

The facility is used to chemically clean production equipment after each Hafnium reduction process run. Reduction vessels (crucibles and retorts) and hafnium/zirconium crystal bars are chemically cleaned with hydrochloric acid. The acid washing transfer system pumps acid back and forth between two crucibles to remove metal impurities before the crucible is returned back to production for the next batch of hafnium. The applicant claims the pad is designed to capture, contain, and divert all wastewater to the central wastewater treatment system. The steel knock-out plate and mats are designed to protect the slab and coating from damage that results from the vessels being placed directly on the slab.

Prior to installation of the concrete slab, an asphalt slab was used. The asphalt, being a weaker material, was subject to breakage from the heavy vessels and equipment. This could potentially allow spilled material containing metal ions and acids to penetrate the barrier and contaminate the soil and groundwater. Before the acid transfer system, employees poured acid manually into the vessels which might have resulted in losses due to spillage. The applicant claims the environmental impact has been substantially reduced as a result of the claimed facility installation.

### **Eligibility**

- ORS 468.155 (1)(a)(A) The principal purpose of this new equipment is not to prevent, control, or reduce a substantial quantity of water pollution because it is not required by the Department or the federal Environmental Protection Agency.
- ORS 468.155 (1)(a)(B) This facility is not used exclusively for pollution control; therefore the **sole purpose of this new equipment is not** to prevent, control, or reduce a substantial quantity of water pollution.

The epoxy coated Hafnium Pickle Slab functions as a processing area that happens to be located outside. The key purpose of the Hafnium Pickle Slab is to provide an area to chemically remove metal impurities from process vessels before they are moved to the next step of the production process. The steel plate, mats and epoxy coating reduce physical damage to the concrete slab caused by the handling of the heavy process vessels. The Hafnium Pickle Slab was installed to meet the requirements of the Uniform Fire Code for spill control and secondary containment of hazardous liquids. The Uniform Fire Code, Article 80, Section 8004.3.4.1.1 and 8004.3.4.1.2 require spill control in outdoor locations where hazardous liquids are dispensed or used.

The acid transfer system is a material handling process used to pump acid between two crucibles and the applicant claims it eliminates employees from using buckets that could cause spillage. The trenches and catch basins serve as a material handling system to transport the waste material to the wastewater treatment facility. The claimed facility is essential for the production of hafnium.

- ORS.468.155. (1)(b)(A) The facility does not dispose of or eliminate industrial waste with the use of treatment works for industrial waste as defined in ORS 468B.005. The claimed facility does not eliminate industrial wastes through any sort of treatment process.

*Disposal (system) means a system for disposing of wastes, either by surface or underground methods and includes municipal sewerage systems, domestic sewerage systems, treatment works, disposal wells and other systems.*

*Treatment works" means any plant or other works used for the purpose of treating, stabilizing or holding wastes.*

***Timeliness of Application***

The department's records show the application was submitted two days after the date the applicant claimed construction was completed; thereby missing the filing requirements in ORS 468.165 (6). The applicant signed the application on 10/5/99. Invoices show the applicant was buying a small number of fittings and claiming plant labor around 10/20/97. The applicant stated that construction started in 8/97 but they claimed invoices dated back to mid 1995.

<i>Application Received</i>	<u>10/12/1999</u>
<i>Application Substantially Complete</i>	<u>1/6/2000</u>
<i>Construction Started</i>	<u>08/01/1997</u>
<i>Construction Completed</i>	<u>10/10/1997</u>
<i>Facility Placed into Operation</i>	<u>10/15/1997</u>

***Facility Cost***

Facility Cost	\$ 132,705
Ineligible Costs	(132,705)
Eligible Facility Cost	<u>\$ 0</u>

The claimed facility cost is greater than \$50,000 but less than \$500,000, therefore, **Moss Adams, LLP** performed an accounting review on behalf of the applicant and according to Department guidelines. The department did not perform an accounting review.

***Facility Cost Allocable to Pollution Control***

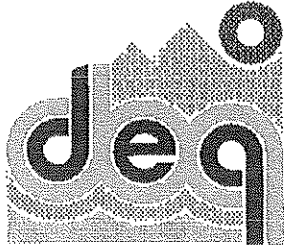
The facility is not eligible; therefore the percentage allocable to pollution control is 0%.

***Compliance and Other Tax Credits***

The applicant claims the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to the site:

- Waste discharge #87645, issued 9/30/98
- Stormwater # 1200-Z: 87645, issued 10/13/97
- Title V # 22-0547, issued 9/19/98

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers, Inc.  
Dennis E. Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ



# Tax Credit Review Report

EQC 0005

Director's  
Recommendation: **DENY**  
**Ineligible Facility**

Applicant	<b>Teledyne Industries, Inc.</b>
Application No.	<b>5286</b>
<u>Claimed</u> Facility Cost	<b>\$22,500</b>
<u>Claimed</u> Percentage Allocable	<b>100%</b>
Useful Life	<b>5 years</b>

## Pollution Control Facility: Water Final Certification

ORS 468.150 -- 468.190  
OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is the parent company of Oremet-Wah Chang. The applicant operates a zirconium, hafnium, tantalum, titanium and niobium production plant. Their taxpayer identification number is 95-23-16679-WA and the address of the production plant is:

**1600 NE Old Salem Road  
Albany, OR 97321-0460**

### *Facility Identification*

The certificate will identify the facility as:

**CyaChem Cyanide Analyzer (Model 2020)**

The applicant is the owner of the facility located at:

**1600 NE Old Salem Road  
Albany, OR 97321-0460**

### *Technical Information*

The claimed water pollution control facility consists of a CyaChem Model 2020 On-Line Cyanide Analyzer. The facility continuously detects cyanide levels in the zirconium, hafnium, tantalum, titanium, and niobium production plant effluent waste stream.

The facility replaces the previous cyanide detection method of sampling and laboratory analysis of the waste stream. On average, there was a 12 hour lag between the sampling and analytical results, thus upset conditions that would generate cyanide in the production waste stream could not be detected in time for corrective action to be taken. The bulk of the cyanide-containing wastewater would be discharged into the waste stream. The new facility samples and analyzes cyanide every 10-15 minutes and relays data to a Rosemount monitoring and control system. If excessive levels of cyanide are detected, the facility triggers an audio and visual alarm at the control system terminal, notifying a technician to take immediate corrective action. In the additional information received on December 10, 1999, Oremet-Wah Chang has committed to install an additional control loop through which a technician will be notified of the alarm via cell phone.

**Eligibility**

- ORS 468.155 The **sole purpose** of this **new device** is to **prevent** and **reduce** a substantial quantity of water pollution.  
 (1)(a)(B)
- ORS 468.155 The analyzer **does not** have a feedback loop that reduces or eliminates industrial waste with the use of treatment works for industrial waste as defined in ORS 468B.005. Therefore, the facility does not meet the eligibility requirement.  
 (1)(b)(A)

**Timeliness of Application**

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>11/12/99</u>
<i>Additional Information Requested</i>	<u>11/22/99</u>
<i>Additional Information Received</i>	<u>12/10/99</u>
<i>Application Substantially Complete</i>	<u>12/10/99</u>
<i>Construction Started</i>	<u>3/31/99</u>
<i>Construction Completed</i>	<u>6/29/99</u>
<i>Facility Placed into Operation</i>	<u>10/8/99</u>

**Facility Cost**

Claimed cost	\$ 22,500
Insignificant contribution	<u>(22,500)</u>
Eligible Cost	0

All of the costs above are actual amounts invoiced. None are allocated or estimated. No ineligible costs were submitted. Envirometrics did not perform an accounting review.

**Facility Cost Allocable to Pollution Control**

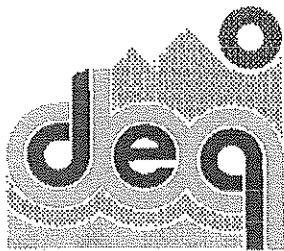
According to ORS 468.190 (1), the following factors were used to determine the percentage of the facility cost allocable to pollution control.

<u>Factor</u>	<u>Applied to This Facility</u>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 5 years. No gross annual revenues are associated with this facility; therefore there is zero return on the investment.
ORS 468.190(1)(c) Alternative Methods	The applicant identified no alternatives.
ORS 468.190(1)(d) Savings or Increase in Costs	There are no savings from the facility.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

**Compliance/Other Tax Credits**

The applicant claims the facility is in compliance with Department rules and statutes.

Reviewers: Mika Kaplan, Envirometrics, Inc.  
 Michael G. Ruby, Ph.D., P.E., Envirometrics, Inc.



Director's  
Recommendation: **DENY**

Applicant	<b>Willamette Industries, Inc.</b>
Application No.	<b>5299</b>
<u>Claimed Facility Cost</u>	<b>\$30,817</b>
<u>Claimed % Allocable</u>	<b>100%</b>
Useful Life	<b>7 years</b>

# Tax Credit Review Report

EOC 0005

## Pollution Control Facility: Water Final Certification

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### *Applicant Identification*

The applicant is a C corporation and operates a **wood products manufacturing plant**. The applicant's taxpayer identification number is 93-0312940 and their address is:

**1300 SW Fifth Avenue  
Suite 3800  
Portland, OR 97201**

### *Facility Identification*

The certificate will identify the facility as:

#### **Forklift Maintenance Building**

The applicant is the owner of the facility of the facility located at:

**2550 Progress Way  
Woodburn, OR 97071**

### *Technical Information*

The claimed facility consists of a new building addition in the forklift maintenance area. It is a Varco building, 24 feet wide by 48 feet long, with V-rib walls, 26-gage panel-rib roofing, and reinforced concrete support piers.

The applicant claims the function of the system is to minimize exposure of potential oil spills and leaks to the stormwater drains.

### *Eligibility*

ORS 468.155 (1)(a)(A) The applicant claimed the **principal purpose** of this **new device** is to comply with the DEQ requirements to prevent water pollution.

NPDES 1200-Z requires implementation of storm water best management practices (BMP) if technically and economically feasible. It states that "Fueling, manufacturing, treatment, storage, and disposal areas shall be covered to prevent exposure of storm water to potential pollutants. Acceptable covers include, but are not limited to, permanent structures such as roofs or buildings and temporary covers such as tarps."



The principal purpose must be the primary purpose. The primary purpose of the cover is to provide shelter for the equipment and maintenance personnel while performing maintenance on the equipment.

ORS 468.155 (1)(b)(A) The facility does not dispose of or eliminate industrial waste with the use of a treatment works.

### ***Timeliness of Application***

The application was submitted within the timing requirements of ORS 468.165 (6).

<i>Application Received</i>	<u>11/1/99</u>
<i>Application Substantially Complete</i>	<u>12/14/99</u>
<i>Construction Started</i>	<u>7/10/98</u>
<i>Construction Completed</i>	<u>12/31/98</u>
<i>Facility Placed into Operation</i>	<u>12/31/98</u>

### ***Facility Cost***

Claimed Facility Cost	\$ 30,817
Ineligible Amount	<u>( 30,817)</u>
Eligible Facility Cost	\$ 0

The claimed facility cost does not exceed \$50,000. An accountant's statement was provided by the applicant and copies of invoices were provided which substantiated the claimed facility cost.

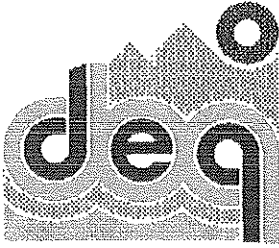
### ***Compliance***

The applicant states the facility is in compliance with Department rules and statutes and with EQC orders. The following DEQ permits have been issued to facility: NPDES Storm Water Discharge #1200-Z, issued 7/22/97

Reviewers: Lois L. Payne, P.E., SJO Consulting Engineers, Inc.  
Dennis E. Cartier, Associate, SJO Consulting Engineers, Inc.  
Maggie Vandehey, DEQ

# ***Attachment D***

## ***Rejections***



# Tax Credit Review Report

EQC 9911

Director's Recommendation:	<b>REJECT</b>
Applicant	<b>Untimely Submittal</b>
Application No.	<b>Wacker Siltronic Corp.</b>
Facility Cost	<b>5141</b>
Percentage Allocable	<b>\$1,010,046</b>
Useful Life	<b>0%</b>
	<b>5 years</b>

## **Pollution Control Facility: Air Final Certification**

ORS 468.150 -- 468.190

OAR 340-016-0005 -- 340-016-0050

### ***Applicant Identification***

The applicant is a C corporation operating as a manufacturer of hyperpure silicon wafers. The applicant's taxpayer identification number is 94-2528330. The applicant's address is:

**7200 NW Front Avenue  
Portland, OR 97210**

### ***Facility Identification***

The certificate will identify the facility as:

**HPM Scrubber, TCS Scrubber & 22 EPI  
Scrubbers for Fab 2.**

The applicant is the owner of the facility located at:

**7200 NW Front Ave.  
Portland, OR**

### ***Technical Information***

The air pollution control equipment claimed in this application consists of tool specific scrubber systems, process specific scrubber systems, emergency release prevention scrubber systems, a hazardous vapor suppressions system, and scrubber exhaust duct systems and fans external to the building. The following is a list of the claimed systems:

- NO<sub>x</sub> Control Systems (ductwork to transport emissions from tools in Fab 2 to an existing NO<sub>x</sub> scrubber approximately 250 feet away).
- Hazardous Production Material (HPM) General Scrubber System
- Trichlorosilane (TCS) Control System (TCS Vent Scrubber, TCS Emergency Scrubber, ducting and TCS Vapor Suppression system)
- Epitaxial (EPI) Scrubbers (18 manufactured by Airgard, model STS096-2C and 4 manufactured by Delatech Inc., model SD 201).

**Eligibility**

- ORS 468.155 HPM Scrubber, TCS Scrubber and 22 EPI Scrubbers  
 (1)(a)(A) The **principal purpose** of this **new equipment installation** is to comply with a requirement imposed by the applicants Air Contaminant Discharge Permit, #26-3002 to **control** acid fumes and VOC emissions, which meet the definition of air pollution.
- ORS 468.155  
 (1)(b) The control is accomplished by the elimination of air contaminants and the use of scrubbers, which meet the definition in ORS 468A.005 of an air-cleaning device.
- ORS 468.155 TCS Emergency Scrubber and TCS Foam Suppression System  
 (1)(a)(A) The **principal purpose** of this **new equipment installation** is **not** to comply with a requirement imposed by the applicants Air Contaminant Discharge Permit to prevent, control, or reduce air pollution. They are requirements of the Uniform Fire Code and Oregon OSHA, therefore are deemed ineligible: These systems are described in the *Facility Cost* section below.

**Timeliness of Application**

The application was **not** submitted within the timing requirements of ORS 468.165 (6). An annual DEQ Air Quality Inspection Report dated 7/14/97 states Feb 2 was completed and operating in July, 1996. According to DEQ air quality rules, all air pollution control equipment must be in place and running prior to production.

<i>Application Received</i>	<u>12/31/98</u>
<i>Additional Information Requested</i>	<u>4/8/99</u>
<i>Additional Information Provided</i>	<u>6/8/99</u>
<i>Application Substantially Complete</i>	<u>4/27/00</u>
<i>Construction Started</i>	<u>1/1/95</u>
<i>Construction Completed</i>	<u>7/96</u>
<i>Facility Placed into Operation</i>	<u>7/96</u>

**Facility Cost**

<b>Claimed Facility Cost</b>	<b>\$ 2,396,414</b>
<b>Ineligible Costs:</b>	
HPM Process Ductwork	\$ -133,429
TCS Emergency Scrubber System	- 288,554
TCS Process Ductwork	- 205,091
TCS Foam Suppression System	- 128,805
NO <sub>x</sub> Interior Ductwork	- 220,573
EPI Process Ductwork	- 4,852
Unsubstantiated Costs	- 117,851
<b>Total Ineligible Costs</b>	<b>- \$ 1,368,968</b>
<b>Eligible Facility Cost</b>	<b>\$ 1,027,446</b>

The claimed facility cost exceeds \$500,000, therefore Maggie Vandehey performed an accounting review on behalf of the Department with the help of the Technical Reviewer.

Copies of invoices were provided which substantiated the eligible facility cost. **Arthur Anderson** performed an accounting review on behalf of Wacker.

***Discussion of Ineligible Costs***

HPM Process Ductwork, TCS Process Ductwork, NO<sub>x</sub> Interior Ductwork and EPI Process Ductwork: Process ducting is used to convey hazardous and toxic fumes from the process tool to the outside of the building. In order to ensure a safe work environment, Oregon OSHA and the Uniform Fire Code require ventilation to remove these materials. Process ductwork is a required part of the ventilation system, however does not reduce air pollution.

TCS Emergency Scrubber System: TCS is a liquid that, when exposed to moisture in the air, forms hydrogen chloride, a corrosive gas. The emergency scrubber system is tied in to the Wacker Life Safety System, which starts the exhaust fan that discharges into the emergency scrubber. This action reduces the potential for employees to be exposed to hydrogen chloride gas. Oregon air quality rules do not require scrubbers to be installed to control emissions in the event of an unplanned release.

TCS Foam Suppression System: The foam suppression system is also part of the Wacker Life Safety System. It is required by the Uniform Fire Code 7901.5.2. In the event of a liquid TCS spill, a sensor sends a signal to an automatic system to spray foam over the area where the liquid spill will flow. The foam prevents moist air from contacting the surface of the TCS, thereby reducing hydrogen chloride gas exposure to employees.

***Facility Cost Allocable to Pollution Control***

<b>Factor</b>	<b>Applied to This Facility</b>
ORS 468.190(1)(a) Salable or Usable Commodity	No salable or useable commodity.
ORS 468.190(1)(b) Return on Investment	The useful life of the facility used for the return on investment consideration is 5 years. No gross annual revenues were associated with this facility.
ORS 468.190(1)(c) Alternative Methods	No alternative investigated.
ORS 468.190(1)(d) Savings or Increase in Costs	No savings or increase in costs.
ORS 468.190(1)(e) Other Relevant Factors	No other relevant factors.

***Compliance and Other Tax Credits***

Based on a Air Quality file review, the facility is in compliance with Department rules and statutes and with EQC orders. DEQ permits issued to facility include: ACDP 26-3002, NPDES 101128 and NPDES 1200-Z.

Reviewers: Dave Kauth  
Maggie Vandehey, DEQ

# ***Attachment E***

## **Transfers**

State of Oregon  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
POLLUTION CONTROL FACILITY CERTIFICATE

Issued to: Weyerhaeuser Company Springfield Particleboard P.O. Box 275 Springfield, OR 97477	Location of Pollution Control Facility: Springfield, OR
As: ( ) Lessee (X) Owner	
Description of Pollution Control Facility: An electrified filter bed (EFB) dust control system on each of two particleboard pre-dryers.	
Type of Pollution Control Facility: (X) Air ( ) Noise ( ) Water ( ) Solid Waste ( ) Hazardous Waste ( ) Used Oil	
Date Facility was completed: 11/28/88	Placed into Operation: 11/28/88
Actual Cost of Pollution Control Facility: \$2,018,632.00	
Percent of actual cost properly allocable to pollution control: 100 Percent	

Based upon the information contained in the application referenced above, the Environmental Quality Commission certifies that the facility described herein was erected, constructed or installed in accordance with the requirements of subsection (1) of ORS 468.165, and is designed for, and is being operated or will operate to a substantial extent for the purpose of preventing, controlling or reducing air, water or noise pollution or solid waste, hazardous wastes or used oil, and that it is necessary to satisfy the intents and purposes of ORS Chapters 454, 459, 467 and 468 and rules adopted thereunder.

Therefore, this Pollution Control Facility Certificate is issued this date subject to compliance with the statutes of the State of Oregon, the regulations of the Department of Environmental Quality and the following special conditions:

1. The facility shall be continuously operated at maximum efficiency for the designed purpose of preventing, controlling, and reducing the type of pollution as indicated above.
2. The Department of Environmental Quality shall be immediately notified of any proposed change in use or method of operation of the facility and if, for any reason, the facility ceases to operate for its intended pollution control purpose.
3. Any reports or monitoring data requested by the Department of Environmental Quality shall be promptly provided.

NOTE: The facility described herein is not eligible to receive tax credit certification as an Energy Conservation Facility under the provisions of Chapter 512, Oregon Law 1979, if the person issued the Certificate elects to take the tax credit relief under ORS 316.097 or 317.072.

Signed William P. Hutchison, Jr.

Title William P. Hutchison, Jr., Chairman

Approved by the Environmental Quality Commission  
on the 11th day of March, 1991.



Nicholas C. Mullan  
Tax Department, CH2E29  
P. O. Box 2999  
Tacoma WA 98477-2999  
Ship or overnight to:  
33663 Weyerhaeuser Way South  
Federal Way WA 98003  
Telephone: (253) 924-2251  
Fax: (253) 924-2584

March 23, 2000

Maggie Vandehey  
Tax Credit Program Coordinator  
State of Oregon  
Department of Environmental Quality  
811 SW Sixth Ave  
Portland, OR 97204

Dear Ms. Vandehey:

Pursuant to Sec. 315.304(8) we are notifying you of the sale of our Springfield Particleboard business to Sierra Pine. Our Springfield Particleboard facility received a pollution control certification (see attached application No. T-2476, Certificate No. 2385) in March of 1991 for the cost amount of \$2,018,632.

Sincerely,

Nicholas C. Mullan  
State Income Tax Manager





Weyerhaeuser Company  
FEIN 91-0470860

<b>RE:</b>	<b>Pollution Control Credit</b>	
<b>Location:</b>	<b>Springfield, OR</b>	
<b>Application Number:</b>	<b>T-2476</b>	
<b>Certificate Number:</b>	<b>2385</b>	<b>Amount</b>
<hr/>		
Actual Cost of Pollution Control Facility		\$ 2,018,632
Percent of Actual Cost Properly Allocable to Pollution Control		100%
Total Certified Cost		2,018,632
Percentage of Credit		50%
<b>Total Credit</b>		<b>\$ 1,009,316</b>
<hr/>		
Credit Allowed - Previous Years Owned and Operated		\$ 807,456
Credit Allowed - Partial Year Owned and Operated (Sold 5/27/1999)		42,055
<b>Total Credit Allowed - Seller</b>		<b>\$ 849,511</b>
<hr/>		
<b>Total Credit Available - Purchaser</b>		<b>\$ 159,805</b>

# Environmental Quality Commission

- Rule Adoption Item
- Action Item
- Information Item

Agenda Item D  
May 14 Meeting

**Title:**

LRAPA Open Burning - SIP Revision

**Summary:**

The purpose of this rulemaking package is to revise Oregon's State Implementation Plan (SIP) to include the 1999 amendments to Lane Regional Air Pollution Authority's (LRAPA) open burning rules. If LRAPA's rule revisions are approved by the Commission, the Oregon SIP will be revised through the amendment of OAR 340-200-0040, and submitted to the Environmental Protection Agency (EPA) for approval.

LRAPA's open burning rule amendments consisted of minor housekeeping changes, a change in the burning permit fee structure, and updating the definition of the Eugene-Springfield Urban Growth Area (UGA). LRAPA's fee structure for open burning permits was changed from a flat fee of \$100 to a volume-based fee of \$4 per cubic yard with a minimum fee of \$50 per permit. The area subject to the open burning regulations was expanded at the request of Fire District 1. The citation in the Eugene-Springfield UGA definition was updated to reflect the current boundary.

**Department Recommendation:**

The department recommends that the Commission approve of LRAPA's open burning rule revision as an amendment to the Oregon State Implementation Plan.

*Laurey Cook*  
Report Author

*Andrew Ginsburg*  
Division Administrator

*Gregg K. Kest*  
Director

State of Oregon  
Department of Environmental Quality Memorandum

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**Date:** May 1, 2000  
**To:** Environmental Quality Commission  
**From:** Langdon Marsh  
**Subject:** Agenda Item D, LRAPA Open Burning - SIP Revision, EQC Meeting May 17, 2000

**Background**

This package contains Lane Regional Air Pollution Authority (LRAPA) rule amendments that require approval from the commission as a revision to the State Implementation Plan (SIP). The SIP is revised through amendment of OAR 340-200-0040, after which the department submits the modifications to the Environmental Protection Agency (EPA) for approval.

Prior to LRAPA's adoption of the open burning rule amendments the proposed rules were reviewed for stringency by the department. The department found the rules were at least as stringent as the department rules and LRAPA proceeded with rulemaking. The open burning rules do not contain emission standards that require the commission's approval under 468A.135; therefore, the commission's evaluation of the rule amendments is only concerned with stringency and incorporation of the rule amendments into the SIP.

LRAPA provided public notice for the rule amendments pursuant to its own process and in accordance with state and federal requirements. LRAPA's Board of Directors authorized the agency to hold public hearings for the proposed amendments. The department authorized LRAPA staff to act concurrently as the EQC's Hearing Officer for amending the SIP rule (OAR 340-200-0040) to incorporate LRAPA's open burning rule amendments.

The federal requirements for SIP revisions include explicit notice that the rule amendment will be a revision of the SIP. The initial LRAPA newspaper advertisement did not state that the open burning rule amendments would revise the SIP. To fulfill this requirement a second announcement was printed in three of the local newspapers and a subsequent hearing was conducted. The hearing notice in the Oregon Bulletin was not reprinted because the original notice stated that the hearing was to amend the SIP rule.

The hearing dates and public notice publications were as follows:

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Accommodations for disabilities are available upon request by contacting the Public Affairs Office at (503) 229-5317 (voice)/(503) 229-6993 (TDD).

3

<i>Media</i>	<i>First Notice</i>	<i>Second Notice</i>
<u>Secretary of State</u>		
Oregon Bulletin	February 1, 1999	No second publication
<u>Newspapers</u>		
Register Guard	January 27, 1999	September 8, 1999
Springfield News	January 27, 1999	September 8, 1999
Dead Mountain Echo	January 28, 1999	September 9, 1999
Cottage Grove Sentinel	January 27, 1999	No second publication
<i>Public Hearings</i>	<i>First Hearing</i>	<i>Second Hearing</i>
LRAPA Board Meeting	March 9, 1999	October 12, 1999

Comments received are summarized in the Agenda Item 7 of both the March 9, 1999 and October 12, 1999 board meetings (Attachments C and F). These reports include LRAPA's evaluation of comments received and modifications recommended to the proposed regulations.

The following sections summarize the issues that this proposed approval/rulemaking action is intended to address, cite the authority to address the issues, describe the action taken by LRAPA Board of Directors, and provide a recommendation for commission action.

**Issue this Proposed Rulemaking Action is Intended to Address**

This approval/rulemaking action is intended to complete the procedural requirements necessary to bring LRAPA's portion of the SIP up-to-date with its own rules. Commission approval of the LRAPA amendments demonstrates the commission's agreement with the LRAPA Board that the regulations meet the provisions of ORS 468A.135, which requires the regional authority's regulations to be at least as stringent as the state regulations. Additionally, the commission action will complete the procedural requirements necessary to revise the SIP and amend OAR 340-200-0040.

**Relationship to Federal and Adjacent State Rules**

All agencies responsible for achieving the National Ambient Air Quality Standards (NAAQS -- established under the Clean Air Act) must include the rules used to attain those standards as part of their state implementation plan. The open burning rules are a mechanism used to achieve the NAAQS and therefore fall into this category. The SIP serves as a primary enforcement mechanism through which the EPA oversees air programs, its revision is subject to federal review and approval.

Procedures for SIP modification vary from state to state. In Oregon the SIP is revised by the amendment of OAR 340-200-0040.

**Authority to Address the Issue**

The commission's role in approval and LRAPA's rulemaking authority are described in ORS 468A.135. ORS 468 and 468A authorize the commission to revise the SIP and amend OAR 340-200-0040.

**Process for Development of the Rulemaking Proposal (including Advisory Committee and alternatives considered)**

LRAPA and its board are subject to the requirements of ORS Chapters 183 and 192 regarding rulemaking procedures and public meetings. LRAPA has its own rulemaking process, which parallels the department's. The LRAPA hearing process is in accordance with ORS 468A.150. An advisory committee reviewed the open burning amendments prior to the public hearings in accordance with ORS 468A.130.

**Summary of Rulemaking Proposal Presented for Public Hearing and Discussion of Significant Issues Involved.**

The open burning rule modifications consisted of a fee structure change, a definition change, and housekeeping changes. The significant amendments made to the open burning rules are as follows:

*Open Burning Rules - Title 47 LRAPA Rules* - The rule amendments changed the fee structure for open burning permits from a flat fee to a fee that is based on the quantity of material burned. The fee for open burning is \$4 per cubic yard, with a \$50 minimum. Four dollars per cubic yard is less than the amount charged by local landfills and greater than the fee charged by local vegetative recyclers. The permit fee modification includes a \$100 burning permit fee for burning vegetation for the purpose of wetland conversion. The open burning permit fees will assist in covering the agency's cost of permit processing and the cost associated with the staff time spent working with applicants to ensure that burning is done in a method that will minimize impacts from smoke. Additionally, a side benefit of the fee structure is that it provides an economic incentive to seek alternatives to open burning.

The rule revision expanded the area subject to seasonal regulation to include all of Lane County Fire District #1. This revision was in response to a request by the Fire District.

*Definition of Words and Terms - Section 12-001 LRAPA Rules* - The term Eugene-Springfield Urban Growth Area was changed to Eugene-Springfield Urban Growth Boundary and the

Eugene-Springfield Metropolitan Area General Plan referenced in the definition was revised from 1982 to current.

### **Summary of Significant Public Comment and Changes Proposed in Response**

LRAPA received three letters with public comments as a result of the first notice of amendment; no official comments were received for the rehearing. The issues raised in the comments are summarized below:

- A citizen questioned the flat fee for burning permits in wetland areas and further questioned why burning in wetlands was allowed. LRAPA stated that various groups are experimenting with fire as a tool to simulate natural conditions to restore wetlands. LRAPA noted that, when burning was used for wetlands restoration, the objective of the permit fee was not an incentive to have applicants consider other methods of disposal, but was set to offset administrative costs.

The citizen questioned whether the new permit fee system would decrease the amount of fees paid by industry. LRAPA responded that it was unlikely that industry would experience a decrease in permitting fees.

- The Oregon Department of Forestry (ODF) stated concern that the effective dates of the LRAPA burning season differ from the dates imposed by the Fire Districts. LRAPA responded that if the Fire Defense Board notifies them that there is a high fire danger, LRAPA will restrict burning. Based on the comment LRAPA added an explanatory note to the rules that states that Fire Districts may restrict burning when they feel it is necessary due to high fire danger.

ODF noted concern regarding overlapping jurisdiction between ODF management areas and the areas described in the LRAPA open burning regulations. LRAPA replied that the lands covered by the Oregon Smoke Management Plan are regulated by ODF and LRAPA restrictions do not apply as stated in Subsection 47-015-6 of the regulation.

- Weyerhaeuser Containerboard Packaging requested that the open burning rules be modified to provide an exemption for emergency heating. LRAPA responded that Weyerhaeuser's situation was unique and there was not sufficient justification to include this exemption in the open burning rules. The situation was to be handled by permit processing on a case by case basis.

### **Summary of How the Proposed Rule Will Work and How it Will be Implemented**

While currently not federally enforceable, the open burning rulemaking fulfilled LRAPA's local requirements. The rule amendments and permit fee structure have been in place in Lane County since March of 1999. If approved by the commission, the open burning amendments will be submitted to the EPA as a revision to the SIP.

6

**Recommendation for Commission Action**

It is recommended that the commission adopt the rules/rule amendments regarding open burning and adopt the rule amendments as a revision to the State of Oregon Clean Air Act Implementation Plan under OAR 340-200-0040.

**Attachments**

- A. LRAPA Rule Language (A1) Strikeout Version of Amendments in Title 47, (A2) Strikeout Version of Definition in Title 12, (A3) Final Rule Language
- B. OAR 340-200-0040 (Oregon's SIP Rule)
- C. Staff Report (Agenda Item 7) of the LRAPA Board Meeting of October 12, 1999 (including Fiscal Impact Statement, Summary of Public Comments and LRAPA Responses, and Rulemaking Justification Analysis).
- D. Minutes of LRAPA Board Meeting October 12, 1999
- E. Notice to Interested Parties dated August 24, 1999
- F. Staff Report (Agenda Item 7) of LRAPA Board Meeting of March 9, 1999
- G. Minutes of LRAPA Board Meeting March 9, 1999
- H. Notice to Interested Parties dated December 2, 1998
- I. DEQ Evaluation Letter dated December 24, 1998
- J. Oregon Bulletin Notice Affidavits of Publication
- K. Newspaper affidavits (K1) September Publication; (K2) January Publication

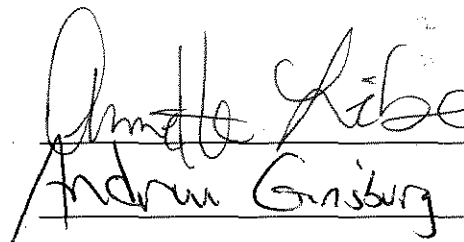
**Reference Documents (available upon request)**

Written Comments Received (listed in Attachment C)  
Oregon Revised Statutes dated 1997

Approved:

Section:

Division:



Report Prepared By: Laurey Cook

Phone: (503) 229-5058

Date Prepared: April 28, 2000

4

**Memo To: Environmental Quality Commission**  
**Agenda Item D, LRAPA Open Burning - SIP Revision, EQC Meeting**  
**Page 6**

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LANE REGIONAL AIR POLLUTION AUTHORITY  
TITLE 47  
Open Burning

Open burning in compliance with the rules in this Title 47 does not exempt any person from any civil or criminal liability for consequences or damages resulting from such burning, nor does it exempt any person from complying with any other applicable law, ordinance, regulation, rule, permit, order, or decree of this or any other governmental entity having jurisdiction.

Section 47-001 General Policy

In order to restore and maintain Lane County air quality in a condition as free from air pollution as is practicable, consistent with the overall public welfare of the County, it is the policy of the Lane Regional Air Pollution Authority to eliminate open burning disposal practices where alternative disposal methods are feasible. As a result, all open burning is prohibited in Lane County except as expressly allowed by these rules or if exempted from these rules by Oregon Statute. Contained in these rules are the requirements for the open burning of residential, construction, demolition, commercial, and industrial waste, and forest slash waste on properties outside the Oregon Smoke Management Plan.

Section 47-005 Statutory Exemptions from These Rules

Due to Oregon statutory exemptions, these rules shall not apply to the following:

1. The operation of residential barbecue equipment for the purpose of cooking food for human consumption.
2. Fires set or permitted by any public agency in the performance of its official duty for the purpose of weed abatement, prevention or elimination of a fire hazard, a hazard to public health or safety, or for the instruction of employees in the methods of fire fighting.
3. Agricultural open burning.
4. Open burning on forest land permitted under the [~~Oregon Department of Forestry (JOD[Θ]F)~~] Smoke Management Plan filed with the Secretary of State.

Section 47-010 Definitions

The following definitions apply to this title, and additional general definitions can be found in Title 12 of these Rules and Regulations.

- "Agricultural open burning" means the open burning of "agricultural wastes," which are materials actually generated or used by an agricultural operation.
- "Agricultural operation" means an activity on land currently used or intended to be used primarily for the purpose of obtaining a profit in money by raising, harvesting and selling crops

1 or by the raising and sale of livestock or poultry, or the produce thereof, which activity is  
2 necessary to serve that purpose. It does not include the construction and use of dwellings  
3 customarily provided in conjunction with the agricultural operation.  
4

- 5 • "Agricultural waste" means any material actually generated or used by an agricultural operation  
6 but excluding those materials described in Section 47-015-1E.  
7
- 8 • "Commercial open burning" means the open burning of "commercial wastes," which are  
9 materials actually generated or used by a commercial operation.  
10
- 11 • "Construction open burning" means the open burning of "construction wastes," which are  
12 materials actually resulting from or produced by a building or construction project.  
13
- 14 • "Demolition open burning" means the open burning of "demolition wastes," which are materials  
15 actually resulting from or produced by the complete or partial destruction or tearing down of  
16 any man-made structure or the clearing of any site, or land clearing for site preparation for  
17 development.  
18
- 19 • "Eugene-Springfield Urban Growth [Area] Boundary (ESUG[A]B)" means the area within and  
20 around the cities of Eugene and Springfield, as described in the [August 23, 1982] currently  
21 acknowledged Eugene-Springfield Metropolitan Area General Plan, as amended.  
22
- 23 • "Forest slash open burning" means burning of vegetative debris and refuse on forest land related  
24 to the growing and/or harvesting of forest tree species where there is no change in the use of the  
25 land from timber production. Forest slash open burning does not include burning for  
26 commercial or individual use, or for any other type of land clearing not related to the growing  
27 and harvesting of forest tree species.  
28
- 29 • "Garbage" means putrescible animal and vegetable wastes resulting from the handling,  
30 preparation, cooking, and serving of food.  
31
- 32 • "Industrial open burning" means the open burning of "industrial wastes," which are materials  
33 produced as a direct result of any manufacturing or industrial process.  
34
- 35 • "Land clearing" means the removal of trees, brush, logs, stumps, debris, or man-made structures  
36 for the purpose of site clean-up or site preparation.  
37
- 38 • "Leaves" means needle or leaf materials which have fallen from trees, shrubs, or plants on the  
39 property around a dwelling unit.  
40
- 41 • "Open burning" includes burning in open fires, burn barrels, incinerators which do not meet  
42 emission limitations specified in Section [33-010] 30-020 of these Rules and Regulations, and  
43 any other outdoor burning which occurs in such a manner that combustion air is not effectively  
44 controlled and combustion products are not effectively vented through a stack or chimney.  
45
- 46 • "Residential open burning" means the open burning of clean wood, [and woody] yard trimmings  
47 and prunings which are actually generated in or around a dwelling for four (4) or fewer family

1 living units. Once this material is removed from the property of origin it becomes commercial  
2 waste. Such materials actually generated in or around a dwelling of more than four (4) family  
3 living units are commercial wastes.

- 4
- 5 • "Responsible person" means each person who is in ownership, control, or custody of the  
6 property on which the open burning occurs, including any tenant thereof; or who is in  
7 ownership, control, or custody of the materials which are burned; or any person who causes or  
8 allows open burning to be initiated or maintained.
  - 9
  - 10 • "Salvage," as used in open burning rules, means the recovery, processing or use of woody debris  
11 for purposes including, but not limited to, energy production (such as fire wood or fuel), fiber  
12 production (such as soil amendments or mulch), or as a raw material for chemical or  
13 manufacturing processes.
  - 14
  - 15 • "Woody Yard Trimmings" means woody limbs, branches and twigs, with any attached leaves,  
16 which have been cut from or fallen from trees or shrubs from the property around a dwelling  
17 unit.

18  
19 Section 47-015 Open Burning Requirements

- 20  
21 1. General requirements--to be met by all open burning conducted in accordance with these Rules  
22 and Regulations:
- 23 A. All open burning shall be constantly attended by a responsible person or an expressly  
24 authorized agent, until extinguished.
  - 25
  - 26 B. It shall be the duty of each responsible person to promptly extinguish any burning which  
27 is in violation of any rule of the LRAPA Board or of any permit issued by the Authority.
  - 28
  - 29 C. No person shall cause, or allow to be initiated or maintained, any open burning which is  
30 prohibited by the burning advisory because of meteorological or air quality conditions.
  - 31
  - 32 D. No person shall cause, or allow to be initiated or maintained, any open burning which  
33 creates a private or public nuisance or a hazard to public safety.
  - 34
  - 35 E. No person shall cause, or allow to be initiated or maintained, open burning of any garbage,  
36 plastics, wire insulation, automobile parts, asphalt, petroleum by-products, petro-  
37 leum-treated materials, rubber products, animal remains, or animal or vegetable matter  
38 resulting from the handling, preparation, cooking, or service of food; or of any other  
39 material which normally emits dense smoke, noxious odors, or hazardous air contaminants.
  - 40
  - 41 F. To promote efficient burning and prevent excessive emissions of smoke, each responsible  
42 person shall assure that all combustible material is dried to the extent practicable and  
43 loosely stacked or windrowed to eliminate dirt, rocks and other non-combustible materials;  
44 and periodically restack or feed the burning pile to enhance combustion.
  - 45
  - 46

1 G. No person shall cause, or allow to be initiated or maintained, any open burning at any solid  
2 waste disposal site unless authorized by a Solid Waste Permit issued pursuant to OAR  
3 340-94-040. The Authority shall be notified by the responsible person prior to such  
4 burning.

5  
6 H. Fires involving materials less than three (3) cubic yards of volume, set for recreational  
7 purposes in designated recreational areas (such as parks, recreational campsites, and  
8 campgrounds) are allowed, except that prohibited materials listed in Section 47-015-1.E  
9 shall not be burned.

10  
11 I. Outdoor barbecuing connected with group outings, festivals, fairs or similar occasions is  
12 allowed, except that prohibited materials listed in Section 47-015-1.E shall not be burned.

13  
14 2. Residential Open Burning Requirements

15  
16 The residential open burning season is October 15 through June 15, with the following  
17 restrictions:

18  
19 A. All open burning is prohibited within the Eugene city limits.

20  
21 B. All open burning is prohibited within the Springfield city limits, except that burning of  
22 woody yard trimmings is allowed on lots of one-half acre or more.

23  
24 C. Within the ESUG[A]B, burning is prohibited if required by local fire codes.

25  
26 D. Residential open burning outside the city limits of Eugene and Springfield but within the  
27 Eugene-Springfield Urban Growth [Area] Boundary is permitted subject to the general  
28 requirements of Section 47-015-1, with the following restrictions:

29  
30 (1) The burning of yard debris is limited to the woody yard trimmings from trees and  
31 shrubs growing upon the same premises where the burning occurs;

32  
33 (2) Open Burning of leaves and grass clippings is prohibited; and

34  
35 (3) The premises upon which such burning is to take place must be a private lot, as  
36 identified in the Lane County tax records, of one half acre in size or more.

37  
38 E. Residential open burning is allowed only on approved burning days, between sunrise and  
39 sunset, with a valid fire permit (if required by fire district). The beginning time for burning  
40 varies and is set as part of the daily burning advisory; however, fires must always be out  
41 by sunset.

42  
43 F. Residential open burning of woody yard trimmings, leaves and grass clippings is allowed  
44 within the fire districts identified below:

45  
46 (1) Bailey-Spencer RFPD

47 (2) Coburg RFPD

- 1 (3) Cottage Grove/South Lane Fire District
- 2 (4) Creswell RFPD
- 3 (5) Dexter RFPD west of the Willamette Meridian
- 4 (6) Eugene RFPD #1
- 5 (7) Goshen RFPD
- 6 (8) Junction City Fire District
- 7 (9) Junction City RFPD
- 8 (10) Lane County Fire District #1 [~~east of Range 7 West~~]
- 9 (11) Lane RFPD #1 outside the ESUGA
- 10 (12) Lowell RFPD
- 11 (13) Marcola RFPD
- 12 (14) McKenzie RFPD outside the ESUGA
- 13 (15) Monroe RFPD, that portion within Lane County
- 14 (16) Oakridge RFPD
- 15 (17) Pleasant Hill RFPD
- 16 (18) Santa Clara RFPD outside the ESUGA
- 17 (19) Westfir RFPD
- 18 (20) Willakenzie RFPD
- 19 (21) Zumwalt RFPD

20  
21 *(Note: Some fire districts require burning permits. ~~Fire districts may restrict burning~~*  
22 *~~whenever fire danger dictates~~ Persons wishing to conduct residential open burning*  
23 *should check first with their fire district.)*

- 24
- 25 G. Residential open burning is allowed year-round outside of the affected areas defined in 47-
- 26 015-2.A through F of this section.
- 27
- 28 H. Failure to conduct residential open burning in accordance with this section is a violation
- 29 of these rules and [shall] ~~may~~ be cause for assessment of civil penalties. Citations will be
- 30 issued by authorized enforcement agents to responsible person(s) upon site inspection
- 31 where residential open burning rules are violated pursuant to this section.
- 32
- 33 3. Construction/Demolition Open Burning Requirements
- 34
- 35 A. Construction/demolition open burning is prohibited inside the ESUG[A]B.
- 36
- 37 B. Construction/demolition open burning is prohibited inside the affected areas described in
- 38 47-015-2.F, unless authorized pursuant to Section 47-020.
- 39
- 40 C. Construction/demolition open burning is allowed elsewhere in Lane County, subject to the
- 41 general requirements of Section 47-015-1.
- 42
- 43 4. Commercial Open Burning Requirements
- 44
- 45 A. Commercial open burning is prohibited inside the ESUG[A]B.
- 46

13

1 B. Commercial open burning is prohibited elsewhere, unless authorized pursuant to Section  
2 47-020.

3  
4 5. Industrial Open Burning Requirements

5 A. Industrial open burning is prohibited inside the ESUG[A]B.

6  
7  
8 B. Industrial open burning is prohibited elsewhere, unless authorized pursuant to Section  
9 47-020.

10  
11 6. Forest Slash Open Burning

12 A. Forest slash open burning in areas covered by the Oregon Smoke Management Plan is  
13 regulated by the Department of Forestry pursuant to ORS 477.515.

14 B. Forest slash open burning in Lane County which is in areas outside the Oregon Smoke  
15 Management Plan is treated by LRAPA as follows:

16 (1) Forest slash open burning is prohibited inside the ESUG[A]B.

17 (2) Forest slash open burning is prohibited inside the affected areas described in 47-015-  
18 2.F, unless authorized pursuant to Section 47-020.

19 (3) Forest slash open burning elsewhere in Lane County, on properties which are not  
20 covered by the OD[Θ]F Smoke Management Plan, is prohibited unless authorized  
21 pursuant to Section 47-020.

22 (4) Forest slash open burning will be coordinated with the [~~Oregon Department of~~  
23 ~~Forestry's~~] ODE East Lane and Western Lane districts and will occur as consistently  
24 as possible with slash burning advisories issued by the Oregon Department of  
25 Forestry.

26 (5) A written plan, approved by the [~~Oregon Department of Forestry~~] ODE, is required  
27 under the Forest Practices Act (ORS 527) when burning is to be conducted:

28 (a) within 100 feet of type D or F streams (domestic water supply or fish-bearing  
29 streams), lakes or significant wetlands (see OAR 629-[24-113] 605-0170(1)(a)  
30 and 629-[24-302] 615-0300(3)); or

31 (b) on highly erosive soils.

32  
33 The [~~Oregon Department of Forestry~~] ODE should be contacted for all Forest  
34 Practices Act requirements.  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47

1 Section 47-020 Letter Permits

- 2
- 3 1. Open burning of commercial, industrial, construction, demolition, or forest slash wastes on a
- 4 singly occurring or infrequent basis, which is otherwise prohibited, may be permitted by a letter
- 5 permit issued by the Authority in accordance with this rule and subject to the general require-
- 6 ments in Section 47-015-1.
- 7
- 8 2. Prescribed burning of standing vegetation for the purpose of species or wetland conversion,
- 9 pursuant to federal or state laws or programs to promote or enhance habitat for indigenous
- 10 species of plants or animals, which is otherwise prohibited, may be permitted by a letter permit
- 11 issued by the Authority in accordance with section 47-020. ~~These permits require a permit fee~~
- 12 ~~of \$100.~~
- 13
- 14 3. Prior to any burning, the applicant must also obtain a valid fire permit issued by the fire permit
- 15 issuing agency having jurisdiction.
- 16
- 17 4. Permits issued for ~~[commercial or industrial operations to conduct commercial, industrial,~~
- 18 ~~construction, demolition, or forest slash] open burning other than prescribed burning of standing~~
- 19 ~~vegetation (47-020-2) require a permit fee of [\$100] \$4 per cubic yard, with a minimum fee of~~
- 20 ~~\$50.~~
- 21
- 22 5. The following factors shall be evaluated in determining whether a letter permit will be approved
- 23 or denied:
- 24
- 25 A. The quantity, type, and combustibility of the materials proposed to be burned;
- 26
- 27 B. The costs and practicability of alternative disposal methods, including on-site and landfill
- 28 disposal and salvage;
- 29
- 30 C. The seasonal timing and expected duration of the burn;
- 31
- 32 D. The willingness and ability of the applicant to promote efficient combustion by using heavy
- 33 equipment, fans, pit incineration, or other appropriate methods;
- 34
- 35 E. The location of the proposed burn site with respect to potential adverse impacts;
- 36
- 37 F. The expected frequency of the need to dispose of materials by burning in the future;
- 38
- 39 G. Any prior open burning violations by the applicant;
- 40
- 41 H. Any additional relevant information.
- 42
- 43 6. Upon receipt and review of the required information, the Authority may approve the application
- 44 if it is satisfied that:
- 45
- 46 A. The applicant has demonstrated that all reasonable alternatives have been explored and no
- 47 practicable alternative method for disposal of the material exists;

- 1 B. The proposed burning will not cause or contribute to significant degradation of air quality;
- 2
- 3 C. There will be no actual or projected violation of any statute, rule, regulation, order, permit,
- 4 ordinance, judgment, or decree.
- 5
- 6 7. The Authority may revoke or suspend an issued letter permit, with no refund of the fee, via
- 7 written or verbal notice, on any of the following grounds:
- 8
- 9 A. Any material misstatement or omission in the required application information;
- 10
- 11 B. If the conditions of the permit are being violated;
- 12
- 13 C. Any actual or projected violation of any statute, rule, regulation, order, permit, ordinance,
- 14 judgment, or decree;
- 15
- 16 D. Any other relevant factor.
- 17
- 18 8. Failure to conduct open burning according to the conditions, limitations, or terms of a letter
- 19 permit, or any open burning in excess of that permitted by the letter permit, shall be a violation
- 20 of the permit and shall be cause for assessment of civil penalties or for other enforcement action
- 21 by the Authority.
- 22
- 23 9. Each letter permit issued by the Authority pursuant to this rule shall contain at least the
- 24 following elements:
- 25
- 26 A. The location at which the burning is permitted to take place;
- 27
- 28 B. A description of the material that may be burned;
- 29
- 30 C. The calendar period during which the burning is permitted to take place;
- 31
- 32 D. The equipment and methods required to be used by the applicant to insure efficient burning;
- 33
- 34 E. The limitations, if any, based upon meteorological conditions required before burning may
- 35 occur;
- 36
- 37 F. Reporting requirements for both starting the fire and completion of the requested burning;
- 38
- 39 G. A statement that Section 47-015-1 is fully applicable to all burning under the permit;
- 40
- 41 H. Such other conditions that the Authority considers to be desirable.
- 42
- 43 10. Letter permits issued by the Authority pursuant to this rule shall be forwarded to the fire permit
- 44 issuing agency having jurisdiction.
- 45



- 1 11. Letter permits are valid only for the specified burning period and shall not be renewable unless
- 2 there were no approved burning days during that period. Any requests to conduct additional
- 3 burning shall require a new permit.

Section 47-030 Summary of Seasons, Areas, and Permit Requirements for Open Burning

Type of Burning	Inside City Limits of Eugene	Inside City Limits of Springfield	Elsewhere Inside the ESUG[ <del>(A)</del> ]	Inside Affected Fire Districts and Outside ESUG[ <del>(A)</del> ]	All Other Areas
Residential Open Burning (Section 47-015-2)	Prohibited by City Ordinance and by LRAPA Section 47-015-2.A	Prohibited by City Ordinance, except that, between October 15 and June 15, tree trimmings and shrub prunings, only, may be burned on lots of one-half acre or greater in size. Burning of grass clippings and fallen leaves is prohibited. Also prohibited by LRAPA Section 47-015-2.B	Prohibited by LRAPA Title 47, except that, between October 15 and June 15, tree trimmings and shrub prunings, only, may be burned on lots of one-half acre or greater in size. Burning of grass clippings and fallen leaves is prohibited.	Burning of woody yard trimmings, leaves, and grass clippings is allowed between October 15 and June 15 on approved burning days with a valid permit from the local fire district (where required by fire district)	Burning of clean wood and yard debris is allowed year round on approved burning days with a valid permit from the local fire district (where required by fire district)
Construction/ Demolition Open Burning (Section 47-015-3)	Burning is prohibited by city ordinance and by LRAPA Section 47-015-3	Burning is prohibited by city ordinance and by LRAPA Section 47-015-3	Burning is prohibited by LRAPA Section 47-015-3	Burning is prohibited, except by letter permit from LRAPA	Burning of approved materials is allowed year round on approved burning days with a valid permit from the local fire district (where required by fire district)
Commercial Open Burning (Section 47-015-4)	Burning is prohibited by city ordinance and by LRAPA Section 47-015-4	Burning is prohibited by city ordinance and by LRAPA Section 47-015-4	Burning is prohibited by LRAPA Section 47-015-4	Burning is prohibited, except by letter permit from LRAPA	Burning is prohibited, except by letter permit from LRAPA
Industrial Open Burning (Section 47-015-5)	Burning is prohibited by city ordinance and by LRAPA Section 47-015-5	Burning is prohibited by city ordinance and by LRAPA Section 47-015-5	Burning is prohibited by LRAPA Section 47-015-5	Burning is prohibited, except by letter permit from LRAPA	Burning is prohibited, except by letter permit from LRAPA
Forest Slash Open Burning (Section 47-015-6) <del>Except on lands included in the ODF Smoke Management Plan</del>	Burning is prohibited by city ordinance and by LRAPA Section 47-015-6	Burning is prohibited by city ordinance and by LRAPA Section 47-015-6	Burning is prohibited by LRAPA Section 47-015-6	Burning is prohibited, except by letter permit from LRAPA	Burning is prohibited, except by letter permit from LRAPA or Under the OD[ <del>(F)</del> ] Smoke Management Plan

General open burning requirements are contained in section 47-015. In case of apparent conflict between this summary and the text of section 47-001 through 47-020, inclusive, the text shall apply.

PROPOSED AMENDMENT  
IN CONJUNCTION WITH PROPOSED  
AMENDMENTS TO LRAPA TITLE 47  
PROJECTED HEARING DATE: 03/09/99

LANE REGIONAL AIR POLLUTION AUTHORITY

TITLE 12

Definitions

Section 12-001 Definitions of Words and Terms Used in LRAPA Rules and Regulations

- "Eugene-Springfield Urban Growth [Area] ~~Boundary~~ (ESUG[A]B)" means the area within and around the cities of Eugene and Springfield, as described in the August 23, 1982 acknowledged Eugene-Springfield Metropolitan Area General Plan, as amended.

## Title 47: Open Burning

Open burning in compliance with the rules in this Title 47 does not exempt any person from any civil or criminal liability for consequences or damages resulting from such burning, nor does it exempt any person from complying with any other applicable law, ordinance, regulation, rule, permit, order, or decree of this or any other governmental entity having jurisdiction.

### Section 47-001 General Policy

In order to restore and maintain Lane County air quality in a condition as free from air pollution as is practicable, consistent with the overall public welfare of the County, it is the policy of the Lane Regional Air Pollution Authority to eliminate open burning disposal practices where alternative disposal methods are feasible. As a result, all open burning is prohibited in Lane County except as expressly allowed by these rules or if exempted from these rules by Oregon Statute. Contained in these rules are the requirements for the open burning of residential, construction, demolition, commercial, and industrial waste, and forest slash waste on properties outside the Oregon Smoke Management Plan.

### Section 47-005 Statutory Exemptions from These Rules

Due to Oregon statutory exemptions, these rules shall not apply to the following:

1. The operation of residential barbecue equipment for the purpose of cooking food for human consumption.
2. Fires set or permitted by any public agency in the performance of its official duty for the purpose of weed abatement, prevention or elimination of a fire hazard, a hazard to public health or safety, or for the instruction of employees in the methods of fire fighting.
3. Agricultural open burning.
4. Open burning on forest land permitted under the ODF Smoke Management Plan filed with the Secretary of State.

### Section 47-010 Definitions

The following definitions apply to this title, and additional general definitions can be found in Title 12 of these Rules and Regulations.

- "Agricultural open burning" means the open burning of "agricultural wastes," which are materials actually generated or used by an agricultural operation.
- "Agricultural operation" means an activity on land currently used or intended to be used primarily for the purpose of obtaining a profit in money by raising, harvesting and selling crops or by the raising and sale of livestock or poultry, or the produce thereof, which activity is necessary to serve that purpose. It does not include the construction and use of dwellings customarily provided in conjunction with the agricultural operation.
- "Agricultural waste" means any material actually generated or used by an agricultural operation but excluding those materials described in Section 47-015-1.E.
- "Commercial open burning" means the open burning of "commercial wastes," which are materials actually generated or used by a commercial operation.
- "Construction open burning" means the open burning of "construction wastes," which are materials actually resulting from or produced by a building or construction project.
- "Demolition open burning" means the open burning of "demolition wastes," which are materials actually resulting from or produced by the complete or partial destruction or tearing down of any man-made structure or the clearing of any site, or land clearing for site preparation for development.
- "Eugene-Springfield Urban Growth Boundary (ESUGB)" means the area within and around the cities of Eugene and Springfield, as described in the currently acknowledged Eugene-Springfield Metropolitan Area General Plan, as amended.

- "Forest slash open burning" means burning of vegetative debris and refuse on forest land related to the growing and/or harvesting of forest tree species where there is no change in the use of the land from timber production. Forest slash open burning does not include burning for commercial or individual use, or for any other type of land clearing not related to the growing and harvesting of forest tree species.
- "Garbage" means putrescible animal and vegetable wastes resulting from the handling, preparation, cooking, and serving of food.
- "Industrial open burning" means the open burning of "industrial wastes," which are materials produced as a direct result of any manufacturing or industrial process.
- "Land clearing" means the removal of trees, brush, logs, stumps, debris, or man-made structures for the purpose of site clean-up or site preparation.
- "Leaves" means needle or leaf materials which have fallen from trees, shrubs, or plants on the property around a dwelling unit.
- "Open burning" includes burning in open fires, burn barrels, incinerators which do not meet emission limitations specified in Section 30-020 of these Rules and Regulations, and any other outdoor burning which occurs in such a manner that combustion air is not effectively controlled and combustion products are not effectively vented through a stack or chimney.
- "Residential open burning" means the open burning of clean wood, yard trimmings and prunings which are actually generated in or around a dwelling for four (4) or fewer family living units. Once this material is removed from the property of origin it becomes commercial waste. Such materials actually generated in or around a dwelling of more than four (4) family living units are commercial wastes.
- "Responsible person" means each person who is in ownership, control, or custody of the property on which the open burning occurs, including any tenant thereof; or who is in ownership, control, or custody of the materials which are burned; or any person who causes or allows open burning to be initiated or maintained.
- "Salvage," as used in open burning rules, means the recovery, processing or use of woody debris for purposes including, but not limited to, energy production (such as fire wood or fuel), fiber production (such as soil amendments or mulch), or as a raw material for chemical or manufacturing processes.
- "Woody Yard Trimmings" means woody limbs, branches and twigs, with any attached leaves, which have been cut from or fallen from trees or shrubs from the property around a dwelling unit.

#### **Section 47-015 Open Burning Requirements**

1. General requirements--to be met by all open burning conducted in accordance with these Rules and Regulations:
  - A. All open burning shall be constantly attended by a responsible person or an expressly authorized agent, until extinguished.
  - B. It shall be the duty of each responsible person to promptly extinguish any burning which is in violation of any rule of the LRAPA Board or of any permit issued by the Authority.
  - C. No person shall cause, or allow to be initiated or maintained, any open burning which is prohibited by the burning advisory because of meteorological or air quality conditions.
  - D. No person shall cause, or allow to be initiated or maintained, any open burning which creates a private or public nuisance or a hazard to public safety.
  - E. No person shall cause, or allow to be initiated or maintained, open burning of any garbage, plastics, wire insulation, automobile parts, asphalt, petroleum by-products, petroleum-treated materials, rubber products, animal remains, or animal or vegetable matter resulting from the handling, preparation, cooking, or service of food; or of any other material which normally emits dense smoke, noxious odors, or hazardous air contaminants.

F. To promote efficient burning and prevent excessive emissions of smoke, each responsible person shall assure that all combustible material is dried to the extent practicable and loosely stacked or windrowed to eliminate dirt, rocks and other non-combustible materials; and periodically restack or feed the burning pile to enhance combustion.

G. No person shall cause, or allow to be initiated or maintained, any open burning at any solid waste disposal site unless authorized by a Solid Waste Permit issued pursuant to OAR 340-94-040. The Authority shall be notified by the responsible person prior to such burning.

H. Fires involving materials less than three (3) cubic yards of volume, set for recreational purposes in designated recreational areas (such as parks, recreational campsites, and campgrounds) are allowed, except that prohibited materials listed in Section 47-015-1.E shall not be burned.

I. Outdoor barbecuing connected with group outings, festivals, fairs or similar occasions is allowed, except that prohibited materials listed in Section 47-015-1.E shall not be burned.

## 2. Residential Open Burning Requirements

The residential open burning season is October 15 through June 15, with the following restrictions:

A. All open burning is prohibited within the Eugene city limits.

B. All open burning is prohibited within the Springfield city limits, except that burning of woody yard trimmings is allowed on lots of one-half acre or more.

C. Within the ESUGB, burning is prohibited if required by local fire codes.

D. Residential open burning outside the city limits of Eugene and Springfield but within the Eugene-Springfield Urban Growth Boundary is permitted subject to the general requirements of Section 47-015-1, with the following restrictions:

(1) The burning of yard debris is limited to the woody yard trimmings from trees and shrubs growing upon the same premises where the burning occurs;

(2) Open Burning of leaves and grass clippings is prohibited; and

(3) The premises upon which such burning is to take place must be a private lot, as identified in the Lane County tax records, of one half acre in size or more.

E. Residential open burning is allowed only on approved burning days, between sunrise and sunset, with a valid fire permit (if required by fire district). The beginning time for burning varies and is set as part of the daily burning advisory; however, fires must always be out by sunset.

F. Residential open burning of woody yard trimmings, leaves and grass clippings is allowed within the fire districts identified below:

(1) Bailey-Spencer RFPD

(2) Coburg RFPD

(3) Cottage Grove/South Lane Fire District

(4) Creswell RFPD

(5) Dexter RFPD west of the Willamette Meridian

(6) Eugene RFPD #1

(7) Goshen RFPD

(8) Junction City Fire District

(9) Junction City RFPD

(10) Lane County Fire District #1

(11) Lane RFPD #1 outside the ESUGB

(12) Lowell RFPD

(13) Marcola RFPD

(14) McKenzie RFPD outside the ESUGB

(15) Monroe RFPD, that portion within Lane County

(16) Oakridge RFPD

(17) Pleasant Hill RFPD

(18) Santa Clara RFPD outside the ESUGB

(19) Westfir RFPD

(20) Willakenzie RFPD

(21) Zumwalt RFPD

*(Note: Some fire districts require burning permits. Fire districts may restrict burning whenever fire danger dictates. Persons wishing to conduct residential open burning should check first with their fire district.)*

G. Residential open burning is allowed year-round outside of the affected areas defined in 47-015-2.A through F of this section.

H. Failure to conduct residential open burning in accordance with this section is a violation of these rules and may be cause for assessment of civil penalties. Citations will be issued by authorized enforcement agents to responsible person(s) upon site inspection where residential open burning rules are violated pursuant to this section.

### 3. Construction/Demolition Open Burning Requirements

A. Construction/demolition open burning is prohibited inside the ESUGB.

B. onstruction/demolition open burning is prohibited inside the affected areas described in 47-015-2.F, unless authorized pursuant to Section 47-020.

C. Construction/demolition open burning is allowed elsewhere in Lane County, subject to the general requirements of Section 47-015-1.

### 4. Commercial Open Burning Requirements

A. Commercial open burning is prohibited inside the ESUGB.

B. Commercial open burning is prohibited elsewhere, unless authorized pursuant to Section 47-020.

### 5. Industrial Open Burning Requirements

A. Industrial open burning is prohibited inside the ESUGB.

B. Industrial open burning is prohibited elsewhere, unless authorized pursuant to Section 47-020.

### 6. Forest Slash Open Burning

A. Forest slash open burning in areas covered by the Oregon Smoke Management Plan is regulated by the Department of Forestry pursuant to ORS 477.515.

B. Forest slash open burning in Lane County which is in areas outside the Oregon Smoke Management Plan is treated by LRAPA as follows:

(1) Forest slash open burning is prohibited inside the ESUGB.

(2) Forest slash open burning is prohibited inside the affected areas described in 47-015-2.F, unless authorized pursuant to Section 47-020.

(3) Forest slash open burning elsewhere in Lane County, on properties which are not covered by the ODF Smoke Management Plan, is prohibited unless authorized pursuant to Section 47-020.

(4) Forest slash open burning will be coordinated with the ODF East Lane and Western Lane districts and will occur as consistently as possible with slash burning advisories issued by the ODF.

(5) A written plan, approved by the ODF, is required under the Forest Practices Act (ORS 527) when burning is to be conducted:

(a) within 100 feet of type D or F streams (domestic water supply or fish-bearing streams), lakes or significant wetlands (see OAR 629-605-0170(1)(a) and 629-615-0300(3)); or

(b) on highly erosive soils.

The ODF should be contacted for all Forest Practices Act requirements.

### Section 47-020 Letter Permits

1. Open burning of commercial, industrial, construction, demolition, or forest slash wastes on a singly occurring or infrequent basis, which is otherwise prohibited, may be permitted by a letter permit issued by the Authority in accordance with this rule and subject to the general requirements in Section 47-015-1.

2. Prescribed burning of standing vegetation for the purpose of species or wetland conversion, pursuant to federal or state laws or programs to promote or enhance habitat for indigenous species of plants or animals, which is otherwise prohibited, may be permitted by a letter permit issued by the Authority in accordance with section 47-020. These permits require a permit fee of \$100.

3. Prior to any burning, the applicant must also obtain a valid fire permit issued by the fire permit issuing agency having jurisdiction.

4. Permits issued for open burning other than prescribed burning of standing vegetation (47-020-2) require a permit fee of \$4 per cubic yard, with a minimum fee of \$50.

5. The following factors shall be evaluated in determining whether a letter permit will be approved or denied:

A. The quantity, type, and combustibility of the materials proposed to be burned;

B. The costs and practicability of alternative disposal methods, including on-site and landfill disposal and salvage;

C. The seasonal timing and expected duration of the burn;

D. The willingness and ability of the applicant to promote efficient combustion by using heavy equipment, fans, pit incineration, or other appropriate methods;

E. The location of the proposed burn site with respect to potential adverse impacts;

- F. The expected frequency of the need to dispose of materials by burning in the future;
- G. Any prior open burning violations by the applicant;
- H. Any additional relevant information.
- 6. Upon receipt and review of the required information, the Authority may approve the application if it is satisfied that:
  - A. The applicant has demonstrated that all reasonable alternatives have been explored and no practicable alternative method for disposal of the material exists;
  - B. The proposed burning will not cause or contribute to significant degradation of air quality;
  - C. There will be no actual or projected violation of any statute, rule, regulation, order, permit, ordinance, judgment, or decree.
- 7. The Authority may revoke or suspend an issued letter permit, with no refund of the fee, via written or verbal notice, on any of the following grounds:
  - A. Any material misstatement or omission in the required application information;
  - B. If the conditions of the permit are being violated;
  - C. Any actual or projected violation of any statute, rule, regulation, order, permit, ordinance, judgment, or decree;
  - D. Any other relevant factor.
- 8. Failure to conduct open burning according to the conditions, limitations, or terms of a letter permit, or any open burning in excess of that permitted by the letter permit, shall be a violation of the permit and shall be cause for assessment of civil penalties or for other enforcement action by the Authority.
- 9. Each letter permit issued by the Authority pursuant to this rule shall contain at least the following elements:
  - A. The location at which the burning is permitted to take place;
  - B. A description of the material that may be burned;
  - C. The calendar period during which the burning is permitted to take place;
  - D. The equipment and methods required to be used by the applicant to insure efficient burning;
  - E. The limitations, if any, based upon meteorological conditions required before burning may occur;
  - F. Reporting requirements for both starting the fire and completion of the requested burning;
  - G. A statement that Section 47-015-1 is fully applicable to all burning under the permit;
  - H. Such other conditions that the Authority considers to be desirable.
- 10. Letter permits issued by the Authority pursuant to this rule shall be forwarded to the fire permit issuing agency having jurisdiction.
- 11. Letter permits are valid only for the specified burning period and shall not be renewable unless there were no approved burning days during that period. Any requests to conduct additional burning shall require a new permit.

**Section 47-030 Summary of Seasons, Areas, and Permit Requirements for Open Burning**

Type of Burning	Inside City Limits of Eugene	Inside City Limits of Springfield	Elsewhere Inside the ESUGA	Inside Affected Fire Districts and Outside ESUGA	All Other Areas
Residential Open Burning (Section 47-015-2)	Prohibited by City Ordinance and by LRAPA Section 47-015-2.A	Prohibited by City Ordinance, except that, between October 15 and June 15, tree trimmings and shrub prunings, only, may be burned on lots of one-half acre or greater in size. Burning of grass clippings and	Prohibited by LRAPA Title 47, except that, between October 15 and June 15, tree trimmings and shrub prunings, only, may be burned on lots of one-half acre or greater in size. Burning of grass clippings and	Burning of woody yard trimmings, leaves, and grass clippings is allowed between October 15 and June 15 on approved burning days with a valid permit from the local fire district (where required by fire district)	Burning of clean wood and yard debris is allowed year round on approved burning days with a valid permit from the local fire district (where required by fire district)



		fallen leaves is prohibited. Also prohibited by LRAPA Section 47-015-2.B	fallen leaves is prohibited.		
Construction/ Demolition Open Burning (Section 47-015-3)	Burning is prohibited by city ordinance and by LRAPA Section 47-015-3	Burning is prohibited by city ordinance and by LRAPA Section 47-015-3	Burning is prohibited by LRAPA Section 47-015-3	Burning is prohibited, except by letter permit from LRAPA	Burning of approved materials is allowed year round on approved burning days with a valid permit from the local fire district (where required by fire district)
Commercial Open Burning (Section 47-015-4)	Burning is prohibited by city ordinance and by LRAPA Section 47-015-4	Burning is prohibited by city ordinance and by LRAPA Section 47-015-4	Burning is prohibited by LRAPA Section 47-015-4	Burning is prohibited, except by letter permit from LRAPA	Burning is prohibited, except by letter permit from LRAPA
Industrial Open Burning (Section 47-015-5)	Burning is prohibited by city ordinance and by LRAPA Section 47-015-5	Burning is prohibited by city ordinance and by LRAPA Section 47-015-5	Burning is prohibited by LRAPA Section 47-015-5	Burning is prohibited, except by letter permit from LRAPA	Burning is prohibited, except by letter permit from LRAPA
Forest Slash Open Burning (Section 47-015-6) Except on lands included in the ODF Smoke Management Plan	Burning is prohibited by city ordinance and by LRAPA Section 47-015-6	Burning is prohibited by city ordinance and by LRAPA Section 47-015-6	Burning is prohibited by LRAPA Section 47-015-6	Burning is prohibited, except by letter permit from LRAPA	Burning is prohibited, except by letter permit from LRAPA or Under the ODF Smoke Management Plan

General open burning requirements are contained in section 47-015. In case of apparent conflict between this summary and the text of section 47-001 through 47-020, inclusive, the text shall apply.

### Title 12: Definitions

"Eugene-Springfield Urban Growth Area (ESUGA)" means the area within and around the cities of Eugene and Springfield, as described in the August 23, 1982 acknowledged Eugene-Springfield Metropolitan Area General Plan, as amended.

340-200-0040

**State of Oregon Clean Air Act Implementation Plan**

(1) This implementation plan, consisting of Volumes 2 and 3 of the State of Oregon Air Quality Control Program, contains control strategies, rules and standards prepared by the Department of Environmental Quality and is adopted as the state implementation plan (SIP) of the State of Oregon pursuant to the federal Clean Air Act, Public Law 88-206 as last amended by Public Law 101-549.

(2) Except as provided in section (3) of this rule, revisions to the SIP shall be made pursuant to the Commission's rulemaking procedures in Division 11 of this Chapter and any other requirements contained in the SIP and shall be submitted to the United States Environmental Protection Agency for approval.

(3) Notwithstanding any other requirement contained in the SIP, the Department is authorized:

(a) To submit to the Environmental Protection Agency any permit condition implementing a rule that is part of the federally-approved SIP as a source-specific SIP revision after the Department has complied with the public hearings provisions of 40 CFR 51.102 (July 1, 1992); and

(b) To approve the standards submitted by a regional authority if the regional authority adopts verbatim any standard that the Commission has adopted, and submit the standards to EPA for approval as a SIP revision.

[NOTE: Revisions to the State of Oregon Clean Air Act Implementation Plan become federally enforceable upon approval by the United States Environmental Protection Agency. If any provision of the federally approved Implementation Plan conflicts with any provision adopted by the Commission, the Department shall enforce the more stringent provision.]

[Publications: The publication(s) referred to or incorporated by reference in this rule are available from the agency.]

Stat. Auth.: ORS 468.020

Stat. Implemented: ORS 468A.035

Hist.: DEQ 35, f. 2-3-72, ef. 2-15-72; DEQ 54, f. 6-21-73, ef. 7-1-73; DEQ 19-1979, f. & ef. 6-25-79; DEQ 21-1979, f. & ef. 7-2-79; DEQ 22-1980, f. & ef. 9-26-80; DEQ 11-1981, f. & ef. 3-26-81; DEQ 14-1982, f. & ef. 7-21-82; DEQ 21-1982, f. & ef. 10-27-82; DEQ 1-1983, f. & ef. 1-21-83; DEQ 6-1983, f. & ef. 4-18-83; DEQ 18-1984, f. & ef. 10-16-84; DEQ 25-1984, f. & ef. 11-27-84; DEQ 3-1985, f. & ef. 2-1-85; DEQ 12-1985, f. & ef. 9-30-85; DEQ 5-1986, f. & ef. 2-21-86; DEQ 10-1986, f. & ef. 5-9-86; DEQ 20-1986, f. & ef. 11-7-86; DEQ 21-1986, f. & ef. 11-7-86; DEQ 4-1987, f. & ef. 3-2-87; DEQ 5-1987, f. & ef. 3-2-87; DEQ 8-1987, f. & ef. 4-23-87; DEQ 21-1987, f. & ef. 12-16-87; DEQ 31-1988, f. 12-20-88, cert. ef. 12-23-88; DEQ 2-1991, f. & cert. ef. 2-14-91; DEQ 19-1991, f. & cert. ef. 11-13-91; DEQ 20-1991, f. & cert. ef. 11-13-91; DEQ 21-1991, f. & cert. ef. 11-13-91; DEQ 22-1991, f. & cert. ef. 11-13-91; DEQ 23-1991, f. & cert. ef. 11-13-91; DEQ 24-1991, f. & cert. ef. 11-13-91; DEQ 25-1991, f. & cert. ef. 11-13-91; DEQ 1-1992, f. & cert. ef. 2-4-92; DEQ 3-1992, f. & cert. ef. 2-4-92; DEQ 7-1992, f. & cert. ef. 3-30-92; DEQ 19-1992, f. & cert. ef. 8-11-92; DEQ 20-1992, f. & cert. ef. 8-11-92; DEQ 25-1992, f. 10-30-92, cert. ef. 11-1-92; DEQ 26-1992, f. & cert. ef. 11-2-92; DEQ 27-1992, f. & cert. ef. 11-12-92; DEQ 4-1993, f. & cert. ef. 3-10-93; DEQ 8-1993, f. & cert. ef. 5-11-93; DEQ 12-1993, f. & cert. ef. 9-24-93; DEQ 15-1993, f. & cert. ef. 11-4-93; DEQ 16-1993, f. & cert. ef. 11-4-93; DEQ 17-1993, f. & cert. ef. 11-4-93; DEQ 19-1993, f. & cert. ef. 11-4-93; DEQ 1-1994, f. & cert. ef. 1-3-94; DEQ 5-1994, f. & cert. ef. 3-21-94; DEQ 14-1994, f. & cert. ef. 5-31-94; DEQ 15-1994, f. 6-8-94, cert. ef. 7-1-94; DEQ 25-1994, f. & cert. ef. 11-2-94; DEQ 9-1995, f. & cert. ef. 5-1-95; DEQ 10-1995, f. & cert. ef. 5-1-95; DEQ 14-1995, f. & cert. ef. 5-25-95; DEQ 17-1995, f. & cert. ef. 7-12-95; DEQ 19-1995, f. & cert. ef. 9-1-95; DEQ 20-1995 (Temp), f. & cert. ef. 9-14-95; DEQ 8-1996(Temp), f. & cert. ef. 6-3-96; DEQ 15-1996, f. & cert. ef. 8-14-96; DEQ 19-1996, f. & cert. ef. 9-24-96; DEQ 22-1996, f. & cert. ef. 10-22-96; DEQ 23-1996, f. & cert. ef. 11-4-96; DEQ 24-1996, f. & cert. ef. 11-26-96; DEQ 10-1998, f. & cert. ef. 6-22-98; DEQ 15-1998, f. & cert. ef. 9-23-98; DEQ 16-1998, f. & cert. ef. 9-23-98; DEQ 17-1998, f. & cert. ef. 9-23-98; DEQ 20-1998, f. & cert. ef. 10-12-98; DEQ 21-1998, f. & cert. ef. 10-12-98; DEQ 1-1999, f. & cert. ef. 1-28-99; DEQ 2-1999, f. & cert. ef. 3-25-99; DEQ 6-1999, f. & cert. ef. 5-21-99; DEQ 10-1999, f. & cert. ef. 7-1-99; renumbered from OAR 340-020-0047; DEQ 15-1999, f. & cert. ef. 10-22-99; DEQ2-2000, f 2-17-00, cert. Ef. 6-1-01

**AGENDA ITEM NO. 7**

**LRAPA Board of Directors Meeting**

October 12, 1999

**TO:** Board of Directors

**FROM:** Barbara Cole, Director

**SUBJ:** Public Hearing and Request for Re-adoption of Amendments to LRAPA Open Burning Rules (Title 47) and Associated Amendment to Definitions (Title 12)

The LRAPA Board of Directors adopted amendments to LRAPA Title 47 and associated changes to Title 12 on March 9, 1999. The notices of the public hearing which were published in local newspapers did not specify that the amendments, if adopted, would be submitted to EPA for inclusion as a revision to Oregon's State Implementation Plan. The amendments are valid as adopted and are in force at this time; however, in order for the EPA to be able to approve them as a SIP revision, the hearing notice must be published again with the SIP revision language, and the amendments must be re-adopted by the board.

**BACKGROUND INFORMATION**

For your reference, the following is an abbreviated and revised version of information presented at the March 9, 1999 public hearing when the amendments were adopted.

**Need for Amendments:** LRAPA staff has been encouraged by the Board of Directors to increase revenues through user fees to provide additional support for the program and to provide an economic incentive for alternatives to open burning. The amendments accomplished those goals and incorporated a request from Lane County Fire District #1 to expand the area of its district to be included in the control area for seasonal and other restrictions on open burning. Some administrative changes and corrections were also made.

**Adopted Changes:** The amendments adopted a fee rate based upon the amount of material to be burned. The rate of \$4 per cubic yard is equivalent to the land fill fee and is greater than the \$2.50 per cubic yard fee charged by local vegetative material recyclers. This is intended to provide some incentive for alternative disposal. In addition, it is also more equitable requiring higher fees from the large waste generators than the current flat rate of \$100. Permits for burning standing vegetation for the purpose of wetland preservation also now have a flat rate fee of \$100. These permits previously required no fee.

The specific adopted changes are as follows:

47-010. The general definition of "Residential Open Burning" is corrected to include leaves and grass clippings. These are specifically prohibited only in some geographical areas in Lane County.

47-010. The name "Eugene-Springfield Urban Growth Area (ESUGA)" is changed to read "Eugene-Springfield Urban Growth Boundary (ESUGB)", and throughout the rest of Title 47. This change is also made in the definition of "Eugene-Springfield Urban Growth Area" in Title 12.

47-015-2F(10). At the request of Lane County Fire District #1, the portion of their district included in the control area is expanded.

47-015-2.F. The "note" in parentheses at the end of the subsection is amended to state that fire districts may restrict burning whenever fire danger dictates.

47-015-2H. The term "shall" is replaced with "may" to more accurately depict the actual enforcement of these rules.

47-015-6B(5)a. The reference to OAR is corrected.

47-020-2. Letter permits for burning of standing vegetation to preserve wetlands have a fee of \$100. These previously had no fees.

47-020-4. Letter permit fees changed from the a flat rate of \$100 to \$4 per cubic yard (with a minimum fee of \$50) and owner/occupants burning construction or demolition waste are now charged a fee.

47-030. In the first column, "Type of Burning," in the category of Forest Slash Open Burning in the last horizontal row, the phrase, "except on lands included in the ODF Smoke Management Plan," is added.

**Differences Between Proposed LRAPA Rule Change and DEQ Rule:** OAR 340-023-0100(11) sets letter permit fees for the DEQ at \$20 for a single season and \$30 for a calendar year, and are for yard debris only. The LRAPA fees for letter permits are greater than the DEQ fees, and are charged for all types of burning described in Section 47-020, Letter Permits.

**Rulemaking Justification Questions:**

1. Are there state requirements that are applicable to this situation? If so, exactly what are they?

Response: No. LRAPA sets its permitting fees independent of the State DEQ.

2. Are the applicable state requirements performance-based, technology-based, or both with the most stringent controlling?

**Response:** Yes. These changes are designed to promote alternatives to open burning.

**Legal Authority:** ORS 183, 468.020, 468A.135; OAR 240-011-0010; LRAPA Titles 13, 14, 47

**Principal Documents Relied Upon:**

1. Attorney General's Uniform and Model Rules of Procedure
2. LRAPA Title 14
3. LRAPA Title 47

**Fiscal and Economic Impact of Amendments:**

**Industry:** Depending upon the amount of material to be burned, the fee changes result in increases or decreases from the previous flat rate fee.

**Public:** The fee changes require the general public to pay fees that they previously were not charged.

**LRAPA:** The additional will recover a greater percentage of the cost of operating the program. The fee increase results in a need for greater LRAPA public education and compliance efforts, short-term.

**Other Government Agencies:** The fee changes require some government agencies to pay fees that they previously were not charged.

**Land Use Consistency Statement:** The rule amendments are consistent with land use as described in applicable land use plans in Lane County.

**Public Comment Process for March 9 Adoption:** An initial proposal was presented to the LRAPA Advisory Committee to get their input before preparing the formal proposal. A description of the proposed amendments was then sent out to LRAPA's mailing list of interested persons in early December of 1998. Copies of the actual draft amendments accompanied the description sent to all fire departments issuing burning permits in Lane County, as well DEQ's Air Quality Division in Portland and EPA Region 10 in Seattle for their review and comment. LRAPA received authorization from DEQ to serve as hearings officer for EQC, and this was a concurrent LRAPA/EQC hearing. Staff received LRAPA board authorization on January 12, 1999 to hold public hearing on these amendments on March 9, 1999. Notice was published in the February 1, 1999 edition of the Secretary of State's Oregon Bulletin. The notices published in the January 27, 1999 editions of the Eugene Register Guard, the Cottage Grove Sentinel, and the Springfield News, and the January 28, 1999 edition of the Oakridge Dead Mountain Echo were the ones which did not indicate that these amendments would be included in Oregon's SIP.

Comments received from all sources were evaluated and, where appropriate, incorporated into the revised draft amendments. Following the public hearing, the LRAPA Board adopted the rules, as proposed.

Response: Not applicable since these changes affect only fees and not control measures.

3. Do the applicable state requirements specifically address the issues that are of concern in Lane County? Was data or information that would reasonably reflect Lane County's concern and situation considered in the state process that established the state requirements?

Response: Not applicable since state requirements are not applicable.

4. Will the proposed requirement improve existing requirements or prevent the need for costly retrofit to meet more stringent future requirements?

Response: Not applicable since these changes affect only fees and not control measures.

5. Is there a timing issue which might justify changing the time frame for implementation of state requirements?

Response: Not applicable since state requirements are not applicable.

6. Will the proposed requirement assist in establishing and maintaining a reasonable margin for accommodation of uncertainty and future growth?

Response: Not applicable since these changes affect only fees and not control measures.

7. Does the proposed requirement establish or maintain reasonable equity in the requirements for various sources (level the playing field)?

Response: Yes. One of the primary purposes of the changes is to improve the equity.

8. Would others face increased costs if a more stringent rule is not enacted?

Response: Not applicable since these changes affect only fees and not control measures.

9. Does the proposed requirement include procedural requirements, reporting or monitoring requirements that are different from applicable state requirements? If so, why? What is the "compelling reason" for different procedural, reporting or monitoring requirements?

Response: Not applicable since these changes do not affect procedural, reporting or monitoring requirements.

10. Is demonstrated technology available to comply with the proposed requirement?

Response: Not applicable since these changes do not require any new technology.

11. Will the proposed requirement contribute to the prevention of pollution or address a potential problem and represent a more cost-effective environmental gain?

## PUBLIC NOTICE AND COMMENT

Notice of the October 12 public hearing was published in the Eugene Register Guard, the Oakridge Dead Mountain Echo, and the Springfield News. (It was submitted to the Cottage Grove Sentinel, but they did not get it into the paper as requested. Because the law requires only that the notice be published in a paper of general circulation in the affected area, the Register Guard is the only newspaper in which we are actually required to publishing the notice. Consequently, not having the notice published in the Cottage Grove paper does not compromise the rulemaking process.) The notice specifies that the rules are in force and valid and that the re-adoption is to correct a deficiency in federal public notice requirements. There has been one telephone call from a person who wanted to verify that none of the rules were changing. He had no other comments.

## OPTIONS FOR BOARD ACTION

1. Re-adopt the rule amendments as adopted in March of 1999. The re-adoption, together with the corrected public notice, will make these rules approvable by EPA for inclusion in Oregon's SIP, thus completing the rulemaking cycle.
2. Do not re-adopt the rule amendments. EPA will not accept or approve the rule amendments. LRAPA's current open burning rules will not be a part of the SIP. The previously adopted version of the rules will remain in the SIP, instead. LRAPA needs to be sure that the rules in the SIP are current to ensure consistency and avoid discrepancies between what is on the books at LRAPA, DEQ, and EPA.

## STAFF RECOMMENDATION

Staff recommends that the board re-adopt the amendments to Titles 12 and 47 as originally adopted on March 9, 1999.

BJC/MJD

LANE REGIONAL AIR POLLUTION AUTHORITY  
BOARD OF DIRECTORS MEETING  
TUESDAY--OCTOBER 12, 1999  
LRAPA Meeting Room  
1010 Main Street  
Springfield, Oregon

## ATTENDANCE:

**Board:** Betty Taylor, Acting Chair--Eugene; Jim Chartier--Eugene; Sid Leiken--Springfield; Pat Patterson--Cottage Grove/Oakridge; Pete Sorenson--Lane County; Gary Whitney--At-Large  
(ABSENT: Al Johnson, Chair--Eugene)

**Staff:** Barbara Cole--Director; Sharon Banks; Merrie Dinteman; Max Huefle; Drew Johnson; John Morrissey

1. **OPENING:** Board chair Al Johnson was not available for this meeting. Vice-chair Betty Taylor presided in his absence, calling the meeting to order at 12:15 p.m.
2. **CONSENT CALENDAR** (August 30, 1999 and September 14, 1999 minutes and expense reports through August 31, 1999): **MSP(PATTERSON/SORENSEN)(UNANIMOUS) APPROVAL OF CONSENT CALENDAR.**
3. **PUBLIC PARTICIPATION:** None.
4. **DIRECTOR'S REPORT:** Cole had several items to add to the information in her written report.

**Eugene City Council.** Cole told the board she was scheduled to brief the Eugene City Council the following evening about LRAPA in general and about ozone issues. This is one of several such presentations Cole has made to Lane County city councils to acquaint them with LRAPA.

**EPA Visit to LRAPA.** The current air program administrator for Region 10, Anita Frankel, will be leaving that position at the end of October. The new program head will be Barbara McAllister. Frankel was scheduled to visit Eugene-Springfield and to attend the LRAPA board meeting on November 9; however, since both the EPA air program administrator and LRAPA's director will be changing at about the same time, the visit has been postponed until LRAPA's new director is on board and McAllister has a chance to settle into her position at EPA.

**Air Toxics.** DEQ has briefed EQC on the recommendations of the air toxics consensus group. There will be a workshop in the Portland area the evening of November 9. A similar workshop will be scheduled in Lane County.

**Monaco Coach Odor Complaints.** Staff was scheduled to attend a Coburg City Council meeting on October 19 to discuss the problem of odor complaints from neighbors of the Monaco Coach facility in Coburg.

**Emergency Notification System Test.** The area's Emergency Notification System is in place to handle a situation such as a chemical release and will be used to call a large number of people immediately and let them know what they need to do. A system test on October 14 will involve calling about 5000



people around the county between the hours of 7:00 and 9:00 p.m. People receiving the calls will be told that it is a test and will be asked for feedback about how the system works. Patterson asked whether city managers and public officials are notified in advance of this so that they will know what is happening in case they get calls from citizens. Cole said that LRAPA is not involved in the test and has no input into how it operates; however, she said she would call the coordinators of the system to see if that has been done.

5. OLD BUSINESS:

McKenzie Forest Products SFO (Stipulated Final Order). The facility is on schedule with the existing SFO.

Cole introduced a draft Stipulated Final Order under which the company would correct deficiencies which have been identified since McKenzie assumed ownership and operation of the facility. Cole said she does not believe the company understood earlier in the process that the board would need to approve the SFO before it becomes official. The company has proceeded in good faith to contract with a consulting firm and do the design work, and with purchase orders for the equipment. They would like some assurance that the provisions agreed to will be approved by the board. The board discussed whether to take action on the SFO at this time or to wait until the November meeting. Several board members commented that they would not have a problem approving the SFO at this time since they have conceptually approved its provisions at a previous meeting.

Leiken MOVED to approve SFO Number 99-1748 for McKenzie Forest Products, and Patterson SECONDED.

During the discussion which followed the motion, staff pointed out that the standing agenda item has been to report status on an existing SFO which was negotiated with the previous owners of the facility and under which the current owners have been operating. Draft SFO Number 99-1748 is for subsequent violations which have occurred since the new owners took over the facility. Since this SFO is not specifically mentioned in the agenda, the board determined that action on the new SFO should be handled at the next meeting, separately from the ongoing status report agenda item.

Leiken and Patterson WITHDREW THE MOTION AND SECOND.

Agency Housing. Banks reported that the building is nearing completion and that the only sub-contract yet to be let is for the perimeter drain around the addition. She said the city is willing to give LRAPA a temporary occupancy permit before the drain is completed, if necessary.

Update on Strategic Planning. Wipper was not available to give an oral update at today's meeting but did leave a written update for the board to review. Cole said she would ask Wipper to firm up the dates for the full strategic planning group meeting and the joint board and advisory committee meeting as soon as possible and let everyone know when the meetings will be held.

6. ADVISORY COMMITTEE: Cole reported that the committee did not meet in September, and there was nothing new to report.

7. PUBLIC HEARING REGARDING PROPOSED RE-ADOPTION OF AMENDMENTS TO LRAPA TITLE 47, OPEN BURNING RULES. Cole explained that staff was requesting that the board re-adopt amendments to Title 47 which were originally adopted in March of this year. The rules are fully effective in Lane County at this time. The reason this action was necessary is that the notice of hearing which was published in local newspapers prior to the March hearing did not state that the proposed amendments would revise the State Implementation Plan. Federal law requires that information to be a part of the notice. Without it, EPA cannot approve the amended rules as part of the SIP.

Public Hearing. Taylor opened the public hearing at 12:42 p.m. Cole submitted into the record affidavits of notice publication in the Eugene Register-Guard, the Springfield News, and the Oakridge Dead Mountain Echo. Taylor asked whether anyone present wished to comment either in favor of or in opposition to the proposed re-adoption of amendments to Title 47. Hearing no response, she closed the public hearing at 12:44 p.m.

**ACTION: MSP(SORENSEN/CHARTIER)(UNANIMOUS) RE-ADOPTION OF MARCH 9, 1999 AMENDMENTS TO TITLE 47.**

8. INFORMATION ITEM--FUEL CELLS. Ralph Johnston explained that a fuel cell is a simple device which combines hydrogen from a fuel source, either from a tank of hydrogen or from other sources such as gasoline or propane, with the oxygen in the ambient air to produce energy. If propane or gasoline are used as fuel, it is necessary to use a device called a fuel reformer to separate out the hydrogen from the carbon; and there are some carbon dioxide emissions from that process. He said fuel cells are the coming technology and will have a substantial impact on air quality since the only emissions from fuel cells is water vapor. They are also very reliable since they have no moving parts. Johnston said fuel cells have run generators for a solid year with no maintenance at all, making them a good alternative to commercial electric power in areas where it is difficult to get electricity or which electricity is frequently interrupted. Fuel cells are also being tested at landfills, where the methane gas mixes with the air to create electricity. Johnston said homes and businesses could become solely self-contained in the future by using fuel cells to provide their own power. He said there are hybrid automobiles out now which use a combination of electricity and gas. The final step, motor vehicles which use fuel cells, should be available at reasonable prices in the next five years or so and could solve a lot of air quality problems.

Whitney asked how this coming technology is taken into account in something like Transplan. Cole replied that a transportation plan such as Transplan must demonstrate conformity and can use only proven, enforceable strategies. Consequently, Johnston added, Transplan does not include the hybrid cars due out in the next year or two or the fuel cell operated vehicles to follow. The technology included in Transplan is limited to what is available on the street today. Whitney said that having to ignore technology which will be available in the next few years seems to him to leave a gap of information about what the situation will really be in five years. Cole said this is a fundamental flaw with the conformity rule since transportation infrastructure is planned out at least 20 years in advance using only current assumptions and requirements and strategies which are enforceable, funded, and permanent.

Sorenson suggested that commitment to this technology by public agencies in Lane County could result in significant emissions reductions. Cole said the Department of Energy initiated a Clean Cities effort to get jurisdictions to jump start alternative fuels technologies, both the vehicles and re-fueling infrastructures. The technologies are available to areas where their use is mandated by the federal government, but outside of those areas it is difficult to start something like that because of the price and

availability of alternative fuel technologies. Cole said the way to overcome that is to establish a buying coalition which is large enough to assure the manufacturers that they will have an adequate market to make it profitable for them to provide the products.

Sorenson asked what is driving development of fuel cell technology now. Cole responded that both energy and air quality needs are driving it. Air quality requirements will get progressively tougher in the future, making fuel cell technology increasingly more attractive. Sorenson commented that a recent newspaper article indicated that oil exploration has stopped in the U. S. and elsewhere, which will drive the price of oil up. That, in turn, will drive technology away from oil. Johnston agreed, stating that fuel cell technology would save a lot of oil import.

9. INFORMATION ITEM--MOBILE SOURCES: Cole presented information regarding mobile sources and their contribution to air pollution levels. She said that, while carbon monoxide should not be a major concern because cleaner cars have been reducing CO levels everywhere, ozone levels have been creeping up in Lane County and will need to be watched closely to avoid violating the standard. Sorenson asked what constitutes a violation, and Cole explained that running records are kept of average ozone levels for each 8 hours of each day. The fourth highest 8-hour average for each year is used in a three-year running average of the fourth highs. If that running three-year average is above .08 parts per million, the area has a violation. If an area violates the standard, it is required to develop an ozone attainment and maintenance plan. Cole said this planning is a massive and very expensive and complicated effort, and it is very expensive for the community and industry to implement the controls contained in the plan. Cole said staff has evaluated data for Lane County and that the trend is upward. She said while there is no cause for alarm, there is reason to be concerned. A string of years with very hot summers would drive the ozone levels up. It takes a long time to design and build public support for mobile source programs and to fund them. Because of the upward trend, work on a mobile source program should start now to be in place before the area violates the ozone standard. Cole said technology is constantly being improved to provide cleaner-burning engines and cleaner fuels for motor vehicles; but since vehicle miles traveled have increased much faster than the general population has increased, it is a constant race to stay ahead of increases in transportation-related emission levels.

Sorenson asked where the majority of the ozone problem comes from, and Cole said transportation sources are the major contributor. In addition to VOC, heavy-duty on-road vehicles produce half of the mobile source NO<sub>x</sub> inventory. Cole explained further that NO<sub>x</sub> and VOC emissions are the ingredients needed to produce ozone in the presence of high temperatures and strong sunlight. It has not yet been determined whether this area's air basin is VOC or NO<sub>x</sub> delimited. She said this analysis will need to be done at some point if a mobile source program is to be really successful, because if it turns out that NO<sub>x</sub> is what's controlling it, reductions in VOCs won't necessarily reduce ozone levels. Cole added that plants and other natural sources are a huge source of VOCs.

Cole also touched on conformity requirements, stating that whereas the requirements in the original Clean Air Act were not very stringent regarding conformity between transportation planning and air quality planning, the Clean Air Act Amendments of 1990 strengthened those requirements significantly. This area used to violate the Carbon Monoxide standard and is under a maintenance plan. As a result, transportation plans such as Transplan must demonstrate with enforceable, permanent, funded controls that the area will stay under the CO emissions budget in the SIP. Consequences of not being able to demonstrate conformity are that the area would not be able to get federal approval for any regionally significant transportation projects, including transit and highway projects. Cole explained further that

there are two kinds of conformity. There is the plan conformity and also a project level conformity which deals with projects on arterials and requires that modeling be performed to ensure that the project will not result in violation of the standards. Cole commented that LCOG, as the lead agency for the CO SIP, is very conscientious about making sure that any such projects meet the area's CO budget.

Sorenson asked how much impact there is on Lane County's airshed from activities in Asia or Latin America or the East Coast. Cole replied that the dilution factor of crossing 6,000 miles of turbulent Pacific Ocean means that there is little impact from Asia. There are other barriers to the east and south. Cole said she believes most of the carbon monoxide, ozone, and particulate in Lane County are generated in Lane County; but the county does receive some of its pollution from other communities in the Willamette Valley, such as Salem and Portland.

Sorenson asked about whether roadside testing of random vehicles could be used to ease into an inspection and maintenance program. Cole responded that a voluntary program based on onboard diagnostics could be done as a first step if LRAPA were to set up a diagnostics station in the parking lot. They could get some kind of sticker or something to indicate that the vehicle passed the test. Chartier suggested that a good starting point could be vehicles belonging to public agencies funded by taxpayers, such as cities, the county, and schools. Cole said large industries might choose to participate, as well. Sorenson asked if people could receive \$5 for bringing in a vehicle that passed the test, and Cole said that would be an incentive, provided LRAPA had the funding for it. Another possibility would be a tax credit for a business whose fleet is certified to meet the emission standards. Cole added that the real cost of gasoline should be charged at the pump. The truer cost of \$4 or \$5 per gallon would be a good incentive to drive less or to develop and use alternative technologies.

Cole explained that EPA requires that onboard diagnostic systems be installed at the factory into all vehicles sold in the United States, starting with model year 1998. A computer can be plugged into the system to get a readout of all the fault codes to determine whether the vehicle has emission problems or not. The system also measures and reports what the emissions are in the combustion chamber and in the tailpipe. The onboard diagnostic system will not only communicate with the computer at a testing center, it will also tell the driver, through dashboard message lights, when a particular system needs to be checked. An inspection program for those vehicles will be much easier and less costly than for older vehicles which don't have the onboard diagnostics. The purpose of Inspection/Maintenance (I/M) programs is to find people who would not otherwise maintain their vehicles to keep emissions at a minimum and require them to do so. An I/M program which test vehicles without onboard diagnostic systems will become obsolete as there are more post-1998 vehicles on the road and less of the older vehicles. Because the fleet rolls over in about five years, and it would be a long time before Lane County will violate the transportation-related standards, Cole said it would make sense for Lane County to wait and institute an onboard diagnostics Inspection/Maintenance program.

Because some of the board members had other commitments this afternoon, the discussion of mobile sources was ended so that the board could discuss the next agenda item.

10. DISCUSSION AND POSSIBLE ACTION--DIRECTOR HIRING PROCESS: Cold asked whether the board wished to appoint a committee to score the applications and, if so, who should comprise the committee. The committee which scored the applications in 1997 included two board members, two advisory committee members (Paul Engelking representing the environmental community and Dave Seluga representing the industrial community), and the DEQ air program administrator.

The board decided it is not necessary to have DEQ represented on the current committee. They also decided that the two advisory committee members should serve again if possible. Cole said she would ask Paul Engelking if he would be willing to serve again and felt confident that he would agree. She said that Dave Seluga might not be available since he has taken a job in Portland. Leiken suggested that Russ Ayers, who regularly attends LRAPA board meetings and is very familiar with the agency and with the industrial community, would make a good appointee to the scoring committee. Other board members agreed. Ayers said he would be willing to serve. Cole suggested that staff members Grecia Castro (Operations Manager) and Jerry Boyum (Technical Services Manager) be asked to score the applications. Board members agreed and said they also wanted Cole to be on the committee.

Cole suggested that Banks do a quick initial sorting to eliminate applicants who lack the basic requirements for the position. The applications will then have the names blanked out, and copies will be sent out to the scoring committee members. When the score sheets are returned, Banks will produce a composite scoring for each applicant. The board will be given copies of all applications, along with the individual score sheets and a composite for each applicant, to consider when they decide which applicants to interview. Sorenson suggested that the applicants who are immediately screened out be notified as to why their applications are not being accepted, and telling them to contact the agency if they feel the agency is mistaken and that they do meet the requirements.

Sorenson suggested that the scoring committee meet and score the applications together to get the benefit of group discussion. Banks responded that having the committee members score the applications independently works well. There is a natural break that becomes evident when you compare the scorings, with a few applicants clustered at the top and the rest divided by a gap in the total scores. Sorenson asked what would be the down side of asking all staff members to score the applications, and Cole responded that the only down side would be the time it would take to complete the process, and the time it would take away from employees' jobs. Taylor added that the more people you have doing the scoring, the more complicated the process becomes.

**ACTION: MSP (SORENSEN/CHARTIER)(UNANIMOUS) APPOINTMENT OF A FIVE-MEMBER APPLICATION SCORING COMMITTEE, TO INCLUDE RUSS AYERS, JERRY BOYUM, GRECIA CASTRO, BARBARA COLE, AND PAUL ENGELKING. (If Engelking is not available, Cole is to have discretion to choose another environmental representative.) THE GOAL OF THE COMMITTEE IS TO SCORE THE APPLICATIONS TO PROVIDE A RANKED LIST OF APPLICANTS FOR BOARD DISCUSSION.**

The board decided that the applications should be given to the scoring committee by Friday, October 22, and that the scored applications should be returned to staff by Friday, October 29. There was some discussion of when to meet to discuss the applications prior to the November 9 board meeting. Due to scheduling conflicts on the morning of November 9 and plans to have a combination reception for Cole and open house for the new lab on the afternoon of November 9, the board decided to meet in executive session on Monday, November 8, at 12:15 p.m. Board members decided to start the November 9 board meeting at 2:00 instead of the normal 12:15 start time, and to follow the meeting with a reception/open house from 4:00 to 6:00 p.m.

10: NEW BUSINESS: Cole informed the board that she had accepted a position with the Port of Seattle and that they wanted her to begin work on November 1. She asked if the board would object to her

leaving a few days earlier than her original November 9 departure date. She said she would be back for the executive session on November 8 and the November 9 board meeting and reception/open house.

**ACTION: MSP (SORENSEN/LEIKEN)(UNANIMOUS) ACCEPT COLE'S RESIGNATION AS OF OCTOBER 29 INSTEAD OF NOVEMBER 9, WITH THE UNDERSTANDING THAT SHE WILL RETURN FOR THE NOVEMBER 8 AND NOVEMBER 9 MEETINGS.**

Cole added that she is still very committed to providing whatever assistance she can to the interim director and new permanent director, for as they long as she is needed.

11. **ADJOURNMENT:** The meeting adjourned at 2:35 p.m. The board will meet in executive session on Monday, November 8, at 12:15 p.m., to discuss the applications for the director position. The next regular meeting of the LRAPA Board of Directors is scheduled for Tuesday, October 12, 1999, and will begin at 2:00 p.m., to accommodate a 4:00--6:00 p.m. farewell reception for Barbara Cole and open house for the new lab space at 1010 Main Street in Springfield, Oregon.

Respectfully submitted,



Merrie Dinteman  
Recording Secretary



## MEMORANDUM

**TO:** Interested Persons

**FROM:** Merrie Dinteman, <sup>MR</sup>LRAPA Rules Coordinator

**DATE:** August 24, 1999

**SUBJ:** Public Hearing and Request for Re-adoption of Amendments to LRAPA Open Burning Rules (Title 47) and Associated Amendment to Definitions (Title 12)

The LRAPA Board of Directors adopted amendments to LRAPA Title 47 and associated changes to Title 12 on March 9, 1999. The notices of the public hearing which were published in local newspapers did not specify that the amendments, if adopted, would be submitted to EPA for inclusion as a revision to Oregon State Implementation Plan. The amendments are valid as adopted and are in force at this time; however, in order for the EPA to be able to approve them as a SIP revision, the hearing notice must be published again with the SIP revision language, and the amendments must be re-adopted by the board.

### PUBLIC HEARING SCHEDULED

The board will be asked to re-adopt the rules at a public hearing:

Date: October 12, 1999  
Time: 12:15 p.m.

Place: LRAPA Meeting Room  
1010 Main Street  
Springfield, Oregon

Notice of this hearing is being published again, with the SIP wording inserted. No new language is being added to either Title 47 or Title 12. If you wish to comment on this proposed action, you may testify at the October 12, 1999 hearing or submit written comments at any time up to October 12 to:

Board of Directors  
Lane Regional Air Pollution Authority  
1010 Main Street  
Springfield, OR 97477

Any written comments submitted on the day of the hearing must be presented orally to the board.

## BACKGROUND INFORMATION

For your reference, the following is an abbreviated and revised version of information presented at the March 9, 1999 public hearing when the amendments were adopted.

**Need for Amendments:** LRAPA staff has been encouraged by the Board of Directors to increase revenues through user fees to provide additional support for the program and to provide an economic incentive for alternatives to open burning. The amendments accomplished those goals and incorporated a request from Lane County Fire District #1 to expand the area of its district to be included in the control area for seasonal and other restrictions on open burning. Some administrative changes and corrections were also made.

**Adopted Changes:** The amendments adopted a fee rate based upon the amount of material to be burned. The rate of \$4 per cubic yard is equivalent to the land fill fee and is greater than the \$2.50 per cubic yard fee charged by local vegetative material recyclers. This is intended to provide some incentive for alternative disposal. In addition, it is also more equitable requiring higher fees from the large waste generators than the current flat rate of \$100. Permits for burning standing vegetation for the purpose of wetland preservation also now have a flat rate fee of \$100. These permits previously required no fee.

The specific adopted changes are as follows:

47-010. The general definition of "Residential Open Burning" is corrected to include leaves and grass clippings. These are specifically prohibited only in some geographical areas in Lane County.

47-010. The name "Eugene-Springfield Urban Growth Area (ESUGA)" is changed to read "Eugene-Springfield Urban Growth Boundary (ESUGB)", and throughout the rest of Title 47. This change is also made in the definition of "Eugene-Springfield Urban Growth Area" in Title 12.

47-015-2F(10). At the request of Lane County Fire District #1, the portion of their district included in the control area is expanded.

47-015-2.F. The "note" in parentheses at the end of the subsection is amended to state that fire districts may restrict burning whenever fire danger dictates.

47-015-2H. The term "shall" is replaced with "may" to more accurately depict the actual enforcement of these rules.

47-015-6B(5)a. The reference to OAR is corrected.

47-020-2. Letter permits for burning of standing vegetation to preserve wetlands have a fee of \$100. These previously had no fees.



Public Hearing and Request for Re-adoption  
Amendments to LRAPA Titles 12 and 47

47-020-4. Letter permit fees changed from the a flat rate of \$100 to \$4 per cubic yard (with a minimum fee of \$50) and owner/occupants burning construction or demolition waste are now charged a fee.

47-030. In the first column, "Type of Burning," in the category of Forest Slash Open Burning in the last horizontal row, the phrase, "except on lands included in the ODF Smoke Management Plan," is added.

**Differences Between Proposed LRAPA Rule Change and DEQ Rule:** OAR 340-023-0100(11) sets letter permit fees for the DEQ at \$20 for a single season and \$30 for a calendar year, and are for yard debris only. The LRAPA fees for letter permits are greater than the DEQ fees, and are charged for all types of burning described in Section 47-020, Letter Permits.

**Rulemaking Justification Questions:**

1. Are there state requirements that are applicable to this situation? If so, exactly what are they?

Response: No. LRAPA sets its permitting fees independent of the State DEQ.

2. Are the applicable state requirements performance-based, technology-based, or both with the most stringent controlling?

Response: Not applicable since these changes affect only fees and not control measures.

3. Do the applicable state requirements specifically address the issues that are of concern in Lane County? Was data or information that would reasonably reflect Lane County's concern and situation considered in the state process that established the state requirements?

Response: Not applicable since state requirements are not applicable.

4. Will the proposed requirement improve existing requirements or prevent the need for costly retrofit to meet more stringent future requirements?

Response: Not applicable since these changes affect only fees and not control measures.

5. Is there a timing issue which might justify changing the time frame for implementation of state requirements?

Response: Not applicable since state requirements are not applicable.

6. Will the proposed requirement assist in establishing and maintaining a reasonable margin for accommodation of uncertainty and future growth?

Response: Not applicable since these changes affect only fees and not control measures.

7. Does the proposed requirement establish or maintain reasonable equity in the requirements for various sources (level the playing field)?

Response: Yes. One of the primary purposes of the changes is to improve the equity.

8. Would others face increased costs if a more stringent rule is not enacted?

Response: Not applicable since these changes affect only fees and not control measures.

9. Does the proposed requirement include procedural requirements, reporting or monitoring requirements that are different from applicable state requirements? If so, why? What is the "compelling reason" for different procedural, reporting or monitoring requirements?

Response: Not applicable since these changes do not affect procedural, reporting or monitoring requirements.

10. Is demonstrated technology available to comply with the proposed requirement?

Response: Not applicable since these changes do not require any new technology.

11. Will the proposed requirement contribute to the prevention of pollution or address a potential problem and represent a more cost-effective environmental gain?

Response: Yes. These changes are designed to promote alternatives to open burning.

**Legal Authority:** ORS 183, 468.020, 468A.135; OAR 240-011-0010; LRAPA Titles 13, 14, 47

**Principal Documents Relied Upon:**

1. Attorney General's Uniform and Model Rules of Procedure
2. LRAPA Title 14
3. LRAPA Title 47

**Fiscal and Economic Impact of Amendments:**

Industry: Depending upon the amount of material to be burned, the fee changes result in increases or decreases from the previous flat rate fee.

Public: The fee changes require the general public to pay fees that they previously were not charged.

LRAPA: The additional will recover a greater percentage of the cost of operating the program. The fee increase results in a need for greater LRAPA public education and compliance efforts, short-term.

Other Government Agencies: The fee changes require some government agencies to pay fees that they previously were not charged.

**Land Use Consistency Statement:** The rule amendments are consistent with land use as described in applicable land use plans in Lane County.

**Public Comment Process for March 9 Adoption:** An initial proposal was presented to the LRAPA Advisory Committee to get their input before preparing the formal proposal. A description of the proposed amendments was then sent out to LRAPA's mailing list of interested persons in early December of 1998. Copies of the actual draft amendments accompanied the description sent to all fire departments issuing burning permits in Lane County, as well DEQ's Air Quality Division in Portland and EPA Region 10 in Seattle for their review and comment. LRAPA received authorization from DEQ to serve as hearings officer for EQC, and this was a concurrent LRAPA/EQC hearing. Staff received LRAPA board authorization on January 12, 1999 to hold public hearing on these amendments on March 9, 1999. Notice was published in the February 1, 1999 edition of the Secretary of State's Oregon Bulletin. The notices published in the January 27, 1999 editions of the Eugene Register Guard, the Cottage Grove Sentinel, and the Springfield News, and the January 28, 1999 edition of the Oakridge Dead Mountain Echo were the ones which did not indicate that these amendments would be included in Oregon's SIP.

Comments received from all sources were evaluated and, where appropriate, incorporated into the revised draft amendments. Following the public hearing, the LRAPA Board adopted the rules, as proposed.

**AGENDA ITEM NO. 7**

**LRAPA Board of Directors Meeting**

**March 9, 1999**

**TO:** Board of Directors

**FROM:** Barbara J. Cole, Director

**SUBJ:** Public Hearing and Request for Adoption of Proposed Amendments to LRAPA Open Burning Rules (Title 47) and Associated Amendment to Definitions (Title 12)

**NEED FOR AMENDMENTS**

LRAPA staff has been encouraged by the Board of Directors to increase revenues through user fees to provide additional support for the program and to provide an economic incentive for alternatives to open burning. The proposed amendments would accomplish those goals and would incorporate a request from Lane County Fire District #1 to expand the area of its district to be included in the control area for seasonal and other restrictions on open burning. The proposal also includes some administrative changes and corrections.

**PROPOSED CHANGES**

The staff is proposing a fee rate based upon the amount of material to be burned. The proposed rate of \$4 per cubic yard is equivalent to the land fill fee and is greater than the \$2.50 per cubic yard fee charged by local vegetative material recyclers. This should provide some incentive for alternative disposal. In addition, it will also be more equitable requiring higher fees from the large waste generators than the current flat rate of \$100. The staff is also proposing that permits for burning standing vegetation for the purpose of wetland preservation have a flat rate fee of \$100. These permits currently require no fee.

The proposed changes are as follows:

47-010. The general definition of "Residential Open Burning" is corrected to include leaves and grass clippings. These are specifically prohibited only in some geographical areas in Lane County.

47-010. The name "Eugene-Springfield Urban Growth Area (ESUGA)" is changed to read "Eugene-Springfield Urban Growth Boundary (ESUGB)", and throughout the rest of Title 47. This change is also made in the definition of "Eugene-Springfield Urban Growth Area" in Title 12.

47-015-2F(10). At the request of Lane County Fire District #1, the portion of their district included in the control area is expanded.

47-015-2.F. Amend the “note” in parentheses at the end of the subsection to state that fire districts may restrict burning whenever fire danger dictates.

47-015-2.H. The term “shall” is replaced with “may” to more accurately depict the actual enforcement of these rules.

47-015-6B(5)a. The reference to OAR is corrected.

47-020-2. Letter permits for burning of standing vegetation to preserve wetlands would have a fee of \$100. These currently have no fees.

47-020-4. Letter permit fees would change from the current flat rate of \$100 to \$4 per cubic yard (with a minimum fee of \$50) and owner/occupants burning construction or demolition waste will now be charged a fee.

47-030. In the first column, “Type of Burning,” in the category of Forest Slash Open Burning in the last horizontal row, add the phrase, “except on lands included in the ODF Smoke Management Plan.”

#### DIFFERENCES BETWEEN PROPOSED LRAPA RULE CHANGE AND DEQ RULE

OAR 340-023-0100(11) sets letter permit fees for the DEQ at \$20 for a single season and \$30 for a calendar year, and are for yard debris only. The proposed LRAPA fees for letter permits will be greater than the DEQ fees, and will be charged for all types of burning described in Section 47-020, Letter Permits.

#### RULEMAKING JUSTIFICATION QUESTIONS

1. Are there state requirements that are applicable to this situation? If so, exactly what are they?

Response: No. LRAPA sets its permitting fees independent of the State DEQ.

2. Are the applicable state requirements performance-based, technology-based, or both with the most stringent controlling?

Response: Not applicable since these changes affect only fees and not control measures.

3. Do the applicable state requirements specifically address the issues that are of concern in Lane County? Was data or information that would reasonably reflect Lane County’s concern and situation considered in the state process that established the state requirements?

Response: Not applicable since state requirements are not applicable.

4. Will the proposed requirement improve existing requirements or prevent the need for costly retrofit to meet more stringent future requirements?

Response: Not applicable since these changes affect only fees and not control measures.

5. Is there a timing issue which might justify changing the time frame for implementation of state requirements?

Response: Not applicable since state requirements are not applicable.

6. Will the proposed requirement assist in establishing and maintaining a reasonable margin for accommodation of uncertainty and future growth?

Response: Not applicable since these changes affect only fees and not control measures.

7. Does the proposed requirement establish or maintain reasonable equity in the requirements for various sources (level the playing field)?

Response: Yes. One of the primary purposes of the changes is to improve the equity.

8. Would others face increased costs if a more stringent rule is not enacted?

Response: Not applicable since these changes affect only fees and not control measures.

9. Does the proposed requirement include procedural requirements, reporting or monitoring requirements that are different from applicable state requirements? If so, why? What is the "compelling reason" for different procedural, reporting or monitoring requirements?

Response: Not applicable since these changes do not affect procedural, reporting or monitoring requirements.

10. Is demonstrated technology available to comply with the proposed requirement?

Response: Not applicable since these changes do not require any new technology.

11. Will the proposed requirement contribute to the prevention of pollution or address a potential problem and represent a more cost-effective environmental gain?

Response: Yes. These changes are designed to promote alternatives to open burning.

#### LEGAL AUTHORITY

ORS 183, 468.020, 468A.135; OAR 240-011-0010; LRAPA Titles 13, 14, 47

## PRINCIPAL DOCUMENTS RELIED UPON

1. Attorney General's Uniform and Model Rules of Procedure
2. LRAPA Title 14
3. LRAPA Title 47

## FISCAL AND ECONOMIC IMPACT OF PROPOSED AMENDMENTS

Industry: Depending upon the amount of material to be burned, the proposed fee changes may result in increases or decreases from the current flat rate fee.

Public: The proposed fee changes would require the general public to pay fees that they currently are not charged.

LRAPA: The additional fees will recover a greater percentage of the cost of operating the program. The proposed fee increase will result in a need for greater LRAPA public education and compliance efforts, short-term.

Other Government Agencies: The proposed fee changes would require some government agencies to pay fees that they currently are not charged.

## LAND USE CONSISTENCY STATEMENT

The proposed rule amendments are consistent with land use as described in applicable land use plans in Lane County.

## PUBLIC COMMENT PROCESS

An initial proposal was presented to the LRAPA Advisory Committee to get their input before preparing the formal proposal. A description of the proposed amendments was then sent out to LRAPA's mailing list of interested persons in early December. Copies of the actual draft amendments accompanied the description sent to all fire departments issuing burning permits in Lane County, as well as DEQ's Air Quality Division in Portland and EPA Region 10 in Seattle for their review and comment. LRAPA received authorization from DEQ to serve as hearings officer for EQC, and this is a concurrent LRAPA/EQC hearing. Staff received LRAPA board authorization on January 12, 1999 to hold public hearing on these amendments on March 9, 1999. Notice was published in the February 1, 1999 edition of the Secretary of State's Oregon Bulletin, the January 27, 1999 editions of the Eugene Register Guard, the Cottage Grove Sentinel, and the Springfield News, and in the January 28, 1999 edition of the Oakridge Dead Mountain Echo.

Comments received from all sources have been evaluated and, where appropriate, incorporated into these revised draft amendments. Details of LRAPA's responses to comments received and any

resulting revisions to the rulemaking proposal are included elsewhere in this report. Following the public hearing, the LRAPA Board will be asked to adopt the rules, either as proposed or with any changes deemed necessary in response to information received at the hearing.

## COMMENTS RECEIVED AND LRAPA RESPONSES

The following comments have been received. Copies of the letters are attached.

1. Jane G. Novick, 04881 Harry Taylor Road, Eugene, OR 97405.

Comment: Why should there be a flat fee for wetland preservation burning while fees for other types of burning are to be based on the amount of material to be burned?

LRAPA Response: Burning of standing vegetation for the purpose of wetland preservation is not a disposal process like other forms of burning requiring fees. Therefore, this fee serves only to partially reimburse LRAPA for administrative costs. It is not an incentive to encourage alternative methods of disposal.

Comment: Since wetlands are supposed to be protected, why is such burning allowed at all?

LRAPA Response: Periodic fires were a natural part of the ecosystem prior to civilization arriving in the Willamette Valley. The various groups which are trying to restore and maintain native plant species are experimenting with fire as a tool in this process.

Comment: Why should any industry experience a decrease in fees depending on the amount of material to be burned?

LRAPA Response: Only by burning a very small amount of waste would an industry experience a decrease in fees, and based upon the experience of the agency such an occurrence would be highly unlikely. It would be more likely for an individual home owner to burn a small amount, and in the interest of equity, the fees for both industry and homeowner should be the same.

2. Dan Shults, Oregon Department of Forestry, Eastern Lane Div., 3150 Main Street, Springfield OR 97478.

Comment: Regarding the residential open burning season October 15 through June 15, the open burning period may vary where fire danger dictates. The fire districts have prohibited burning as early as the first week of May and as late as November 1.

LRAPA Response: There is often confusion when the Fire Defense Board, or individual fire districts, choose to prohibit burning before the end of LRAPA's burning season or after the beginning of the season. When the Fire Defense Board notifies LRAPA that Lane County fire districts have cut off open burning due to high fire danger, LRAPA will also prohibit open



burning, and the telephone advisory line will give out that information. It is not as simple when an individual fire district chooses to prohibit burning when others do not. In that case, LRAPA cannot provide adequate advisory information to all individuals calling the advisory line to determine whether they are able to burn on a given day. Subsection 47-015-2 states that the residential open burning season is October 15 through June 15, and then lists various restrictions. Staff is proposing to add language to Subsection 47-015-2.F which states that fire districts may restrict burning whenever they deem it to be necessary due to high fire danger.

Comment: Reference to OAR 629-604-0170(1)(a) needs to be changed to reflect recent changes in that section of OAR.

LRAPA Response: This change is made in the draft amendments.

Comment: The Forest Slash Open Burning section of the table in Section 470-030 contains some incorrect information and should be changed as follows:

- A. Some areas within the ESUGB are also within an ODF Forest Protection District, and burning could be allowed in those areas under an ODF burning permit.
- B. An ODF burning permit is required for forest slash burning on property within an ODF Forest Protection District and outside the ESUGB. A LRAPA letter permit is not required.
- C. Forest slash burning in "all other areas" would include lands both inside and outside ODF Forest Protection Districts. Any land regulated under ODF Smoke Management Plan would be regulated by ODF and not require a LRAPA permit.

LRAPA Response: As stated in Subsection 47-015-6, lands covered by the Oregon Smoke Management Plan are regulated by the Department of Forestry and are therefore exempt from LRAPA rules. Staff is proposing to add the clarifying phrase, "except on lands included in the ODF Smoke Management Plan," relative to each of the categories on the last horizontal section of the table in Section 47-030, to make it clear that the LRAPA restrictions apply only on lands outside ODF jurisdiction.

3. Russell Ayers, Weyerhaeuser Containerboard Packaging, PO Box 275, Springfield, Oregon 97477.

Comment: Weyerhaeuser Company's current Air Contaminant Discharge Permit, which was issued by LRAPA, contains a condition which provides for plant site emergency heating for freeze protection. This provision only allows the use of portable propane or kerosene heaters which the company originally believed would be adequate. However, the company now says that this heating practice was not adequate for the cold temperatures this area experienced in December, 1998. They wish to return to their previous practice of burning presto logs in 55-gallon burn barrels, and are currently discussing a possible permit modification with

LRAPA staff. The company is suggesting that LRAPA's open burning rules (Title 47) be modified to provide a general exemption for industrial emergency heating.

LRAPA Response: Staff is currently discussing the situation with Weyerhaeuser, and no final determination of a possible permit modification has been made. Staff believes that Weyerhaeuser's situation is unique and that there is not justification to include in the open burning rules a general exemption for industrial emergency heating. This situation can best be handled through the permitting process on a case-by-case basis.

#### OPTIONS FOR BOARD ACTION

1. Do nothing. The rules will remain as they are, and LRAPA will not be able to recover more of the costs of operating open burning related activities. Since the current budget relies somewhat on increased cost recovery, the projected deficit at the end of the current fiscal year would be greater.
2. Request that staff revise the proposal and bring it back to the board at a future date. Based on comments received to date, this option is not likely to result in significant improvement to the proposal.
3. Adopt the proposed amendments with changes based on comments received.
4. Adopt the proposed amendments as presented.

#### DIRECTOR'S RECOMMEND

The director recommends that the amendments be adopted under either option 3 or option 4, whichever is more appropriate following the hearing.

REJ/mjd

## MINUTES

LANE REGIONAL AIR POLLUTION AUTHORITY  
BOARD OF DIRECTORS MEETING  
TUESDAY--MARCH 9, 1999  
LRAPA Meeting Room  
1010 Main Street  
Springfield, Oregon

### ATTENDANCE:

**Board:** Al Johnson, Chair--Eugene; Jim Chartier--Eugene; Sid Leiken--Springfield; Pat Patterson--Cottage Grove/Oakridge; Betty Taylor--Eugene; Gary Whitney--At-Large (ABSENT: None)

**Staff:** Barbara Cole--Director; Sharon Banks; Grecia Castro; Merrie Dinteman; Tom Freeman; Drew Johnson; Ralph Johnston; Kim Metzler; John Morrissey; Sayf Munir; Laura Wipper

1. **OPENING:** Johnson called the meeting to order at 12:18 p.m.
2. **MINUTES:** Sorenson noted that on page 1, under election of officers, the minutes stated that he had asked why it was necessary to elect a vice-chair. He asked that the minutes be corrected to reflect that the question was actually whether election of a vice-chair is mandated by LRAPA's charter or by law, or whether it is a matter board custom.

**ACTION: MSP(SORENSEN/TAYLOR)(UNANIMOUS) APPROVAL OF FEBRUARY 9, 1999 MINUTES, AS CORRECTED.**

3. **EXPENSE REPORTS:** Banks reported that General Fund grant revenues and expenditures are less at this time than what was projected. General Fund fee revenues are also less than projected, partly because asbestos notifications have not been as numerous as expected and because the open burning fee change has not yet gone into effect. Those fees were anticipated to be in place earlier in the current budget cycle. Nearly 100 percent of the Title V revenues have been collected, and some unanticipated construction fees should put Title V over 100 percent of budget for the current fiscal year.

**Asbestos Fees:** There was some discussion regarding getting word out to contractors regarding the need to check for and report asbestos, both friable and non-friable, and the fees associated with asbestos. Board members asked how contractors are notified of these requirements and fees. Staff responded that brochures are distributed to building departments to try to get the information out to anyone who might be doing demolition or renovation work which might bring them into contact with asbestos-containing materials. Staff has asked building departments to give LRAPA basic information about these types of jobs when they issue permits; however, the building departments have not been willing to do that. The Springfield building department does send LRAPA a copy of its monthly report of building activities which gives the number of demolition permits and building permits, new construction, remodels, etc.; but it is very general in nature and does not provide information necessary for LRAPA staff to stop by those projects to see if they are being done according to the asbestos rules. Sorenson commented that the building departments already have full workloads and probably view a request from another government entity, without offer of payment, as an intrusion. He suggested that if LRAPA staff offered to pay for specific reporting services, building departments might be more willing to provide the requested information. He stated that it is not fair to the people who are submitting notices and paying the fees to have others not being required to do the same; and there should be some way to get the information to change that. Freeman stated that, in addition to asbestos handling, new

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businesses coming into the area need to know what is necessary for them to comply with air quality permitting, and building departments could help with that. Leiken commented that the state builders' association membership is trying to comply with all environmental regulations and that compliance with environmental laws is seen as a good selling point for a new generation of home buyers who are aware of environmental concerns. Contractors who aren't members of the association are less likely to be aware of or comply with environmental regulations. Cole said staff will follow up with trying to establish a better reporting system to catch construction activities which fall under LRAPA's rules.

Airmetrics: Airmetrics had a slow month in February; but a large order billed the first part of March will bring those figures back up. Banks said Airmetrics is in the process of getting an MBA intern from the U of O to do a formal business plan for Airmetrics to try to focus on where marketing can be enhanced. Banks added that part of the discussion with the U of O was to try to develop a market for some of the products, such as Tedlar bags, which LRAPA can produce at very little cost and realize a larger profit. Cole said that development of a business plan was one of the ideas that came out of the budget process last year and is being followed up now. In response to board inquiry, Banks said Airmetrics has a rental program for people who want to use the samplers but don't wish to purchase them. There is also some older equipment which can be loaned to people who can't afford to purchase the samplers. In addition, EPA has a repository of Airmetrics sampling devices which can be borrowed, either free or at very low cost, by non-profit organizations or government entities.

Cash Flow: DEQ's third quarter payment and some other revenues were received after the first of March and so were not included in the report for the period ending February 28. At the time of this meeting, the cash flow is about where it was projected to be at this time.

Permit Fees: The board also discussed the issue of permit fees, in light of the PW Pipe item on this agenda. (See PW Pipe, Agenda Item Number 6.)

State/Federal Funding for LRAPA: Cole reported that LRAPA has about 10 percent of the population and 16 percent of the permitted industrial facilities in the state, but is receiving only 3 percent of the state general fund appropriation for air quality from DEQ. The state's appropriation was reduced by the Legislature a number of years ago, and DEQ cut LRAPA's share accordingly. Since then, the appropriation has increased, but the amount DEQ has passed through to LRAPA has remained at the reduced level. Sorenson asked who alerts the state legislative delegation to this situation, and Banks said that at this point staff is trying to deal with it internally by asking DEQ for 10 percent of the state's appropriation for air quality. In addition, EPA awards a base grant each to the state, and DEQ passes part of that through to LRAPA. The amount of the federal grant received by LRAPA has remained at the same level since 1990 even though the amount awarded by EPA has increased steadily since that time. LRAPA has the option to negotiate its own base grant directly with EPA rather than having the state pass the funding along. LRAPA might want to explore that further in the future.

**ACTION: MSP (TAYLOR/CHARTIER)(UNANIMOUS) APPROVAL OF EXPENSE REPORTS THROUGH FEBRUARY 28, 1999 AS PRESENTED.**

4. **ADVISORY COMMITTEE:** Metzler reported that the committee met in February but did not have a quorum. Members present discussed preparation for the strategic planning process. Four committee members will be full participants in that process.

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Metzler pointed out a new display board which was designed and developed for LRAPA to help teach people about sources of air pollution and things that individuals can do to help keep the air cleaner. She said the display was used at a recent teachers' workshop, as well as a Business Expo at the Gateway Mall. It is to be set up in schools and lobbies of buildings such as banks and public service buildings where there is high traffic and people have time to look at it. Taylor asked what grade levels are to be targeted. Metzler said she and Wipper talked to children who stopped to look at it at the Expo, and it seemed that the nine-year-olds were the youngest ones who really looked at it. She said she plans to start with third or fourth grades.

5. PUBLIC PARTICIPATION: None.

6. REQUEST BY PW PIPE TO REDUCE ITS AIR CONTAMINANT DISCHARGE PERMIT FEES: PW Pipe has an Air Contaminant Discharge Permit issued by LRAPA. The annual Permit Compliance Determination fee last year was \$1,000. Following amendments to LRAPA's permit fee schedule, this year's annual Permit Compliance Determination fee was billed at \$4,400, an increase of 440 percent. Additionally, PW Pipe's request for board review pointed out that the DEQ fee for this same source category is only \$2,243. Banks said that, overall, LRAPA's ACDP permit fees are 84 percent of what DEQ's ACDP fees were at the time the LRAPA's fee schedule was changed in 1998; but there are some source categories which, due to complexity of the source and corresponding work to process the application and write the permit, are categorized by LRAPA at either more or less than 84 percent of the state's fees. Banks added that the current DEQ fee for this subcategory is disproportionately lower than their other moderate subcategories. DEQ is currently considering another permit fee increase and is evaluating the fee for the category in question, which might be raised on their fee schedule as well.

Cole explained further that there are also some categories which previously had two subcategories, either "simple" or "complex." There are sources which did not readily fit into either of those subcategories, and a third, "moderate," subcategory was added as part of 1998's amendments to the fee schedule to more adequately reflect the complexity and workload associated with those sources. Some sources which were previously in the "complex" subcategory were dropped to the "moderate" subcategory, resulting in lower fees. Conversely, some sources which had previously been categorized as "simple" were raised to the "moderate" subcategory, resulting in higher fees. This is the situation with PW Pipe.

Whitney asked what factors enter into the decision to put a source into the moderate category, and what is different, now, that would cause LRAPA to put it into the simple category. Castro responded that each source category has a definition which includes some examples. One of the examples within this source category is air conveying systems, which includes PW Pipe. The problem here is that, while PW Pipe falls within the definition, the category is designed to catch high polluting sources which present air quality problems. PW Pipe is actually well controlled because the emissions are a useable product which is recovered and used in making the pipes.

Sorenson stated his understanding that permit fees are based on the complexity of permitting and inspection and determination of what type of source it is, as opposed to impact on the environment and on health. He asked if environmental and health impacts are taken into consideration. Cole responded that HAPs provisions take that into account, and sources of any of the 188 substances which Congress has determined are the most dangerous HAPs must pay fees on a per ton basis, rather than just the fee in a fee table. For other types of sources, environmental and health impacts are not a specific

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consideration. The fees are based on the amount of work which must be done to write the permit and perform the compliance activities for the source category.

As a way to avoid charges that LRAPA disproportionately assesses fees and is insensitive to the costs of doing business, Sorenson asked whether the board should set a policy to not allow LRAPA's permit fees to deviate more than a certain percentage up or down from DEQ's fees. Banks responded that LRAPA's source categories are not exactly the same as DEQ's. DEQ writes permits for some sources which LRAPA does not, and LRAPA write permits for some sources that DEQ does not. If there were such differences, Sorenson said staff could come back to the board and ask them to amend the policy. He suggested that a non-binding guideline would not intrude on the agency's flexibility. Chartier asked whether staff is sure that DEQ would always place a source in the same category as LRAPA would. Castro said she did not think this source would end up in a different source category here than with DEQ. The difference is in the levels that the two agencies permit. DEQ does not permit the small sources that LRAPA does. Cole suggested this could be reviewed as part of the budget cycle, and if there are fees that fall outside of that criteria, staff could explain why those fees are recommended, or could agree that maybe those fees are out of line and should be adjusted.

Taylor asked that this be placed on a future agenda, and that staff present a discussion of how Sorenson's suggested policy for limiting the difference between the fees charged by the two agencies would work, and what the advantages and disadvantages would be.

Castro said she wanted board guidance regarding how to handle this specific case. Johnson said the situation raises a question of fairness for him because staff has said the complexity of the permit puts it into the moderate category, and yet staff is now proposing to reclassify the source as simple.

Johnson asked if there were a representative of PW Pipe present who wished to address the board. Ron Gerrard, the plant manager, said he had two points to make. One is that the permit fee is based on the complexity of the permit. The reason that the permit is so complex is that the company has more emission points than they need, just to make sure that they are capturing every bit of particulate that is being moved by the system. He said he does not know how LRAPA calculates the amount of time and effort it takes to write the permit. PW Pipe personnel actually do the calculations, and it does not take \$4,000 worth of their time to do that. The other point Gerrard said he wanted to make was that PW Pipe has an environmental safety and health person who spends about 50 percent of her time making sure the facility is in environmental compliance with air and water quality permits and regulations. There is also a maintenance person who spends every day touring the facility to make sure that all equipment is operating properly. Everything is monitored with gauges, and the operation is clean. The company is very concerned that the fees have gone from \$1,000 to over \$4,000 when nothing about the facility has changed.

**ACTION: MSP(TAYLOR/SORENSEN)(6:1-CHARTIER,JOHNSON, LEIKEN, PATTERSON, SORENSON, TAYLOR IN FAVOR; WHITNEY OPPOSED) ADOPTION OF THE STAFF RECOMMENDATION TO RECLASSIFY PW PIPE TO THE SIMPLE SUBCATEGORY ON THE BASIS OF EMISSION LEVELS.**

Leiken said that, speaking from the business standpoint, he does not think the LRAPA board should just raise fees drastically. He said it should be done in smaller increments over several years to give the sources time to budget the necessary funds and to avoid losing LRAPA's good reputation for customer

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service. Patterson said he concurred completely and would like to see some justification for the fees going this high. He said that at some point he would like to see a definition of the difference between simple and complex and what the criteria are in both areas. Cole said staff will include that in the report for a future meeting.

Sorenson said he seconded the motion because he felt this should be a board decision if there's this much uncertainty as to how to categorize this source. He added that he thought this is a good example of what he spoke about earlier regarding using impact on public health or the environment as a criterion for establishing fees. People who put less into the atmosphere should be rewarded compared to those who put more into the atmosphere. Cole said staff can research that and include in its report some of the pros and cons. She said that, if fees were based on the level of risk, sources would want LRAPA to do a thorough job in describing where they fall on a risk continuum. She added that, while using risk assessment as a criterion for establishing permit fees is a good idea, conceptually, risk assessment is a very involved process and would greatly increase the cost of processing permits.

Whitney said the board discussed this last year during the rulemaking process and decided to use cost as a major criterion because it is more measurable and the information is more available. He said that while it was agreed that the fees should reflect the relative time and effort for permit processing, the board also felt strongly that LRAPA fees should remain below DEQ's as a policy. They had several options at the time and decided on bringing LRAPA's fees up to 84 percent of DEQ's. Whitney said he did not expect to see a 400 percent increase for one source, and he agrees that it is not a good policy step to have this happen to one of LRAPA's customers in the regulated community. On the other hand, Whitney said he does not know how the board can justify second-guessing the technical experts in the agency who have said this source belongs in the moderate category. He said his position is that if the source belongs in the moderate category, it should be left there. If the problem is the fee increase, the board should do something about that, such as waiving it for two years and instituting it incrementally to mitigate the economic impact. Banks said that would mean changing the fee table and going through the rulemaking and public comment and hearing process. Whitney said if that is the appropriate way to deal with this situation, then that is what the board should do. He said he had heard staff say they are not comfortable with the 440 percent fee increase but had not heard justification for taking the source out of the category. Cole explained further that the source does not fit into any well defined category and so is included in a source category which is intended to capture otherwise not classified sources that are problematic, in that their emissions are generally pretty high and not well controlled. She said maybe the solution is to, sometime in the future, create another category for the pipe manufacture done by PW Pipe.

Staff member John Morrissey said that one of the problems with this situation is that this is a relatively complex facility with 20 plus or minus baghouses, and so in there might be a lot of work in actually crafting the permit. That's done once every five years. On an annual basis, field staff works with the source on complaints and compliance determinations. Morrissey said he does not feel this facility warrants a \$4,400 annual fee due to the fact that it is so well monitored and controlled. He said maybe this facility should be put in the moderate category for permitting and in the simple category for compliance. Johnson asked if there is a need to change the fee table structure to accommodate businesses that don't fit into the existing categories. Cole said that Castro is already looking at that with the operations staff and that staff will review that as part of the regular budget cycle to make sure that it is still aligned. It got quite a bit out of alignment with DEQ from not having been changed since 1990, and the intent is to not let that happen again.

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Chartier said his understanding is that this company put in a lot of baghouses so that if they did have an emissions problem they would be able to control it and would not pollute the environment. By putting in all the extra baghouses, they made the permitting process more complex and expensive than it would be for this same type of facility without all the extra baghouses. He said it seems unfair to penalize a company which put in all the equipment to make sure that they wouldn't pollute, when someone else who doesn't put in the equipment pays a much smaller permitting fee and then just takes the chance that they will pollute the air and have to pay a fine.

Regarding having this placed on a future agenda, Sorenson said that, as one of the instigators of a future discussion, he does not want to have this subject put ahead of anything else that staff has scheduled for future board meetings.

7. **PUBLIC HEARING ON PROPOSED AMENDMENTS TO LRAPA TITLE 47 (OPEN BURNING RULES):** Staff member Ralph Johnston briefly explained that the main reason for these amendments was to change the fees for special letter permits to recover more of the costs of administering that program. Instead of the existing flat rate of \$100 for commercial and industrial open burning, the amendments would require the applicant to pay \$4.00 per cubic yard of material to be burned and would apply also to residential open burning of land clearing or demolition debris. The higher fees are also intended to provide economic incentive for alternatives to open burn, such as recycling. A second reason for the amendments was a request by the Lane County Fire District No. 1 to include all of that district in the seasonal restrictions of LRAPA's rules. The existing rules exclude that portion of the district which is west of Range 7 West. Other changes include minor wording changes for clarity and changes in rule references. Comments received, to date, and staff's responses were included in the staff report.

Patterson noted that forestry burning is mentioned in the rule and said he thought that kind of burning is under different rules. Johnston replied that it is, and that the Oregon Department of Forestry requested that clarifying language be put into these rule amendments. LRAPA's rules apply to slash burning only outside of ODF jurisdiction. Patterson also asked whether the fees apply to backyard burning; and Johnston said there would be a fee for residential open burning of land clearing debris or demolition debris, but the fee does not apply to backyard burning of residential yard debris.

Sorenson noted that the exemptions listed at the beginning of Title 47 include residential barbecues, agricultural open burning, and forest land burning that's regulated by the state's Smoke Management Plan. He asked whether Johnston had an estimate of the actual tonnage covered by LRAPA's open burning rules. Johnston replied that the city of Eugene has totally banned backyard burning. Inside the city limits of Springfield and inside the Eugene-Springfield UBG, burning can only occur on lots of half an acre or larger. The letter permits apply mainly to areas outside the UBG and outside of the BLM, Forest Service, and private forest lands covered by the state's Smoke Management Plan. He did not have an estimate of actual tonnage.

Patterson asked why LRAPA rules include letter permits for wetlands. Johnston said that since fire is a natural occurrence, it is being used to try to bring back some of the native plant species in wetlands areas. Permits for this type of burning have not included a fee before. The proposal would require a flat \$100 fee to help offset LRAPA's costs.



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**Public Hearing:** Johnson opened the public hearing at 1:37 P.M. Cole entered into the hearing record affidavits of hearing notice publication in the Eugene Register Guard, the Oakridge Dead Mountain Echo, the Cottage Grove Sentinel, and the Springfield News. She also entered a photocopy of the notice published in the February 1, 1999 edition of the Secretary of State's Oregon Bulletin. Johnson asked if anyone present wished to speak either in support of or in opposition to the proposed amendments to LRAPA Title 47. Hearing no comment, Johnson closed the public hearing at 1:39 p.m.

**Discussion:** Whitney expressed concern that most people will experience an increase in cost for open burning. Based on the previous discussion regarding the increased permit fees, Whitney wondered whether the board should take more time to be sure that the public is aware of the proposed increase in open burning fees. Staff suggested the procedure which was followed with a previous open burning rule change, where the rules did not take effect for several months following adoption, and a public information campaign took place during the interim to be sure that as many people as possible would be aware of the change before it took effect.

Taylor commented that people who have land clearing or demolition debris to dispose of don't have to burn it and pay the permit fee. They can recycle the material instead, which fits in with the agency's purpose to make the air cleaner.

Leiken said that the business community today is getting more involved in alternative types of technology, and there are different types of taxes levied on business to encourage conversion to the new technologies. He said he is very comfortable with saying that this is a way to reduce pollution and enhance air quality.

Sorenson said he is comfortable with the rule change but would like to think, if someone were truly adversely affected by this and for some reason could not change their behavior, the board would be open to listening to them and trying to help if possible. Johnson asked whether it would be possible to develop criteria for the board to use if someone came forward with a request for a reduction in fees based on hardship, so that all such requests would be treated equally. Cole responded that the rule could be modified again to include hardship criteria. Sorenson said he didn't think that should be built in at this time, but the board should be open to listening if people come forward and want to be heard. If a significant number of people give evidence that this fee is a hardship, the rule could be changed at some point in the future.

Sorenson asked what entities would request LRAPA's permission to do large amounts of burning which would result in the large fees. Cole said that, currently, there is an old mill site with dimensional lumber leftovers and land clearing debris which is being considered for installation of an RV park. They wish to burn about 3,000 square yards of material adjacent to a small community. Under the proposed fees schedule, instead of costing the current \$100, 3,000 square yards of materials would result in a permit fee of \$12,000. Cole commented that it is a matter of who assumes the cost of this type of disposal. Should the people who live adjacent to a large open burn have to assume the quality of life costs and health impact costs of the fire, or should the entity conducting the burn assume the cost or be required to really think through how they're disposing of the material.

Patterson said he thought the board should be very careful and should take the time to notify people that these fees are going into effect. He added that there will always be some people who will burn, no matter what, but people need to know about this ahead of time.

Cole agreed that the response of the public to the increased cost of permits is a very real concern, because it is not just the increased cost of a burning permit. There is also the cost of loading debris onto trucks and transporting it to a disposal site, and then paying the disposal fees. She said she expects staff and board members to hear about this as people become familiar with the new fees.

Cole went on to explain that the whole purpose of the rule amendment is to increase revenue to offset costs. The original staff proposal last year was to cover the added costs of running the agency through Air Contaminant Discharge Permit fee increases alone. The advisory committee and board wanted to spread the costs over multiple programs rather than just the industrial sources. That is why the asbestos fees were changed and open burning fee changes were proposed. Cole said it costs more than \$100 of staff time to deal with some of the larger open burning requests. During the permitting process, staff works with applicants to ensure that the burning is done as cleanly as possible under conditions that will minimize the health impact from the smoke. The purpose of the increase is to have the entities that cause the pollution assume the cost of managing the open burning permitting and oversight program. A side benefit of the increased fee is to encourage alternative disposal methods.

Whitney said he supports the change in the rules but feels strongly that there needs to be a phase-in period to let people know about the fee before it actually takes effect. Since the proposal has no phase-in, he said he would have to vote against it.

**ACTION: MSP (TAYLOR/LEIKEN)(4:3--CHARTIER, JOHNSON, TAYLOR AND SORENSON FOR; LEIKEN, PATTERSON AND WHITNEY AGAINST) ADOPTION OF THE PROPOSED AMENDMENTS TO LRAPA TITLE 47, WITH CHANGES BASED ON COMMENTS RECEIVED, TO TAKE EFFECT IMMEDIATELY UPON ADOPTION.**

Sorenson said that, even though he voted for the rule amendments, he would be very open to hearing any public concerns about being displaced or severely impacted. Johnson said he also would want to hear from any citizens who feel this places too great a hardship on them.

8. **LRAPA SALARY SURVEY:** Cole presented a brief background, stating that the board directed staff at the end of last year to evaluate how employees are compensated. Staff hired an independent third party contractor to look at the agency's compensation package, including both wages and benefits. The contractor met with staff earlier and shared her perspectives. The consultant provided recommendations in her written report for board consideration. Cole suggestion three options for how to proceed with this. Option 1 would be to just accept the consultant's recommendations without review. Some employees think this is the best thing to do because LRAPA spent the money to hire the consultant and should use the information she provided. Cole said she thinks the data needs to be examined more closely before any decisions can be made as to how to proceed. Option 2 would be to use the consultant's data and decide whether additional information is needed, then identify the markets in which LRAPA competes for staff when recruiting. All the information could be used to identify the market value of compensation packages for similar positions and calculate the percentage of market value of LRAPA's compensation package for each position. This option would also look at the difficulty of recruitment and retention for each position and the learning curve required for the different positions, as well as a routine wage review tied to the budget process. Option 3 would be to continue to adjust LRAPA wages to match DEQ wages, and use Option 2 or some similar method to determine wages for positions which have no DEQ counterpart. Cole said the board should establish a policy regarding whether LRAPA employee salaries and benefits should be at 100 percent of market value, or a different

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percentage. Staff needs to get information regarding what costs would be associated with maintaining a certain percentage, as well as whether there would be recruitment and/or retainability problems associated with particular positions, and how long it takes to bring new employees up to speed in different positions. Cole said that range changes are a routine part of the regular budget process, to see how closely LRAPA can match market value given the revenue realities of a particular budget year. She suggested that if the board decided to adjust the ranges of positions as recommended by the consultant, it would be best to prioritize them and start with those which are the most below market first. Cole also recommended that if any employees are currently being compensated at a rate higher than the market value, their wages not be cut, but that the salary be held at that level until the market catches up. Cole stated that each position goes through a comparison review every three years unless the employee or manager asked that it be done sooner. Since all positions have been evaluated at this time, Cole recommended having this type of independent review performed every three years for all positions.

Banks said she needs some general direction from the board as to how staff should proceed regarding salary adjustments, because the budget for the next fiscal year is being drafted, and she needs to be able to build in whatever the requirements are going to be.

Johnson commented that some of the urban areas with which the salaries were compared have a high cost of living. Banks responded that if you look at it nationwide, the Pacific Northwest is more expensive than a lot of other areas of the country. Johnson also had concerns about the actual comparability of the jobs with which LRAPA's positions were compared. He said Option 2 is a go-slow approach where you first look at the consultant's recommendations and then determine if the assumptions are valid. Johnson said he was concerned about what the financial impact would be if the board gives staff specific direction now. Cole said that is why staff should bring to the board specific information about what the different options would cost.

Taylor said she was ready to say that Option 2 sounded like the right choice, as recommended in the staff report; but from this discussion it appeared that staff didn't favor Option 2 after all. Banks said she thinks Option 2 is probably the right thing to do, but she is concerned that staff will perceive that management is substituting its own judgment and subjectivity and going out to find the numbers it needs to get its desired results.

Sorenson commented that he has been through this type of compensation survey before and has seen how they can drag on for a long time and generate a lot of ill will. He suggested another option, to be more aggressive in getting formal staff response to the report. If LRAPA is successful in getting its share of the federal grant and the state General Fund money, and if the increased fees generate more revenue, there might be enough to bring all positions up to 100 percent of the market rate. If there is not enough money to do that, at least you would have some buy-in from the people most affected. He said it didn't sound like it would be possible, right now, to make the adjustments. Banks said it might be possible to make minor modifications to those are the really out of line. She said the information/data management position is probably the most out of line with current market conditions. Cole said it will be necessary to look at the numbers before making that decision.

Staff member Drew Johnson said he had talked to a lot of staff members who felt that this report tried to present an independent third-party opinion but came across in almost all of its recommendations as being very subjective and not objective at all. Al Johnson asked if staff felt that the consultant

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misrepresented the information on the positions, and Drew Johnson said the data was analyzed, but some of the conclusions didn't seem to follow from the data.

Sorenson asked Cole what people's reaction has been to the consultant's report. Cole said she had heard everything from the opinion that the whole study is subjective and worthless to the opinion that LRAPA has paid a consultant to do this and the results should be used. Some people have said they think LRAPA employees are paid appropriately, and the agency has more important program needs than salary adjustments. Cole pointed out that this is difficult for an agency as small as LRAPA because, whereas with a large organization where you have a number of individuals in each position classification and therefore can depersonalize the study, with LRAPA's having only one person in quite a few of the positions, it becomes very personal. She said she has two large binders of the information upon which the consultant based her report and conclusions, and she has invited staff to look at the information upon which conclusions regarding their positions are based and talk to her if they have concerns about specific recommendations. Cole said that one of the steps in the process should be for her to sit down with each employee and the employee's manager and determine whether everyone agrees with the consultant's findings and, if not, why not.

Staff member Laura Wipper had several comments. First, she said she appreciates the effort to get staff comments. Second, she said that, coming from many years of working with state government, she knows that comparing LRAPA strictly with DEQ is not a fair comparison because state agencies do not compare favorably with local governments. State agencies train workers and then lose them to city and county governments because the state doesn't pay well enough to keep them. Another problem with comparing LRAPA and DEQ positions is that, because LRAPA is a small agency the employees perform a greater variety of duties and have more responsibilities than a comparable position with a large organization like DEQ. Third, Wipper said she felt that some of staff's feelings about salary comes from a perspective of how well your contribution is valued. There are different ways to value staff when salary is not an option, and perhaps that should enter into the discussion, as well.

Leiken said that, from his experience working with consultants, it seems to him that you can accept only about 50 percent of their recommendations. Regarding funding any salary adjustments, Leiken suggested that board members could lobby the legislature to require DEQ to give LRAPA the entire 10 percent of the General Fund appropriation to which it is entitled. Leiken said LRAPA should be aggressive about this, because the local agency should not have to suffer because the state agency is not passing the money through as it should. Banks explained that it is partly LRAPA's fault for not asking for an increase, resulting in LRAPA's having a flat appropriation of \$50,000 since 1990. DEQ's air quality director has assured LRAPA that DEQ is interested in rectifying the situation; however, Banks said she agrees that if they don't do it soon LRAPA needs to approach the legislature. She said she would like to let DEQ know that if they don't resolve this within the next three weeks, LRAPA board members will begin contacting legislators.

Johnson said it appeared to him that Banks needed direction from the board, and the board needs more information before moving forward with this. Banks said one thing the board could do would be to say whether they want LRAPA to be within a certain percentage of market value. Chartier said it is difficult for him to determine a percentage for LRAPA, because market value is not just wages but also includes such things as chances for promotion, working conditions, and training opportunities.

MINUTES: LRAPA BOARD OF DIRECTORS MEETING  
TUESDAY, MARCH 9, 1999

Johnson suggested an interim step to look at what the impact on the budget would be if the positions that are the most out of line according to the consultant's report were bumped up a step. Chartier asked whether staff agrees with the consultant's statements regarding which positions are the most out of line, and Cole said her conclusions did not match the consultant's exactly. She favors using Option 2 to take a closer look at the data and arrive at independent conclusions. Chartier asked if there was agreement that the data management position is the one that is the farthest out of line, and Banks said there was agreement on that.

Cole said staff needs guidance as to which approach to take because, if it is to be rectified this year instead of next year, staff will need to get through the process as quickly as possible to provide wage increases where they are needed.

Taylor said Option 2 appeared to be the best alternative and was also the staff recommendation and asked who would be doing the work. Banks said it would be herself, Cole and the management team.

Johnson said he would expect to perhaps fix some glaring problems but not necessarily solve all the problems within the next month. Cole agreed and said she sees this as something that is done repeatedly through time to ensure that LRAPA remains competitive with the market. She said staff needs to attempt to get this process done in time for the current budgeting process instead of waiting for next year's budget cycle to address these issues. Banks said she can prepare the budget with the appropriate increases included; and if LRAPA does not get its fair share from DEQ the increases in salaries can be taken out of the proposed budget. Johnson asked whether the additional clerical person that is to be in the budget will be taking over duties from other clerical staff, and Banks said that will be a permanent position for work that has been funded with interns and work study students for which LRAPA pays only a part of the wages. There currently are not enough clerical people to do all the work that needs to be done.

**ACTION: MSP(TAYLOR/LEIKEN)(UNANIMOUS) APPROVAL OF OPTION 2, TO USE THE CONSULTANT'S DATA AND DETERMINE WHETHER ADDITIONAL DATA IS NEEDED, THEN USE ALL DATA COMPILED TO CALCULATE THE PERCENTAGE OF MARKET VALUE OF LRAPA'S COMPENSATION PACKAGE FOR EACH POSITION, AND ADDRESS POSITION WAGE RANGE CHANGES AS A ROUTINE PART OF THE REGULAR BUDGET PROCESS.**

9. DIRECTOR'S REPORT: There were no questions or comments regarding the written director's report of agency activities.
10. OLD BUSINESS:

McKenzie Forest Products SFO (formerly Springfield Forest Products).

Cole reported that staff is working on some outstanding compliance issues with McKenzie Forest Products. The source has chosen to contest one of the enforcement actions, and that is scheduled for a March 31 hearing before a hearings officer. There have been four boiler opacity violations, and a significant Notice of Civil Penalty Assessment is being drafted. Because the new management has expressed a very strong interest in becoming environmentally responsible and managing the facility in a way distinctly different from the former management, LRAPA is working with them on an SFO under

M I N U T E S: LRAPA BOARD OF DIRECTORS MEETING  
TUESDAY, MARCH 9, 1999

which part of the civil penalty would be applied to installing control and monitoring equipment earlier than they would have otherwise. There was a fire in a cyclone the day of the February LRAPA board meeting, and staff is working with them to understand what happened and to put in place provisions to ensure that it doesn't happen again. There was a Notice of Non-Compliance several weeks ago for mass emission limits from a cyclone that became evident through a source test which LRAPA required them to do. That could be a substantial issue, and staff is working with them on that, as well. The facility is in compliance with the SFO at this time, and staff will continue to work with them on the other compliance issues.

Agency Housing: Banks reported that construction is progressing and should still come in under budget. Approximately half of the funding has been used, to date, and the move-in is currently projected for the first part of June. Banks said that the roof should be completed in a couple of weeks, after which subcontractors will move in to do their parts. The project should move more quickly from that point.

11: NEW BUSINESS: None.

12: ADJOURNMENT: The meeting adjourned at 2:38 p.m. There was to have been a presentation of the methodology for the strategic planning immediately following this meeting; however, by the time the meeting was several board members had left and others had other commitments. Wipper distributed a draft agenda for the March 16 and 19 performance management workshops. The next regular meeting of the LRAPA Board of Directors is scheduled for Tuesday, April 13, 1999, 12:15 p.m. in the LRAPA meeting room at 1010 Main Street in Springfield.

Respectfully submitted,



Merrie Dinteman  
Recording Secretary



## MEMORANDUM

To: Interested and Affected Parties

From: Barbara Cole, Director

Date: December 2, 1998

Subj: Proposed Rulemaking--Amendments to LRAPA Open Burning Rules (Title 47)

This rulemaking announcement is to alert interested parties to the proposed changes prior to beginning the public hearing process. The full proposal is being sent to local fire districts and other government agencies who conduct burning under these rules or issue permits for open burning.

### NEED FOR AMENDMENTS

The staff was encouraged by the Board of Directors to increase revenues through user fees to provide additional support for the program and to provide an economic incentive for alternatives to open burning.

### LEGAL AUTHORITY

ORS 183, 468.020, 468A.135; OAR 240-011-0010; LRAPA Titles 13, 14, 47

### PRINCIPAL DOCUMENTS RELIED UPON

1. Attorney General's Uniform and Model Rules of Procedure
2. LRAPA Title 14
3. LRAPA Title 47

### PROPOSED CHANGES

The staff is proposing a fee rate based upon the amount of material to be burned. The proposed rate of \$4 per cubic yard is equivalent to the land fill fee and is greater than the \$2.50 per cubic yard fee charged by local vegetative material recyclers. This should provide some incentive for alternative disposal. In addition, it will also be more equitable requiring higher fees from the large waste generators than the current flat rate of \$100. The staff is also proposing that permits for burning

standing vegetation for the purpose of wetland preservation have a flat rate fee of \$100. These permits currently require no fee.

The proposed changes are as follows:

47-010. The general definition of "Residential Open Burning" is corrected to include leaves and grass clippings. These are specifically prohibited only in some geographical areas in Lane County.

47-010. The name "Eugene-Springfield Urban Growth Area (ESUGA)" is changed to read "Eugene-Springfield Urban Growth Boundary (ESUGB)", and throughout the rest of Title 47.

47-015-2F(10). At the request of Lane County Fire District #1, the portion of their district included in the control area is expanded.

47-015-2H. The term "shall" is replaced with "may" to more accurately depict the actual enforcement of these rules.

47-015-6B(5)a. The reference to OAR is corrected.

47-020-2. Letter permits for burning of standing vegetation to preserve wetlands would have a fee of \$100. These currently have no fees.

47-020-4. Letter permit fees would change from the current flat rate of \$100 to \$4 per cubic yard (with a minimum fee of \$50) and owner/occupants burning construction or demolition waste will now be charged a fee.

#### DIFFERENCES BETWEEN PROPOSED LRAPA RULE CHANGE AND DEQ RULE

OAR 340-023-0100(11) sets letter permit fees for the DEQ at \$20 for a single season and \$30 for a calendar year, and are for yard debris only. The proposed LRAPA fees for letter permits will be greater than the DEQ fees, and will be charged for all types of burning.

#### FISCAL AND ECONOMIC IMPACT OF PROPOSED AMENDMENTS

Industry: Depending upon the amount of material to be burned, the proposed fee changes may result in increases or decreases from the current flat rate fee.

Public: The proposed fee changes would require the general public to pay fees that they currently are not charged.

LRAPA: The additional fees will recover a greater percentage of the cost of operating the program. The proposed fee increase will result in a need for greater LRAPA public education and compliance efforts, short-term.



Other Government Agencies: The proposed fee changes would require some government agencies to pay fees that they currently are not charged.

#### LAND USE CONSISTENCY STATEMENT

The proposed rule amendments are consistent with land use as described in applicable land use plans in Lane County.

#### PUBLIC COMMENT PROCESS

At the January 12, 1999 LRAPA Board of Directors meeting, staff plans to request authorization of public hearing on these proposed amendments at the March 9, 1999 meeting. Notice of the March 9 hearing will be published in local newspapers and in the Secretary of State's Bulletin (February 1, 1999 edition). The proposed amendments will be submitted to the Oregon Department of Environmental Quality headquarters in Portland and to the U. S. EPA's Region 10 office in Seattle, for their review and comment. The proposal will also go to the LRAPA Advisory Committee for review and comment.

Prior to the hearing, oral and written comments will be received until February 19, 1999. Oral comments should be directed to Ralph Johnston at (541) 726-2514 Extension 213. Written comments should be directed to:

Barbara Cole, Director  
Lane Regional Air Pollution Authority  
1010 Main Street  
Springfield, OR 97477

Comments received from all sources will be evaluated and, where appropriate, incorporated into a revised draft for presentation at the public hearing. A separate document will be prepared, detailing LRAPA's responses to comments received and any resulting revisions to the rulemaking proposal. Following the public hearing, the LRAPA Board will be asked to adopt the rules, either as proposed or with any changes deemed necessary in response to information received at the hearing.

#### CONTACT FOR FURTHER INFORMATION

If you would like more information regarding the proposed rule amendments, please contact Ralph Johnston at (541) 726-2514 Extension 213. If you would like to be added to the mailing list for rulemaking announcements, please contact Merrie Dinteman at the same telephone number, Extension 225.

REJ/mjd

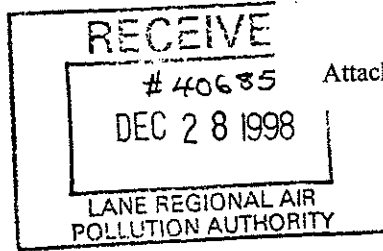


# Oregon

John A. Kitzhaber, M.D., Governor

Department of Environmental Quality

811 SW Sixth Avenue  
Portland, OR 97204-1390  
(503) 229-5696  
TDD (503) 229-6993



Attachment I page 1

December 24, 1998

Barbara Cole, Director  
Lane Regional Air Pollution Authority  
1010 Main Street  
Springfield, OR 97477

ROUTE TO: BC  
MD  
# \_\_\_\_\_  
FILE \_\_\_\_\_

Re: Amendments to LRAPA Open Burning Rules  
(Title 47) and Definitions (Title 12)

Dear Ms. Cole:

We have reviewed the proposed amendments to Lane Regional Air Pollution Authority Open Burning regulations dated November 23, 1998 and changes to Title 12 definitions. We find the proposed rules to be at least as strict as the comparable rules of the Department of Environmental Quality.

We hereby authorize you on behalf of the Environmental Quality Commission to act as Hearings Officer for the public comment process of adopting this proposal as a revision to the State of Oregon Clean Air Act Implementation Plan. If you have any questions, please contact Dave Nordberg at (503) 229-5519.

Sincerely,

Gregory A. Green  
Administrator  
Air Quality Division

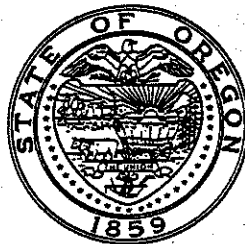
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# OREGON BULLETIN

Supplements the 1999 Oregon Administrative Rules Compilation

VOLUME 38, No. 2  
February 1, 1999

For December 16, 1998 - January 15, 1998



Published by  
**PHIL KEISLING**  
Secretary of State

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## OTHER NOTICES

**HOW TO COMMENT:** Written comments on the proposed action may be submitted to Joe Mollusky at DEQ's Headquarters office, 811 SW 6th Avenue, Portland, OR 97204. Comments must be received by March 1, 1999. Questions may also be directed to Mr. Mollusky at that address or by calling him at (503) 229-6744 or toll-free in Oregon at 1-800-452-4011. The TTY number is (503) 229-6993.

DEQ will hold a public meeting to answer questions and receive verbal comments on the proposed action, if requested by 10 or more persons, or a group with a membership of 10 or more. **THE NEXT STEP:** DEQ will consider all public comments prior to making a final cleanup decision about the Chambers Oil site. DEQ will provide public notice of the final decision.

### PROPOSED DELISTING OF CRYSTAL LITE MANUFACTURING FACILITY, TUALATIN, OREGON

**PROJECT LOCATION:** 11971 SW Herman Rd., Tualatin Business Park, Tualatin, OR.

**PROPOSAL:** As required by ORS 465.320, the Department of Environmental Quality (DEQ) invites public comment on the proposed removal of the Crystal Lite Manufacturing Company property from the DEQ's Confirmed Release List and Inventory. The property is addressed 11971 SW Herman Road in Tualatin, Oregon.

**HIGHLIGHTS:** The Crystal Lite Manufacturing Company facility had been the subject of numerous DEQ pollution complaints and hazardous waste violations between 1982 and 1992. In the mid-1990s, volatile organic compounds (VOCs) were discovered in groundwater northeast of the site. A remedial investigation documented a VOC-contaminated plume of groundwater extending from the Crystal Lite building, off-site to the northeast approximately 1,300 feet. No significant VOCs were detected in soil or sediment on or off the site since during the remedial investigation. A groundwater beneficial use determination documented no significant adverse impacts to current and reasonably likely future uses of groundwater. The off-site area is zoned for a manufacturing park but is currently undeveloped. A site-specific risk assessment did not document any unacceptable human health or ecological risks associated with the plume of contaminated groundwater. DEQ issued a no further action decision for the site on December 21, 1998. A memorandum summarizing the basis for DEQ's proposal will be available for public review beginning February 1, 1999.

**HOW TO COMMENT:** To schedule an appointment at DEQ, contact Debra Curtiss at 229-6361. The DEQ project manager is Alicia C. Voss (229-5011). Written comments should be sent to Alicia Voss at DEQ, Northwest Region, 2020 SW 4th Avenue, Suite 400, Portland, OR 97201 by March 3, 1999. A public meeting will be held to receive verbal comments if requested by 10 or more people or by a group with membership of 10 or more.

**THE NEXT STEP:** DEQ will consider all public comments and the Regional Administrator will make a final decision after consideration of these public comments.

### A CHANCE TO COMMENT ON... RECOMMENDATION FOR NO FURTHER ACTION AT THE DILLARD'S SOLVENT SITE

**PROJECT LOCATION:** Dillard's Solvent Site, 154 Beecher Rd., Sunny Valley, OR.

**PROPOSAL:** The Department of Environmental Quality (DEQ) is recommending no further action (NFA) for the cleanup of the solvent release at the Dillard's solvent site. Cleanup has been completed according to DEQ's requirements and based on the data available there appears to be no risk to human health or the environment.

**HIGHLIGHTS:** Leaking drums of hazardous material (solvents) were discovered by DEQ at the Dillard's residence in Sunny Valley, Oregon on August 23, 1993. An environmental investigation and cleanup was initiated in November, 1993 and continued for four years. Contaminated soil beneath the drum storage area was removed and several groundwater monitoring wells were installed. In addition, local residential supply wells were sampled.

The results of the investigation suggested that there is limited contamination in the groundwater beneath the site and that impacts to groundwater will not affect human health or the environment. Solvents were not detected in the residential wells during the initial round of sampling in 1994 and were not detected during the final round of residential well sampling in 1998. Contaminated soil was treated on-site and after solvent contamination was undetectable, the soil was replaced to its original location. As part of the NFA process, an institutional control (deed restriction for the Dillard's property) was issued to restrict beneficial use of groundwater in and near the former drum storage area. Further cleanup action and investigation is not warranted.

A more detailed description of the NFA recommendation is presented in the staff report prepared by DEQ. The staff report will be available for review during the public comment period at DEQ's Eugene, Roseburg, and Medford offices.

**HOW TO COMMENT:** Written comments on the NFA recommendation may be submitted to Bryn Thoms at DEQ's Eugene office, 1102 Lincoln St., Suite 210, Eugene, OR 97401. Comments must be received by March 1, 1999. Questions may also be directed to Mr. Thoms at that address or by calling him at 541-686-7838 x 254 or 1/800-844-8467. The TTY number is 541-687-5603.

A public meeting to answer questions and receive verbal comment on the proposed cleanup will be held if requested by 10 or more persons or a group with a membership of 10 or more.

**THE NEXT STEP:** DEQ will consider all public comments prior to issuing the NFA letter.

\*\*\*\*\*

### Lane Regional Air Pollution Authority and Department of Environmental Quality

Date:	Time:	Location:
3-9-99	12:15 p.m.	LRAPA Meeting Rm. 1010 Main St. Springfield, OR

**Hearing Officer:** Barbara J. Cole

**Stat. Auth.:** ORS 183 & 468A

**Stats. Implemented:** ORS 183 & 468A

**Proposed Amendments:** 340-020-0047, LRAPA 12-001, LRAPA 47-010, LRAPA 47-015, LRAPA 47-020, LRAPA 47-030

**Last Date for Comment:** Verbal: 3-9-99; Written: 3-1-99

**Summary:** Under the proposed amendments, LRAPA would amend the fees charged for open burning letter permits under Section 47-020; amend several definitions in 47-010 and the same definitions included in 12-001; expand the portion of Lane County Fire District #1 listed in 47-015 to be included in the control area subject to seasonal restrictions, at the district's request; and correct several rule references in 47-010 and 47-015.

**Rules Coordinator:** Merrie Dinteman

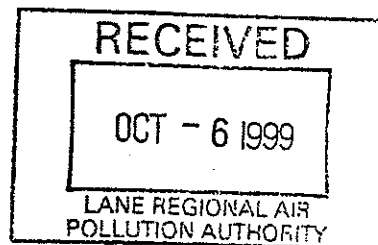
**Address:** Lane Regional Air Pollution Authority, 1010 Main St., Springfield, OR 97477

**Telephone:** (541) 726-2514, ext. 225

# Affidavit of Publication

Attachment K1 page 1

State of Oregon  
County of Lane



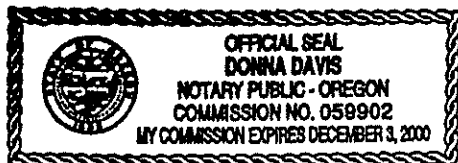
I, Larry D. Roberts, being first  
duly sworn deposes and say that I am the  
Publisher of the Dead Mountain Echo, a newspaper of  
general circulation published at Oakridge, Oregon in  
the aforesaid county and state, as defined by ORS 193-  
~~010 ET SEQ~~ that a notice, a printed copy of which is  
hereto annexed, was published in the entire issue of  
said newspaper for :  
one consecutive week, in the  
following issues: #22, 9-9-99.

Signed: [Signature]

Subscribed and sworn to before me this  
4th day of Oct, 1999

[Signature] Notary Public of Oregon

My commission expires: 12-3-2000



NOTICE OF INTENT TO RE-ADOPT AMENDMENTS TO LRAPA RULES

In accordance with Title 14 of the Lane Regional Air Pollution Authority (LRAPA) Rules and Regulations, the Board of Directors adopted amendments to LRAPA Title 47 on March 9, 1999. The notice of hearing which was published in local newspapers at that time did not specify that these amendments, if adopted, would be submitted to the Environmental Protection Agency as a revision to Oregon's State Implementation Plan. In order for the amendments to be approved by EPA, it is necessary to re-publish the notice of hearing with the required language, and to re-adopt the rules LRAPA is proposing:

To re-adopt amendments to LRAPA Title 47, "Open Burning," which: amend the fees charged for open burning letter permits under Section 47-020; amend several definitions in Section 47-010; expand the portion of Lane County Fire District #1 listed in Section 47-015 to be included in the control area subject to seasonal restrictions, at the request of the district and correct several rule references in Sections 47-010 and 47-015.

To re-adopt amendments to LRAPA Title 12, "Definitions," which include the definition revisions from the Title 47 rule making in the same definitions included in Section 12-001.

The provisions of the previously adopted amendments are currently valid, as adopted in March. The purpose of the proposed re-adoption is strictly to fulfill federal notice requirements so that the amendments can be approved as a SIP revision. No new changes are proposed.

WHO IS AFFECTED: These rules affect persons wishing to perform open burning which falls under the requirements of Section 47-020, Letter Permits. This includes burning of materials from commercial and industrial operations, construction, demolition, land clearing, forest slash wastes (on properties not included in the Oregon Department of Forestry's Smoke Management Plan), and prescribed burning of standing vegetation for the purpose of species or wetland conversion. The rules also affect residents within the jurisdiction of Lane Fire District Number 1 West of Range-7 West, which was formerly outside the control area affected by seasonal open burning restrictions. The proposed re-adoption will not change the existing rules.

PUBLIC HEARING: Public hearing on the above rule re-adoption will be held before the LRAPA Board of Directors.

Date: Tuesday, October 12, 1999  
Time: 12:30 p.m.  
Location: LRAPA Meeting Room  
1010 Main Street  
Springfield, Oregon

Copies of the adopted rules, and supporting documentation, are available until October 12, 1999. Copies can be obtained by coming to the LRAPA office at 1010 Main Street, Springfield, Oregon, or by calling Merrie Dinteman at (541) 726-2514 Ext. 225 to request that a copy be sent to you. The public may comment on the proposed re-adoption by testifying at the hearing; or in writing prior to the hearing. Written comments should be addressed to the LRAPA Board of Directors, 1010 Main Street, Springfield, Oregon, 97477.

# Affidavit of Publication

State of Oregon, County of Lane-ss

I, Belinda DuBell being duly sworn, depose and say that I am the legal clerk of the Springfield News a newspaper of general circulation, as defined by ORS 193.010 and 193.020; printed and published at Springfield in the aforesaid county and state, that the legal publication re: Notice of Intent to adopt rule amendments.

A printed copy of which is hereto annexed, was published in the entire issue of said newspaper for one successive and consecutive weeks in the following issues: September 08, 1999.

THE SPRINGFIELD NEWS

by: Belinda DuBell

Subscribed and sworn to me this 10th day of September, 1999.

Fran Ramsey  
Notary Public for Oregon

My commission expires October 24, 2000.



# GUARD PUBLISHING COMPANY

P.O. BOX 10188

PHONE (541) 485-1234

EUGENE, OREGON 97440

Legal Notice 1824769

## Legal Notice Advertising

Attachment K1 page 4

LANE REGIONAL AIR POLLUTION  
ATTN: MERRIE DINTEMAN  
225 N 5TH 501  
SPRINGFIELD, OR 97477

#

### AFFIDAVIT OF PUBLICATION

STATE OF OREGON, }  
COUNTY OF LANE, } ss.

I, Rhonda Fabreth, being first duly affirmed, depose and say that I am the Advertising Manager, or his principal clerk, of The Register-Guard, a newspaper of general circulation as defined in ORS 193.010 and 193.020; published at Eugene in the aforesaid county and state; that the Notice of Intent, printed copy of which is hereto annexed, was published in the entire issue of said newspaper for one successive and consecutive day(s) in the following issues:

September 8, 1999

### NOTICE OF INTENT TO RE-ADOPT AMENDMENTS TO LRAPA RULES

In accordance with Title 14 of the Lane Regional Air Pollution Authority (LRAPA) Rules and Regulations, the Board of Directors adopted amendments to LRAPA Title 47 on March 9, 1999. The notice of hearing which was published in local newspapers at that time did not specify that these amendments, if adopted, would be submitted to the Environmental Protection Agency as a revision to Oregon's State Implementation Plan. In order for the amendments to be approvable by EPA, it is necessary to re-publish the notice of hearing with the required language, and to re-adopt the rules. LRAPA is proposing:

To re-adopt amendments to LRAPA Title 47, "Open Burning," which: amend the fees charged for open burning letter permits under Section 47-020, amend several definitions in Section 47-010, expand the portion of Lane County Fire District #1 listed in Section 47-015 to be included in the control area subject to seasonal restrictions, at the request of the district, and correct several rule references in Sections 47-010 and 47-015.

To re-adopt amendments to LRAPA Title 12, "Definitions," which: include the definition revisions from the Title 47 rulemaking in the same definitions included in Section 12-001.

The provisions of the previously adopted amendment are currently valid, as adopted in March. The purpose of the proposed re-adoption is strictly to fulfill federal notice requirements so that the amendments can be approved as a SIP revision. No new changes are proposed.

**WHO IS AFFECTED:** These rules affect persons wishing to perform open burning which falls under the requirements of Section 47-020, Letter Permits. This includes burning of materials from commercial and industrial operations, construction, demolition, land clearing, forest slash wastes (on properties not included in the Oregon Department of Forestry's Smoke Management Plan), and prescribed burning of standing vegetation for the purpose of species or wetland conversion. The rules also affect residents within the jurisdiction of Lane Fire District Number 1 west of Range 7 West, which was formerly outside the control area affected by seasonal open burning restrictions. The proposed re-adoption will not change the existing rules.

**PUBLIC HEARING:** Public hearing on the above rule re-adoption will be held before the LRAPA Board of Directors:

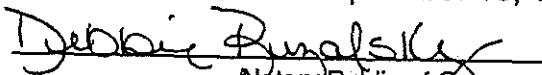
Date: Tuesday, October 12, 1999  
Time: 12:30 p.m.  
Location: LRAPA Meeting Room  
1010 Main Street  
Springfield, Oregon

Copies of the adopted rules, and supporting documentation, are available until October 12, 1999. Copies can be obtained by coming to the LRAPA office at 1010 Main Street, Springfield, Oregon, or by calling Merrie Dinteman at (541) 726-2514 Ext. 225 to request that a copy be sent to you. The public may comment on the proposed re-adoption by testifying at the hearing; or in writing prior to the hearing. Written comments should be addressed to the LRAPA Board of Directors, 1010 Main Street, Springfield, Oregon 97477.

No. 1824769 - September 8, 1999.



Subscribed and affirmed to before me this September 15, 1999

  
Notary Public of Oregon

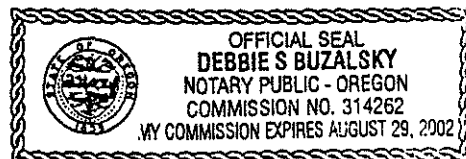
My commission expires: August 29, 2002

Account #:

INVOICE 1824769

Case: Re-Adopt Amendments to LRAPA Rules

Amt Due: \$210.94



# Affidavit of Publication

Attachment K2 page 1

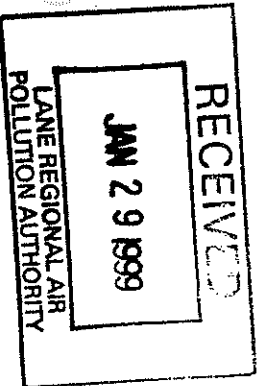
State of Oregon  
County of Lane

I, Roslie Lilja being first duly sworn, depose and say that I am the legal clerk of The Cottage Grove Sentinel, a newspaper of general circulation, as defined by ORS 193.010, and 193.020, printed and published Cottage Grove in the aforesaid county and state; that:

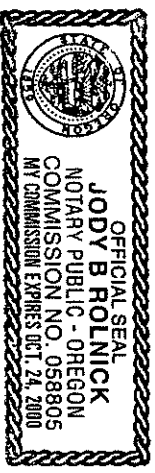
To amend LRAPA Title 47, "Open Burning," to: amend the fees charged for open burning letter permits under section 47-020;.....

a printed copy of which is hereto annexed, was published once a week in the entire issue of said newspaper for One week in the following issues: January 27, 1999.

*Roslie Lilja*  
Subscribed and sworn to before me this 21 day of January, 1999.



*Jody B. Rolnick*  
Notary Public for Oregon



### LEGAL NOTICE

#### Notice of intent to adopt amendments to LRAPA rules

In accordance with Title 14 of the Lane Regional Air Pollution Authority (LRAPA) Rules and Regulations, the Board of Directors is proposing:

To amend LRAPA Title 47, "Open Burning" to: amend the fees charged for open burning letter permits under Section 47-020; amend several definitions in Section 47-010; expand the portion of Lane County Fire District #1 listed in Section 47-015 to be included in the control area subject to seasonal restrictions, at the request of the district; and correct several rule references in Sections 47-010 and 47-015.

To amend LRAPA Title 12, "Definitions," to: include the definition revisions from the Title 47 rulemaking in the same definitions included in Section 12-001.

**Who is Affected:** The proposed amendments would affect persons wishing perform open burning which falls under the requirements of Section 47-020, Letter Permits. This includes burning of materials from commercial and industrial operations, construction, demolition, land clearing, forest slash wastes (on properties not included in the Oregon Department of Forestry's Smoke Management plan), and prescribed burning of standing vegetation for the purpose of species or wetland conversion. The amendments would also affect residents within the jurisdiction of Lane Fire District Number 1 west of Range 7 West, which is currently outside the control area affected by seasonal open burning restrictions.

#### PUBLIC HEARING:

Public hearing on the above rule adoption will be held before the LRAPA Board of Directors:

Date: Tuesday, March 9, 1999 Time: 12:30 PM

Location: LRAPA Meeting Room 1010 Main Street Springfield OR

Copies of the proposed rules, as well as Statements of Need and Fiscal Impact, are available until March 9, 1999. Copies can be obtained by coming to the LRAPA office at 1010 Main Street, Springfield, Oregon, or by calling Merrie Dinteman at (541) 726-2514 Ext. 225 to request that a copy be sent to you. The public may comment on the proposed regulations by testifying at the hearing or prior to the hearing, until March 1, 1999, in writing or by calling the LRAPA business office, 726-2514 Extension 213 (Ralph Johnston), Extension 216 (Barbara Cole), or Extension 225 (Merrie Dinteman). Written comments should be addressed to the LRAPA Board of Directors, 1010 Main Street, Springfield, Oregon 97477



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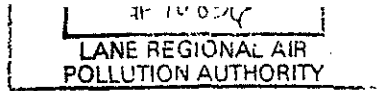
Date: Tuesday, March 9, 1999

Time: 12:30 p.m.

Location: LRAPA Meeting Room, 1010 Main Street, Springfield, Oregon

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j.27 (946)



# Affidavit of Publication

State of Oregon, County of Lane-ss

I, Adriana Perez being duly sworn, depose, and say that I am the legal clerk of the Springfield News a newspaper of general circulation, as defined by ORS 193.010 and 193.020; printed and published at Springfield in the aforesaid county and state, that the legal publication re: Notice of intent to adopt amendments to LRAPA rules.

A printed copy of which is hereto annexed, was published in the entire issue of said newspaper for one successive and consecutive weeks in the following issues: January 27, 1999.

THE SPRINGFIELD NEWS

by:

*Adriana Perez*

Subscribed and sworn to me this 28th day of January

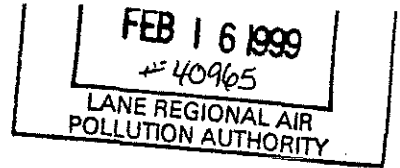
*Frances D. Ramsey*  
Notary Public for Oregon

My commission expires August 8, 1999.



# Affidavit of Publication

State of Oregon  
County of Lane



I, Larry Roberts being first  
duly sworn deposes and say that I am the  
Publisher of the Dead Mountain  
Echo, a newspaper of general circulation pub-  
lished at Oakridge, Oregon in the aforesaid county  
and state, as defined by ORS 193-010 ET SEQ  
that See attached

.....  
a printed copy of which is hereto annexed, was  
published in the entire issue of said newspaper  
for 1 successive and consecutive weeks  
in the following issues

1-28-99, #42

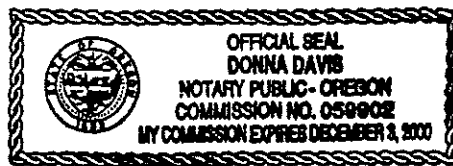
Signed: [Signature]

Subscribed and sworn to before me this

12th day of Feb, 19 99

[Signature] Notary Public of Oregon

My commission expires: 12-3-2000



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Date: Tuesday, March 9, 1999  
Time: 12:30 p.m.  
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1010 Main Street  
Springfield, Oregon  
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LNTSAB

# GUARD PUBLISHING COMPANY

P. O. BOX 10188

PHONE (541) 485-1234

EUGENE, OREGON 97440

Legal Notice 23206

## Legal Notice Advertising

- LANE REGIONAL AIR
- ATTN: MERRIE DINTEMAN
- 1010 MAIN STREET
- SPRINGFIELD, OR 97477

- Tearsheet Notice
- Duplicate Affidavit

Attachment K2 page 4

LANE REGIONAL AIR POLLUTION AUTHORITY

## AFFIDAVIT OF PUBLICATION

STATE OF OREGON, )  
COUNTY OF LANE, ) ss.

I, RHONDA K. FABRETH  
being first duly affirmed, depose and say that I am the Advertising Manager, or his principal clerk, of the Eugene Register-Guard, a newspaper of general circulation as defined in ORS 193.010 and 193.020; published at Eugene in the aforesaid county and state; that the

### NOTICE OF INTENT

a printed copy of which is hereto annexed, was published in the entire issue of said newspaper for ONE successive and consecutive DAY in the following issues:

JANUARY 27, 1999

### NOTICE OF INTENT TO ADOPT AMENDMENTS TO LRAPA RULES

In accordance with Title 14 of the Lane Regional Air Pollution Authority (LRAPA) Rules and Regulations, the Board of Directors is proposing:

To amend LRAPA Title 47, "Open Burning," to amend the fees charged for open burning letter permits under Section 47-020; amend several definitions in Section 47-010; expand the portion of Lane County Fire District #1 listed in Section 47-015 to be included in the control area subject to seasonal restrictions; at the request of the district; and correct several rule references in Sections 47-101 and 47-015.

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Date:

Tuesday, March 9, 1999.

Time:

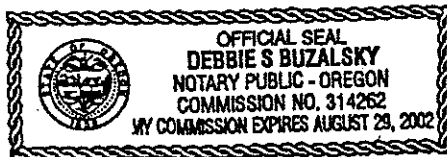
12:30 p.m.

Location:

LRAPA Meeting Room  
1010 Main Street  
Springfield, Oregon

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No. 23206 - January 27, 1999.



*Rhonda K. Fabreth*

Subscribed and affirmed to before me this 2/3/99

*Debbie Buzalsky*  
Notary Public of Oregon

My Commission Expires: 8.29.02

AFFIDAVIT

# Environmental Quality Commission

- Rule Adoption Item
- Action Item
- Information Item

**Agenda Item E**  
**May 18, 2000 Meeting**

**Title:**

Title V Permitting Program CPI Fee Increase

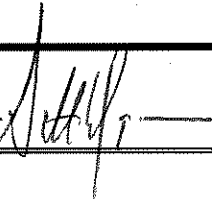
**Summary:**

The proposed rule will increase Title V permitting fees according to the Consumer Price Index (CPI). The increase is needed to support the current and expected Operating Permit Program workload. The Oregon Operating Permit program is required to be fully funded by fees from all sources subject to Title V of the Clean Air Act in order to retain federal approval status. This proposal, if adopted, will be submitted to the U.S. Environmental Protection Agency as a revision to the State Implementation Plan (OAR 340-200-0040), which is a requirement of the Clean Air Act.

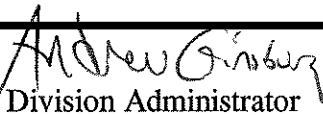
**Department Recommendation:**

The Department recommends that the Environmental Quality Commission adopt the proposed rule amendments to increase Title V fees by the Consumer Price Index.

Report Author



Andrew Ginsburg  
Division Administrator



Director



State of Oregon  
Department of Environmental Quality Memorandum

---

**Date:** May 1, 2000  
**To:** Environmental Quality Commission  
**From:** Langdon Marsh  
**Subject:** Agenda Item E, EQC Meeting - May 18, 2000.  
Title V Permitting Program CPI Fee Increase

**Background**

On February 11, 2000, the Director authorized the Air Quality Division to proceed to a rulemaking hearing on proposed rules which will increase Title V Operating Permit program fees by the 1999 Consumer Price Index (CPI).

Pursuant to the authorization, hearing notice was published in the Secretary of State's Bulletin on March 1, 2000. The Hearing Notice and informational materials were mailed to the mailing list of those persons who have asked to be notified of rulemaking actions, and to a mailing list of persons known by the Department to be potentially affected by or interested in the proposed rulemaking action on February 18, 2000.

A Public Hearing was held March 22, 2000 with Kathleen Craig serving as Presiding Officer. Written comment was received through March 24, 2000. The Presiding Officer's Report (Attachment C) summarizes the hearing and states that no oral or written testimony was presented at the hearing. The Department received no other written comments.

The following sections list key terms, and summarize the proposed rulemaking action.

**Key Words and Acronyms**

ACDP: Air Contaminant Discharge Permit  
CPI: Consumer Price Index - a measure of the average change in prices paid by urban consumers.  
SIP: State Implementation Plan (OAR 340-200-0040) required by the Clean Air Act.  
Title V: Title V of the Clean Air Act - requires permits for air pollution sources to operate.

**Issue This Proposed Rulemaking Action is Intended to Address**

This proposal addresses Title V Permitting fee adjustments in response to the CPI. Costs of implementing and administering the Oregon Title V Operating Permit Program have increased due to personnel salary increases and inflation. As required to retain federal approval status, the Oregon

Operating Permit Program must be fully funded by fees from all sources subject to Title V. Though all but two of the initial Title V Permits have been issued, workload remains high in response to increased permit renewals, permit modifications, and increased compliance assurance work. The CPI increase is necessary to maintain adequate resources to meet the workload demand.

### **Relationship to Federal and Adjacent State Rules**

Title V of the Clean Air Act and EPA rules (40 CFR Part 70) require that Title V fees fully pay for the cost of the Title V program. Federal law requires that fees be increased to keep pace with inflation.

EPA rules (40 CFR Part 51) specify requirements for establishing and amending the State Implementation Plan. The proposed rules do not differ from federal requirements.

For this rulemaking, state rules are no more or less stringent than the federal rules.

### **Authority to Address the Issue**

The Commission has the statutory authority to address both the Title V fee amendment and applicability under ORS468.065, ORS468A.040, and ORS468A.315. The Commission's SIP revision authority resides in ORS468A.035.

### **Process for Development of the Rulemaking Proposal (including Advisory Committee and alternatives considered)**

Regulatory authority issues were determined in consultation with the office of the Attorney General. CPI adjustment information was provided by the State Economist's office. Staff salary information was provided by Department budget staff. No advisory committee was convened for the proposed rule change. However, the Department provided information regarding the fee amendment proposal to fee payer representatives during rule development and received no adverse comment.

### **Summary of Rulemaking Proposal Presented for Public Hearing and Discussion of Significant Issues Involved.**

This rulemaking proposes to increase Title V permitting fees by the Consumer Price Index to adjust for increased costs of implementing the Oregon Operating Permit Program. The CPI for 1999 was 2.27 percent.

### **Summary of Significant Public Comment and Changes Proposed in Response**

The Department received no written or oral comments in response to this proposed rulemaking.

**Summary of How the Proposed Rule Will Work and How it Will be Implemented**

The Department will begin billing Title V sources at the new rates starting July 1, 2000.

**Recommendation for Commission Action**

The Department recommends that the Commission adopt the proposed rules to increase Title V fees by the Consumer Price Index.

**Attachments**

- A. Rule (Amendments) Proposed for Adoption
- B. Supporting Procedural Documentation:
  - 1. Legal Notice of Hearing
  - 2. Fiscal and Economic Impact Statement
  - 3. Land Use Evaluation Statement
  - 4. Questions to be Answered to Reveal Potential Justification for Differing from Federal Requirements
  - 5. Cover Memorandum from Public Notice
- C. Presiding Officer's Report on Public Hearing
- D. Rule Implementation Plan

Approved:      Section:

Division:

Jill Trachala - Acting Manager  
Andrew Ginsburg

Report Prepared By: Scott Manzano

Phone: (503) 229-6480

Date Prepared: April 14, 2000

# Attachment A

State of Oregon  
DEPARTMENT OF ENVIRONMENTAL QUALITY

Rulemaking Proposal  
for  
Oregon Title V Operating Permit Fee Increase

## Proposed Rule Changes

### DIVISION 216

#### AIR CONTAMINANT DISCHARGE PERMITS

##### 340-216-0090

##### Fees and Permit Duration

- (1) All persons required to obtain a permit shall be subject to a three part fee consisting of a uniform non-refundable filing fee, an application processing fee, and an annual compliance determination fee which are determined by applying **Table 1, Part II**. The amount equal to the filing fee, application processing fee, and the annual compliance determination fee shall be submitted as a required part of any application for a new permit. The amount equal to the filing fee and the application processing fee shall be submitted with any application for modification of a permit.
- (2) The fee schedule contained in the listing of air contaminant sources in **Table 1** shall be applied to determine the ACDP user fees (**Table 1, Part I**.) and ACDP fees (**Table 1, Part II**.) on a Standard Industrial Classification (SIC) plant site basis.
- (3) Modifications of existing, unexpired permits which are instituted by the Department or Regional Authority due to changing conditions or standards, receipt of additional information, or any other reason pursuant to applicable statutes and do not require refiling or review of an application or plans and specifications shall not require submission of the filing fee or the application processing fee.
- (4) Applications for multiple-source permits received pursuant to OAR 340-216-0070 shall be subject to a single filing fee. The application processing fee and annual compliance determination fee for multiple-source permits shall be equal to the total amounts required by the individual sources involved, as listed in **Table 1**.
- (5) The annual compliance determination fee shall be paid at least 30 days prior to the start of each subsequent permit year. Failure to timely remit the annual compliance determination fee in accordance with the above shall be considered grounds for not issuing a permit or revoking an existing permit.
- (6) If a permit is issued for a period less than one (1) year, the applicable annual compliance determination fee shall be equal to the full annual fee. If a permit is issued for a period greater than 12 months, the applicable annual compliance determination fee shall be prorated by multiplying the annual compliance determination fee by the number of months covered by the permit and dividing by twelve (12).
- (7) In no case shall a permit be issued for more than ten (10) years, except for synthetic minor source permits which shall not be issued for more than five (5) years.
- (8) Upon accepting an application for filing, the filing fee shall be non-refundable.
- (9) When an air contaminant source which is in compliance with the rules of a permit issuing agency relocates or proposes to relocate its operation to a site in the jurisdiction of another permit issuing



agency having comparable control requirements, application may be made and approval may be given for an exemption of the application processing fee. The permit application and the request for such fee reduction shall be accompanied by:

- (a) A copy of the permit issued for the previous location; and
  - (b) Certification that the permittee proposes to operate with the same equipment, at the same production rate, and under similar conditions at the new or proposed location. Certification by the agency previously having jurisdiction that the source was operated in compliance with all rules and regulations will be acceptable should the previous permit not indicate such compliance.
- (10) If a temporary or conditional permit is issued in accordance with adopted procedures, fees submitted with the application for an ACDP shall be retained and be applicable to the regular permit when it is granted or denied.
- (11) All fees shall be made payable to the permit issuing agency.
- (12) Pursuant to ORS 468A.135, a regional authority may adopt fees in different amounts than set forth in **Table 1** provided such fees are adopted by rule and after hearing and in accordance with ORS 468.065(2).
- (13) Sources which are temporarily not conducting permitted activities, for reasons other than regular maintenance or seasonal limitations, may apply for use of a modified annual compliance determination fee in lieu of an annual compliance determination fee determined by applying Table 1. A request for use of the modified annual compliance determination fee shall be submitted to the Department in writing along with the modified annual compliance determination fees on or before the due date of the annual compliance determination fee. The modified annual compliance determination fee shall be \$539.
- (14) Owners or operators who have received Department approval for payment of a modified annual compliance determination fee shall obtain authorization from the Department prior to resuming permitted activities. Owners or operators shall submit written notification to the Department at least thirty (30) days before startup specifying the earliest anticipated startup date, and accompanied by:
- (a) Payment of the full annual compliance determination fee determined from **Table 1** if greater than six (6) months would remain in the billing cycle for the source; or
  - (b) Payment of 50% of the annual compliance determination fee determined from **Table 1** if six (6) months or less would remain in the billing cycle.
- (15) Fees for general permits:
- (a) The fees for source assignment to a general permit shall be seventy-five percent of the applicable fees in **Table 1**, OAR 340-216-0090 except as provided in Subsection (d) of this Section. Fees shall be specified in the permit;
  - (b) The Department may provide in the permit that the annual compliance determination fee in OAR 340-216-0090 **Table 1** shall be paid annually or at less frequent intervals;
  - (c) For initial assignment to a general permit, the fees shall be prorated to the next highest full year for the remaining life of the permit;
  - (d) Exceptions:
    - (A) The filing fee and compliance determination fee required by OAR 340-216-0090 **Table 1** shall not be reduced;
    - (B) The initial permitting or construction fees required in OAR 340-216-0090 **Table 1** shall not apply.

[NOTE: This rule is included in the State of Oregon Clean Air Act Implementation Plan as adopted by the EQC under OAR 340-200-0040.]

Stat. Auth.: ORS 468.020 & ORS 468A.040

Stats. Implemented: ORS 468.065

Hist.: DEQ 47, f. 8-31-72, ef. 9-15-72; DEQ 63, f. 12-20-73, ef. 1-11-74; DEQ 107, f. & ef. 1-6-76; Renumbered from 340-020-0033.12; DEQ 125, f. & ef. 12-16-76; DEQ 20-1979, f. & ef. 6-29-79; DEQ 11-1983, f. & ef. 5-31-83; DEQ 6-1986, f. & ef. 3-26-86; DEQ 12-1987, f. & ef. 6-15-87; DEQ 17-1990, f. & cert. ef. 5-25-90; DEQ 27-1991, f. & cert. ef. 11-29-91; DEQ 4-1993, f. & cert. ef. 3-10-93; DEQ 12-1993, f. & cert. ef. 9-24-93; Renumbered from 340-020-0165; DEQ 19-1993, f. & cert. ef. 11-4-93; DEQ 20-1993(Temp), f. & cert. ef. 11-4-93; DEQ 13-1994, f. & cert. ef. 5-19-94; DEQ 21-1994, f. & cert. ef. 10-14-94; DEQ 22-1994, f. & cert. ef. 10-14-94; DEQ 22-1995, f. & cert. ef. 10-6-95; DEQ 18-1997, f. 8-27-97, cert. ef. 10-1-97; DEQ 7-1998, f. & cert. ef. 5-5-98; DEQ 12-1998, f. & cert. ef. 6-30-98; DEQ 14-1998, f. & cert. ef. 9-14-98; DEQ 10-1999, f. & cert. ef. 7-1-99; DEQ 14-1999, f. & cert. ef. 10-14-99, Renumbered from 340-028-1750

<b>TABLE 1</b> <b>AIR CONTAMINANT SOURCES AND</b> <b>ASSOCIATED FEE SCHEDULE</b> <b>(340-216-0090)</b>		
<b>Part I.</b>		
Note: Fees in (A) through (H) are in addition to any other applicable fee.		
A.	Late Payment a) 8 - 30 days b) > 30 days	\$200 \$400
B.	Ambient Monitoring Network Review	\$1,170
C.	Modeling Review	\$2,600
D.	Alternative Emission Control Review	\$1,950
E.	Non-technical permit modification (name change, ownership transfer, and similar)	\$65
F.	Initial Permitting or Construction a) Complex b) Moderately Complex c) Simple	\$28,600 \$13,000 \$2,600
G.	Elective Permits - Synthetic Minor Sources a) Permit Application or Modification b) Annual Compliance Assurance	\$2,144,192 \$1,129,154
H.	Filing	\$98

## DIVISION 220

### OREGON TITLE V OPERATING PERMIT FEES

#### 340-220-0030 Annual Base Fee

- (1) The Department shall assess an annual base fee of ~~\$2,822,884~~ for each source subject to the Oregon Title V Operating Permit program.
- (2) The annual base fee shall be paid to cover the period from November 15 of the current calendar year to November 14 of the following year.

Stat. Auth.: ORS 468 & ORS 468A

Stats. Implemented: ORS 468 & ORS 468A

Hist.: DEQ 20-1993(Temp), f. & cert. ef. 11-4-93; DEQ 13-1994, f. & cert. ef. 5-19-94; DEQ 12-1995, f. & cert. ef. 5-23-95; DEQ 22-1995, f. & cert. ef. 10-6-95; DEQ 7-1996, f. & cert. ef. 5-31-96; DEQ 9-1997, f. & cert. ef. 5-9-97; DEQ 12-1998, f. & cert. ef. 6-30-98; DEQ10-1999, f. & cert. ef. 7-1-99; DEQ14-1999, f. & cert. ef. 10-14-99, Renumbered from 340-028-2580

#### 340-220-0040 Emission Fee

- (1) The Department shall assess an emission fee of ~~\$32,9033.63~~ per ton to each source subject to the Oregon Title V Operating Permit Program.
- (2) The emission fee shall be applied to emissions from the previous calendar year based on the elections made according to OAR 340-220-0190.

Stat. Auth.: ORS 468 & ORS 468A

Stats. Implemented: ORS 468 & ORS 468A

Hist.: DEQ 20-1993(Temp), f. & cert. ef. 11-4-93; DEQ 13-1994, f. & cert. ef. 5-19-94; DEQ 12-1995, f. & cert. ef. 5-23-95; DEQ 22-1995, f. & cert. ef. 10-6-95; DEQ 7-1996, f. & cert. ef. 5-31-96; DEQ 9-1997, f. & cert. ef. 5-9-97; DEQ 12-1998, f. & cert. ef. 6-30-98; DEQ10-1999, f. & cert. ef. 7-1-99; DEQ14-1999, f. & cert. ef. 10-14-99, Renumbered from 340-028-2590

### **340-220-0050**

#### **Specific Activity Fees**

Specific activity fees shall be assessed by the Department for an Oregon Title V Operating Permit program source with any one of the following activities:

(1) Existing Source Permit Revisions:

- (a) Administrative\* — ~~\$282,288~~;
- (b) Simple — ~~\$1,129,154~~;
- (c) Moderate — ~~\$8,465,651~~;
- (d) Complex — ~~\$16,929,303~~.

(2) Ambient Air Monitoring Review — ~~\$2,257,307~~.

\*includes revisions specified in OAR 340-218-0150(1)(a) through (g). Other revisions specified in OAR 340-218-0150 are subject to simple, moderate or complex revision fees.

Stat. Auth.: ORS 468 & ORS 468A

Stats. Implemented: ORS 468 & ORS 468A

Hist.: DEQ 20-1993(Temp), f. & cert. ef. 11-4-93; DEQ 13-1994, f. & cert. ef. 5-19-94; DEQ 12-1998, f. & cert. ef. 6-30-98; DEQ10-1999, f. & cert. ef. 7-1-99; DEQ14-1999, f. & cert. ef. 10-14-99, Renumbered from 340-028-2600

### **340-220-0190**

#### **Failure to Pay Fees**

Any owner or operator that fails to pay fees imposed by the Department under these rules shall pay a penalty of 50 percent of the fee amount, plus interest on the fee amount computed in accordance with **Section 6621(a)(2) of the Internal Revenue Code of 1986 (as amended)**.

[Publications: The publication(s) referred to or incorporated by reference in this rule are available from the agency.]

Stat. Auth.: ORS 468 & ORS 468A

Stats. Implemented: ORS 468 & ORS 468A

Hist.: DEQ 20-1993(Temp), f. & cert. ef. 11-4-93; DEQ 13-1994, f. & cert. ef. 5-19-94; DEQ14-1999, f. & cert. ef. 10-14-99, Renumbered from 340-028-2740

Attachment B1

Secretary of State

**NOTICE OF PROPOSED RULEMAKING HEARING**

A Statement of Need and Fiscal Impact accompanies this form.

DEQ - Air Quality Division

Agency and Division

Chapter 340 Divisions 216 and 220

Administrative Rules Chapter Number

Susan M. Greco

Rules Coordinator

(503) 229-5213

Telephone

811 S.W. 6th Avenue, Portland, OR 97213

Address

March 22, 2000

3:00 PM

811 SW Sixth Ave Rm 3A, Portland

Kathleen Craig

Hearing Date

Time

Location

Hearings Officer

Are auxiliary aids for persons with disabilities available upon advance request?

Yes

**RULEMAKING ACTION**

**AMEND:**

OAR 340-200-0040; OAR 340-216-0090; OAR 340-220-0030; OAR 340-220-0040;  
OAR 340-220-0050; and OAR 340-220-0190

Stat. Auth.: ORS 468.020, 468A.035, 468A.040, and 468A.315.

Stats. Implemented: ORS 468.020, 468A.010, 468A.025, 468A.045, and 468A.315

**RULE SUMMARY**

The Department of Environmental Quality is proposing to amend its rules to increase Oregon Title V Permit Program fees which includes sources that have Synthetic Minor permits. These amendments, if adopted, will be submitted to the US Environmental Protection Agency (EPA) as a revision to the State Implementation Plan, which is a requirement of the Clean Air Act.

March 24, 2000

Last Day for Public Comment

  
Susan M. Greco 2/15/00

Authorized Signer and Date

## Attachment B2

State of Oregon  
DEPARTMENT OF ENVIRONMENTAL QUALITY

Rulemaking Proposal  
for  
Oregon Title V Operating Permit Fee Increase

### Fiscal and Economic Impact Statement

#### Introduction

As required by federal law, the Oregon Operating Permit Program must be fully funded by fees from all sources subject to Title V of the Clean Air Act. Program administration and implementation costs have increased due to salary increases and inflation. Based on the 1999 Consumer Price Index, the Department proposes to increase fees 2.27% for fiscal year 2001 (July 1, 2000 through June 30, 2001) in order to implement the program and maintain federally required self-supporting status. Oregon Operating Permit Program sources will pay more for each ton of regulated air pollution released, and for annual compliance assurance work and permit modification work. The Department does not project an increase in overall program revenue for fiscal year 2001 because of an anticipated decrease in overall Title V chargeable emissions.

**Title V Base Fees and Emission Fees:** In 1999, the Annual Base Fee and per-ton Emission Fees were charged to 125 major industrial sources. Our records indicate Title V Base and Annual Emission fees will be assessed to 126 sources by the Department in 2000. If the amendment is approved, the Base Fee will increase from 2,822/year to \$2,884/year, and the annual fee paid per ton of pollution will increase from \$32.90 to \$33.63. Emission and Base fee revenue is expected to decrease for fiscal year 2001.

**Title V Modification Fees:** For fiscal year 2001, the Department estimates assessing fees for twenty five Administrative Amendments; a \$6 increase to \$288 each, twelve Simple Title V Modifications; a \$25 increase to \$1,154 each, eight Moderate Title V Modifications; an \$186 increase to \$8,651 each, two Complex Title V Modifications; a \$374 increase to \$17,303 each, and two ambient Air Monitoring Reviews: \$50 increase to \$2,307 each. Title V modification workload is not expected to significantly change from fiscal year 2000.

**Synthetic Minor Fees:** The Annual Compliance Assurance Fee will increase from \$1,129 to \$1,154. 126 Synthetic Minor sources are currently charged an Annual Compliance Assurance Fee. The Department also expects 126 sources to be assessed the Annual Compliance Assurance Fee in fiscal year 2001. These sources are large industrial sources that elected to have emission limits on their operation in order to avoid obtaining a more costly Title V permit. Although these sources are not required to obtain Title V Operating Permits, the fees for their Synthetic Minor limits are required by Title V rules.

For fiscal year 2001, the Department anticipates 16 Synthetic Minor sources will also have to pay the Synthetic Minor Application Processing Fee because their permits will be expiring. It is also estimated that there will be approximately 10 applications for modifications and 3 new applications, all requiring the payment of Application Processing Fees. The Application Processing Fee will increase from \$2,144 to \$2,192. Application processing workload is not expected to be significantly different than in fiscal year 2000.

### **General Public**

Higher permit fees are expected to affect consumers through proportionately higher costs of goods and services produced by Title V sources.

### **Small Business**

Title V and Synthetic Minor Permits are based on the amount of pollutants discharged, not the number of employees. Some major industrial sources of air pollution may be small businesses. In general, these companies tend to emit less than 100 tons per year of air pollutants but are considered "major" because of their potential to emit 100 or more tons per year. The proposed fee increase would raise the fees of a 100 ton/year source by a total of \$135 (from \$6,112 to \$6,247) as long as the source does not need any modifications to its permit, and does not need an ambient monitoring review done. This increase includes the increased base fee and the higher emission fee rate.

Many of the sources that received Synthetic Minor Permits are small businesses. The fee increase would be \$25 for the annual compliance assurance fee and \$48 for the application processing fee, which pays for permit renewals and modifications.

### **Large Business**

Most major sources of air pollution subject to Title V permitting and the associated fees are large industrial facilities. The largest source of air pollution in Oregon emitted approximately 9,095 tons of assessable emissions and paid \$302,054 in 1999. Assuming emissions remain the same in 2000, this source would pay \$308,920 because of the increase. In 1999, approximately 16 percent of Title V sources emitted more than 1,000 tons per year, 65 percent from 100 to 1,000 tons per year, and 19 percent emitted less than 100 tons per year.

## Local Governments

Currently, Coos County is the only local government agency required to have a Title V Operating Permit. Their applicable fees would also increase by 2.27 percent. We anticipate Coos County will pay annual fees in 2000 of approximately \$8,837, an increase of \$169 over 1999 fees.

The Lane Regional Air Pollution Authority is the only other air permitting agency in Oregon. They also must also demonstrate to the EPA that their Title V Operating Permit Program is self-supporting. They establish their own fee schedule, and this rule amendment will not necessarily affect them.

## State Agencies

The Oregon State University and Oregon Health Sciences University currently are the only state agencies required to have Title V Operating Permits. Oregon State University will pay estimated annual fees in 2000 of \$8,339, an increase of \$2518 over 1999 fees. In 2000, the Oregon Health Sciences University will pay estimated annual fees of \$17,984, an increase of \$1601 over 1999 fees. The projected revenue increases from these two agencies are essentially the result of increased emissions.

As previously provided, the Oregon Department of Environmental Quality does not project an increase in revenue as a result of the CPI adjustment, and does not anticipate any personnel adjustments to implement and administer the Oregon Title V Operating Permit Program.

## Assumptions

Estimated Title V program revenue forecasts and expenditures are based on the assumption that all facilities subject to this program in Oregon have been identified. A total of 126 sources are currently subject to Title V permitting and fee requirements.

Revenues from the 2.27 percent CPI fee increase and from the expected permit modifications will be used solely to fund the Oregon Title V Operating Permit Program. The proposed increase will not result in an increase in staff, and is necessary to retain federal approval status. Information regarding the Consumer Price Index (CPI) used for this analysis is provided below:

<u>Year</u>	<u>CPI</u>
1989	1.24
1993	1.446
1998	1.631
1999	1.668

**Residential Development**

The Department has determined that this rule making proposal will have no impact on the cost of developing a 6,000 square foot parcel and the construction of a 1,200 square-foot single-family, detached dwelling on that parcel.



## Attachment B3

State of Oregon  
DEPARTMENT OF ENVIRONMENTAL QUALITY

Rulemaking Proposal  
for  
Oregon Title V Operating Permit Fee Increase

### Land Use Evaluation Statement

**1. Explain the purpose of the proposed rules.**

Costs of implementing and administering the Title V Operating Permit Program in Oregon have increased due to inflation. The Oregon Operating Permit program is required to be fully funded by fees from all sources subject to Title V of the Clean Air Act in order to retain federal approval status. An increase in the fees charged is necessary to implement the program and maintain self supporting status.

The fee increase will not result in an increase in staff. Regulated facilities will pay more for each ton of regulated air pollution released, and for annual compliance assurance work and permit modification work. The fee increase is based on a 2.27 percent increase in the U.S. Consumer Price Index since the last rule adoption.

**2. Do the proposed rules affect existing rules, programs or activities that are considered land use programs in the DEQ State Agency Coordination (SAC) Program?**

Yes  No

**a. If yes, identify existing program/rule/activity:**

Oregon's Federal Operating Permit Program, which regulates air emissions from major industrial sources.

**b. If yes, do the existing statewide goal compliance and local plan compatibility procedures adequately cover the proposed rules?**

Yes  No  (if no, explain):

The proposed rules would be implemented through the Department's existing stationary source permitting program. An approved land use compatibility statement is required from local government before an air permit is issued.

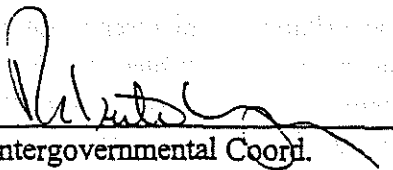
c. If no, apply the following criteria to the proposed rules.

Not applicable

3. If the proposed rules have been determined a land use program under 2. above, but are not subject to existing land use compliance and compatibility procedures, explain the new procedures the Department will use to ensure compliance and compatibility.

Not applicable

Division

  
Intergovernmental Coord.

1/28/00  
Date

Attachment B4

State of Oregon  
DEPARTMENT OF ENVIRONMENTAL QUALITY

Rulemaking Proposal  
for  
Oregon Title V Operating Permit Fee Increase

Questions to be Answered to Reveal  
Potential Justification for Differing from Federal Requirements.

- 1. Are there federal requirements that are applicable to this situation? If so, exactly what are they?**

Yes. Title V of the Clean Air Act and EPA rules (40 CFR Part 70) require that Title V fees fully pay for the cost of the Title V program. Federal law requires that fees be increased to keep pace with inflation. Federal law also specifies which sources must obtain Title V permits.

EPA rules (40 CFR Part 51) specify requirements for establishing and amending the State Implementation Plan. The proposed rules do not differ from federal requirements.

- 2. Are the applicable federal requirements performance based, technology based, or both with the most stringent controlling?**

Not applicable.

- 3. Do the applicable federal requirements specifically address the issues that are of concern in Oregon? Was data or information that would reasonably reflect Oregon's concern and situation considered in the federal process that established the federal requirements?**

Yes

- 4. Will the proposed requirement improve the ability of the regulated community to comply in a more cost effective way by clarifying confusing or potentially conflicting requirements (within or cross-media), increasing certainty, or preventing or reducing the need for costly retrofit to meet more stringent requirements later?**

Not Applicable.

**5. Is there a timing issue which might justify changing the time frame for implementation of federal requirements?**

Not Applicable

**6. Will the proposed requirement assist in establishing and maintaining a reasonable margin for accommodation of uncertainty and future growth?**

Not Applicable

**7. Does the proposed requirement establish or maintain reasonable equity in the requirements for various sources? (level the playing field)**

Not Applicable

**8. Would others face increased costs if a more stringent rule is not enacted?**

Not Applicable

**9. Does the proposed requirement include procedural requirements, reporting or monitoring requirements that are different from applicable federal requirements? If so, Why? What is the "compelling reason" for different procedural, reporting or monitoring requirements?**

Not Applicable

**10. Is demonstrated technology available to comply with the proposed requirement?**

Not Applicable

**11. Will the proposed requirement contribute to the prevention of pollution or address a potential problem and represent a more cost-effective environmental gain?**

Not Applicable

Attachment B5

**State of Oregon  
Department of Environmental Quality**

**Memorandum**

**Date:** February 18, 2000  
**To:** Interested Parties and Affected Public  
**Subject:** Rulemaking Proposal and Rulemaking Statements - Annual Oregon Title V Operating Permit Fee Increase.

This memorandum contains information on a proposal by the Department of Environmental Quality (Department) to adopt rule amendments regarding Title V Operating Permit Program fees. This proposal, if adopted, will be submitted to the U.S. Environmental Protection Agency (EPA) as a revision to the SIP (OAR 340-200-0040), which is a requirement of the Clean Air Act. Pursuant to ORS 183.335, this memorandum also provides information about the Environmental Quality Commission's intended action to amend Oregon Administrative Rules.

The Department has the statutory authority to address the Title V fee under ORS468.065, ORS468A.040, and ORS468A.315. The SIP revision authority resides in ORS468A.035.

**What's in this Package?**

Attachments to this memorandum provide details on the proposal as follows:

- Attachment A The official statement describing the fiscal and economic impact of the proposed rule (required by ORS 183.335).
- Attachment B A statement providing assurance that the proposed rules are consistent with statewide land use goals and compatible with local land use plans.
- Attachment C Questions to be Answered to Reveal Potential Justification for Differing from Federal Requirements.
- Attachment D The actual language of the proposed rule amendments to Title V fees.

**Hearing Process Details**

The Department is conducting a public hearing and you are invited to review these materials and present written or oral comment. The hearing will be held as follows:

**Date:** March 22, 2000  
**Time:** 3:00 p.m.  
**Place:** 811 SW 6<sup>th</sup> Avenue, Third Floor, Room 3A  
Portland, OR

**Deadline for submittal of Written Comments:** March 24, 2000 at 5:00 p.m.

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Written comments can be presented at the hearing or to the Department any time before the date above. Comments should be sent to: Department of Environmental Quality, Scott Manzano, 811 S.W. 6th Avenue - 11<sup>th</sup> floor, Portland, Oregon 97204. Comments may also be hand delivered to the same address, between 8:00 a.m. and 5:00 p.m., Monday through Friday.

In accordance with ORS 183.335(13), no comments from any party can be accepted after the deadline for submission of comments has passed. If you want your comments to be considered by the Department in the development of these rules, your comments must be received before the close of the comment period. The Department recommends that comments be submitted as early as possible to allow for adequate review and evaluation.

Kathleen Craig of the Department staff will be the Presiding Officer at the hearing.

### **What Happens After the Public Comment Period Closes?**

Following close of the public comment period, the Presiding Officer will prepare a report which summarizes the oral testimony presented and identifies written comments submitted. The Environmental Quality Commission (EQC) will receive a copy of the Presiding Officer's report. The public hearing will be tape recorded, but the tape will not be transcribed.

The Department will review and evaluate the rulemaking proposal in light of all information received during the comment period. Following the review, the rules may be presented to the EQC as originally proposed or with modifications made in response to public comments received.

The EQC will consider the Department's recommendation for rule adoption during one of their regularly scheduled public meetings. The targeted meeting date for consideration of this rulemaking proposal is May 19, 2000.

The Department will notify you of the time and place for final EQC action if you present oral testimony at the hearing or submit written comment during the comment period. Otherwise, if you want to be appraised of this proceeding and receive a copy of the recommendation that is presented to the EQC for adoption, please request that your name be placed on the mailing list for this rulemaking proposal.

### **Background on Development of the Rulemaking Proposal**

#### **Why is there a need for the rule?**

Costs of implementing and administering the Title V Operating Permit Program in Oregon have increased due to inflation and personnel salary increases. As required to retain federal approval status, the Oregon Operating Permit program must be fully funded by fees from all sources subject to Title V of the Clean Air Act.

Three types of fees fund the Title V Operating Permit Program. The first is a base fee charged to each Title V source each year. The second type of fee is an annual emission fee charged for each ton of regulated emissions. The third type of fee covers special activities, including permit revisions, ambient monitoring and synthetic minor provisions. Synthetic Minor sources are those that have federally enforceable permit conditions that keep them from being subject to Title V requirements.

Since federal approval, resource and fee adjustments have been made to respond to a higher than expected program workload, and to manage budgets associated with legislative salary increases. During fiscal year 1999, program staff salaries increased close to 5 percent while the program adjusted fees 1.62 percent to account for the 1998 CPI. The Department projects fiscal year 2000 salaries to increase an average of 5 percent and proposes to partially offset the revenue difference with a 2.27 percent increase based on the 1999 CPI. The Department plans to address the remainder of the revenue difference by implementing streamlining measures to increase permitting efficiency.

Oregon has issued Title V Permits for all but two major sources, which are now in public comment. Though the initial round of permit issuance is essentially complete, the program workload remains high due to increased permit renewals, modification work, and increased compliance assurance. From July 2000 through June 2001, the Department expects to renew 20 percent of Title V permits. Since Title V permit modifications are typically incorporated as part of permit renewal work, modification fees are not assessed to sources that elect to modify at the end of a permit cycle. The Department anticipates charging fees for 2 Complex, 8 Moderate, 12 Simple, and 25 Administrative Title V modifications during fiscal year 2001.

#### **How was the rule developed?**

Oregon Revised Statute (ORS) 468A.315 allows the Department to increase Title V fees based on the amount of the increase in the Consumer Price Index (CPI). A CPI increase of 2.27 percent for 1999, obtained from the State Economist, was used to calculate the new per-ton Emission Fee, the Annual Base Fee, Synthetic Minor fees, Title V Modification fees, and the Ambient Air Monitoring Review fee.

No advisory committee was convened for the proposed rule change because no policy decisions

2/

were needed. However, the Department has provided information regarding this proposed amendment to fee payer representatives, and has received no adverse comments.

Documents relied upon to develop this rulemaking proposal include the aforementioned statutory references, Department Title V permit tracking data, and Consumer Price Index information which can be reviewed at the Department of Environmental Quality's office at 811 SW 6th Avenue, Portland, Oregon. Please contact Scott Manzano at 503-229-6480 for times when the documents are available for review. Consumer Price Index data is also directly available at <http://www.oea.das.state.or.us/econdata/annind.prn>.

**Whom does this rule affect including the public, regulated community or other agencies, and how does it affect these groups?**

The fee revision will affect all sources subject to Title V fees.

**How will the rule be implemented?**

The Department will begin billing existing Title V sources at the new rates starting June 1, 2000. Synthetic Minor sources will receive their annual billing according to the standard billing schedule beginning June 1, 2000. No procedural changes will be necessary.

**Are there time constraints?**

The fee amendments must be adopted by June 1, 2000 to meet the billing schedules.

**Contact for More Information**

If you would like more information on this rulemaking proposal, or would like to be added to the mailing list, please contact:

Scott Manzano, Oregon DEQ  
811 SW 6<sup>th</sup> Avenue - 11<sup>th</sup> floor  
Portland, OR 97204  
(503) 229-6480

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*This publication is available in alternate format (e.g. large print, Braille) upon request. Please contact DEQ Public Affairs at 503-229-5317 to request an alternate format.*

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Attachment C

State of Oregon  
Department of Environmental Quality

Memorandum

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Date: March 22, 2000

To: Environmental Quality Commission

From: Kathleen Craig *VC*

Subject: Presiding Officer's Report for Rulemaking Hearing  
Hearing Date and Time: March 22, 2000, beginning at 3:00 p.m.  
Hearing Location: 811 SW 6<sup>th</sup> Ave. Room 3A, Portland OR.

Title of Proposal: Title V Permitting Program CPI Fee Increase

The rulemaking hearing on the above titled proposal was convened at 3:00 p.m. The hearing officer and the rule writer were both present but no one else attended the hearing.

There was no oral or written testimony, and the hearing was closed at 3:30 p.m.

## Attachment D

State of Oregon  
DEPARTMENT OF ENVIRONMENTAL QUALITY

### Rulemaking Proposal for Oregon Title V Operating Permit Fee Increase

### Rule Implementation Plan

#### **Summary of the Proposed Rule:**

The proposed rule will increase Title V permitting fees according to the Consumer Price Index (CPI). The increase is needed to support the current and expected Oregon Title V Operating Permit Program workload. The Oregon Operating Permit program is required to be fully funded by fees from all sources subject to Title V of the Clean Air Act in order to retain federal approval status.

#### **Proposed Effective Date of the Rule**

May 18, 2000

#### **Proposal for Notification of Affected Persons**

Affected sources will be notified through Department billings.

#### **Proposed Implementing Actions**

The Department will begin billing sources at the new rate starting July 1, 2000.

#### **Proposed Training/Assistance Actions**

None necessary - only the fee rates will be changed. Billing procedures will remain the same.

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# Environmental Quality Commission

- Rule Adoption Item
- Action Item
- Information Item

**Agenda Item F**  
**May 17, 2000 Meeting**

**Title:**

Solid Waste Rule Amendments - Solid Waste Planning and Recycling Grants OAR 340-083-0010 to 340-083-0100

**Summary:**

The purpose of this rulemaking is to propose rules that would amend the Solid Waste Planning and Recycling Grant rules to allow the Department to award grants for projects that implement current program goals and objectives. Additionally, the rule amendments will formalize inclusion of the household hazardous waste grants as part of the solid waste grant program. The rule amendments do not apply to household hazardous waste collection events.

Specifically, this proposal would amend the grant rules to: change the selection criteria, making them broader than before; add a provision for focused grants, which will allow the solid waste program to target, and give priority for funding, to defined types of projects intended to achieve specific environmental objectives; remove grants categories from rule which will allow the solid waste program to tie grant categories to its strategic objectives; and, include rolling stock as an eligible expenditure.

**Department Recommendation:**

Adoption of the proposed rule amendments as presented in Attachment A.

*Jaquie Moon*  
Report Author

*Mary Ward*  
Division Administrator

*Harold Wash*  
Director

State of Oregon  
Department of Environmental Quality Memorandum

---

**Date:** May 1, 2000  
**To:** Environmental Quality Commission  
**From:** Langdon Marsh  
**Subject:** Agenda Item F, Solid Waste Rule Amendments – Solid Waste Planning and Recycling Grants OAR 340-083-0010 to 340-083-0100, EQC Meeting May 17, 2000

**Background**

On January 13, 2000 the Director authorized the Waste Prevention and Management Division to proceed to a rulemaking hearing on proposed rules which would amend the Solid Waste Planning and Recycling Grant rules to allow the Department to award grants for projects that implement current program goals and objectives. Additionally, the rule amendments will formalize inclusion of the household hazardous waste grants as part of the solid waste grant program. The rule amendments do not apply to household hazardous waste collection events.

Pursuant to the authorization, hearing notice was published in the Secretary of State's Bulletin on February 1, 2000. The Hearing Notice and informational materials were mailed to the mailing list of those persons who have asked to be notified of rulemaking actions, and to a mailing list of persons known by the Department to be potentially affected by or interested in the proposed rulemaking action on January 18, 2000.

Public Hearings were held at 1:00 p.m. on February 23, 2000 in Pendleton, and February 29, 2000 in Salem with Inez Julia Austin and Jacquie Moon respectively serving as Presiding Officers. Written comment was received through March 3, 2000. The Presiding Officers' Report (Attachments C-1 and C-2) summarize the oral testimony presented at the hearing. Attachment C-3 lists all the written comments received. (A copy of the comments is available upon request.)

Department staff have evaluated the comments received (Attachment D). Modifications to the initial rulemaking proposal are not being recommended by the Department.

The following sections summarize the issue that this proposed rulemaking action is intended to address, the authority to address the issue, the process for development of the rulemaking proposal including alternatives considered, a summary of the rulemaking proposal presented for public hearing, a summary of the significant public comments and the changes proposed in response to those comments, a summary of how the rule will work and how it is proposed to be implemented, and a recommendation for Commission action.

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Accommodations for disabilities are available upon request by contacting the Public Affairs Office at (503) 229-5317 (voice)/(503) 229-6993 (TDD).

Memo To: Environmental Quality Commission

**Agenda Item F**, Solid Waste Rule Amendments – Solid Waste Planning and Recycling Grants OAR 340-083-0010 to 340-083-0100, EQC Meeting May 17, 2000

Page 2

### **Issue this Proposed Rulemaking Action is Intended to Address**

The Department created the Solid Waste Planning and Recycling Grant program in response to the 1989 Legislature's authorization to use tipping fees from garbage disposal to help local governments meet the challenges of planning for solid waste management and waste reduction activities. Approximately \$250,000 is available annually for solid waste grants. Since the first grant round in 1991, 105 solid waste grants totaling \$2,024,773 have been awarded. In addition, since 1994, 14 household hazardous waste grants totaling \$122,376 have been awarded.

The Department established four key objectives for the grant program. They were, in descending order of importance:

- Target funds to areas of greatest financial and environmental need
- Stretch limited dollars - award a larger number of small grants
- Equitably distribute funds among the grant categories and communities
- Provide for innovative and improved solid waste management in the form of demonstration grants

The grant program has operated for nine years with these same objectives. The objectives pre-dated important legislation and policy decisions, specifically:

- The 1991 Recycling Act, which, among other things, adopted the statewide recovery goal of 50% for the year 2000, and set 1995 watershed recovery rates to measure each watershed's progress toward achieving the statewide goal
- The adoption of the Oregon Integrated Resource and Solid Waste Management Plan, 1995 – 2005. The primary focus of this plan was on moving up the solid waste hierarchy to emphasize waste prevention programs
- The development of DEQ's Strategic Plan, which established waste prevention and achieving a statewide 50% recovery rate as key objectives for the state's solid waste program

### **Relationship to Federal and Adjacent State Rules**

The solid waste grant program is not a regulatory program, and consistency with adjacent states and the federal government is not an issue.

#### **Federal**

There are no federal requirements applicable to this rulemaking.

### **Authority to Address the Issue**

The Department has the statutory authority to address this issue under ORS 459A.120(2)(b) & (e).

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Memo To: Environmental Quality Commission

**Agenda Item F**, Solid Waste Rule Amendments – Solid Waste Planning and Recycling Grants OAR 340-083-0010 to 340-083-0100, EQC Meeting May 17, 2000

Page 3

**Process for Development of the Rulemaking Proposal (including Advisory Committee and alternatives considered)**

The Solid Waste Policy and Program Development section formed a grants analysis team (team), comprised of three regional solid waste technical assistance staff and two headquarters staff, to review, evaluate, and revise, if necessary, the grant program. The team's mission, assigned to it by managers in the solid waste program, was to develop a "... strategy to deliver Oregonians and the environment the most effective grant program within existing budgets."

Internal and external stakeholders were invited to participate in a process of reviewing and commenting on the proposed goals and objectives. A facilitated stakeholder meeting was held on March 30, 1999 to gain stakeholders' perspectives regarding whether the team was on track with the new goals and objectives for the grant program. Written comments were also solicited. Twelve local governments were formally surveyed on many of the implementation and grant management issues, and team members informally discussed these issues with additional local government representatives. An advisory group was deemed unnecessary because it would be repetitive of the review process.

In response, during the 8-month review process, the team made the determination that the solid waste grant program could become more effective if it were revised to implement current solid waste program goals and legislation. New goals and objectives were developed. Implementation and grant management issues were addressed as well.

**Stakeholder Meeting**

The team developed six program objectives for the grant program, and presented them at the stakeholders' meeting. There was general support for the objectives, and a sense that some could be combined. There were concerns about whether one of the objectives, market development, could occur through local government grants. Waste prevention was recognized as a need for the state, but there were concerns about the ability of rural areas to participate.

Based on comments from this meeting, the team revised the objectives. The revised objectives follow.

**GOAL:** To conserve natural resources through the solid waste grant program, DEQ will provide funding and program assistance to support the solid waste hierarchy. The objectives of the solid waste grant program are to:

- Assist the state to meet and exceed its 50% recovery goal
- Increase waste prevention and reuse
- Encourage purchase of recovered materials/local market development
- Encourage integrated solid waste planning
- Share grant project results statewide

**Implementation and Grant Management Issues**

The team included the whole range of grant implementation issues in the review, from the frequency of

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Memo To: Environmental Quality Commission

**Agenda Item F**, Solid Waste Rule Amendments – Solid Waste Planning and Recycling Grants OAR 340-083-0010 to 340-083-0100, EQC Meeting May 17, 2000

Page 4

grant rounds to the internal grant selection process. Twelve local governments from around the state were surveyed and asked to provide comments on a variety of implementation issues. Examples of the survey questions follow.

- Focused grants - what did they think of focused grants, that is, targeting specific programs such as waste prevention for grant awards?
- Eligible projects (grant categories) – what activities should be eligible for a grant?
- Grant round timing - - what timing for opening and awarding grants would work best for their budgeting cycle?
- Selection criteria – what should the selection criteria be?

Many of the local governments' recommendations were accepted and included in the team's final recommendations to the Department's solid waste program managers.

#### Grant Activities that may be funded

The new program objectives will allow the Department to award grants for projects that advance solid waste program goals and have the most potential for durable environmental benefits. Examples of projects that might be funded follow.

##### Assist the state to meet and exceed its 50% recovery goal

1. Target heavy or high volume materials with low recovery rates, such as compostable organic material, for research and collection
2. Prepare cost analysis or rate studies which support development of variable weight-based rates for garbage collection and drop-off

##### Increase waste prevention and reuse

1. Develop and implement waste prevention and reuse public education campaigns
2. Initiate local waste prevention and reuse programs

##### Increase use of recovered materials/local market development

1. Prepare local market development research and planning studies
2. Develop and implement local government recycled product procurement programs

#### **Summary of Rulemaking Proposal Presented for Public Hearing and Discussion of Significant Issues Involved.**

Specifically, this proposal would amend the grant rules to:

- *Change the selection criteria*, making them broader than current selection criteria. Specific criteria will be developed for each grant category and publicized before the grant round is opened in the Public Notice of Fund Availability. This will allow the solid waste program to solicit more types of grant projects than is possible under the current rules
- *Add a provision for focused grants*, which will allow the solid waste program to target, and give priority for funding, to defined types of projects intended to achieve specific environmental objectives

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Memo To: Environmental Quality Commission

**Agenda Item F**, Solid Waste Rule Amendments – Solid Waste Planning and Recycling Grants OAR 340-083-0010 to 340-083-0100, EQC Meeting May 17, 2000

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- *Remove grants categories from rule.* This will allow the solid waste program to tie grant categories to its strategic objectives
- *Include rolling stock as an eligible expenditure.* Rolling stock such as a forklift is no different than other equipment used for processing recyclable materials. Additionally, using the grant program to purchase a truck would allow rural Oregon communities to band together to centralize the collection of recyclable materials. "Exclusive" use of this equipment for recycling and waste reduction activities will be delineated in the grant contract

The proposed selection criteria are expanded to accommodate broader environmental objectives that will advance solid waste program goals. The previous selection criteria gave preference to financially needy local governments with few recycling opportunities located far from markets for recyclable materials. Consequently, 73% of the grant funds were awarded to communities located in counties with populations less than 100,000.

With this automatic preference removed, small local governments located in counties with populations less than 25,000 may be impacted. These very small local governments received 44% -- \$893,501 -- of the grant funds since the inception of the grant program. Slightly more than 25% -- \$234,451 -- of the funds went to projects to develop or enhance recycling depots in rural communities, 44% to projects to prepare solid waste management plans, with the remaining 31% to projects for general recycling and education activities.

Under the revised grant program objectives and the resulting new selection criteria proposed in the amended rules, it is possible that some proposals to develop or enhance recycling depots in very small communities may not score competitively. This is possible because the smaller amounts of recyclable material and higher expense to recover it may make such projects less cost effective and have fewer environmental benefits than other types of projects. However, grant proposals for establishing depots will continue to be funded where they make environmental and financial sense.

Additionally, the solid waste program management team, comprised of regional and headquarters managers, will ensure that any program area selected for focused grants will benefit both small and large local governments, and all local governments will be able to compete for focused grants.

The Department also made the following technical changes to the proposed rules after mailing the Public Information Package:

1. 340-083-0020 (2): "Department" -- The Department of Environmental Quality. Decisions with respect to grants pursuant to this Division may be delegated to the Administrator of the Waste Prevention and Management Division.
2. 340-083-0070: The Department shall coordinate evaluation of grant proposals. Grants will be awarded based on the criteria below in subsections (a) through (f) of this section.
3. 340-083-0090 (2): For a grant application to be considered for approval, the following criteria must be met: [...]



Memo To: Environmental Quality Commission

**Agenda Item F**, Solid Waste Rule Amendments – Solid Waste Planning and Recycling Grants OAR 340-083-0010 to 340-083-0100, EQC Meeting May 17, 2000

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### Summary of Significant Public Comment and Changes Proposed in Response

The Department received written testimony from the Mayor of Pendleton. This testimony was also provided orally at the public hearing in Pendleton. The Mayor's comments were not supportive of the rule amendments because he perceived the rule amendments to be disadvantageous to rural eastern Oregon communities. Department staff have evaluated the comments. Modification to the initial rulemaking is not being recommended. The public comments and Department responses follow.

#### Selection Criteria – who should receive a grant

**Comment:** The Department should not pursue the rule amendments because the proposed amendments will have significant negative impacts on economically disadvantaged rural eastern Oregon communities, already faced with critically limited resources, because they will no longer score competitively when the grants are awarded.

**Comment:** Because DEQ will no longer give extra consideration to small rural communities, a majority of the grant funds will be diverted away from small east-side local governments to large west-side local governments which already have a large tax base and are capable of providing their own funding.

**Response:** The Department believes it is time to shift the focus of the grant program in order to use it as a tool to more fully support solid waste environmental goals. The two major goals - - helping the state meet its 50% recovery goal, and encouraging waste prevention and reuse - - apply across all Oregon communities, and nothing in the proposed rule amendments prohibits small local governments from applying for and receiving grant funding.

#### Miscellaneous

**Comment:** Local governments who can afford to hire professional grant writers to prepare applications would receive increased funding, which would work against small local governments because they often lack the resources to hire grant writers.

**Response:** The Department agrees that grants should not be awarded simply on the basis of sophisticated presentations. The intent is to award grants based on evidence that the proposed projects have potential to produce significant and durable environmental results, and are well planned. As in the past, Department Technical Assistance staff are available to assist local governments develop sound project proposals.

### Summary of How the Proposed Rule Will Work and How it Will be Implemented

If the Commission adopts these rules, in June of 2000 all local governments will be notified of the rule amendment and what the amended rules might mean to them. The notification will include examples of the types of projects the solid waste program hopes to fund, the general selection criteria, and a schedule for the upcoming grant round.

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Memo To: Environmental Quality Commission

**Agenda Item F**, Solid Waste Rule Amendments – Solid Waste Planning and Recycling Grants OAR  
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The Department will open a new round of grants in late August 2000. The Public Notice of Fund Availability announcing the opening of the grants will be mailed to all local governments and other interested parties in early August 2000. The notice will include the specific selection criteria that will be used to select the grants. The grants will be closed for application November 1, 2000, and the awards will be announced by March 1, 2001.

Regional solid waste technical assistants will work with local governments to further inform them of the changes in the grant program and to offer technical assistance in developing sound grant proposals.

The Department's Solid Waste Policy and Program Development section will take steps to ensure that these rule changes do not reap any negative unintended consequences. These include monitoring the distribution of grant awards, and selecting a grant focus with the goal in mind that all local governments will be able to participate.

For more details see Attachment E.

### **Recommendation for Commission Action**

It is recommended that the Commission adopt the rule amendments that change the grant rules by broadening the selection criteria, adding a provision for focused grants, removing specific grant categories, and adding rolling stock as an eligible expenditure, as presented in Attachment A of the Department Staff Report.

### **Attachments**

- A. Rule Amendments Proposed for Adoption
- B. Supporting Procedural Documentation:
  - 1. Legal Notice of Hearing
  - 2. Fiscal and Economic Impact Statement
  - 3. Land Use Evaluation Statement
  - 4. Questions to be Answered to Reveal Potential Justification for Differing from Federal Requirements
  - 5. Cover Memorandum from Public Notice
- C. Presiding Officers' Report on Public Hearing
- D. Department's Evaluation of Public Comment
- E. Rule Implementation Plan

### **Reference Documents (available upon request)**

Written Comments Received (listed in Attachment C)  
Stakeholder Meeting Summary  
Meeting notes and agendas, Grants Analysis Team

Memo To: Environmental Quality Commission

**Agenda Item F**, Solid Waste Rule Amendments – Solid Waste Planning and Recycling Grants OAR  
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Approved:

Section:

Christopher M. Taylor

Division:

Mary Wahl

Report Prepared By: Jacquie Moon

Phone: 503-229-5479

Date Prepared: April 10, 2000

JM

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10/19/95

10

SOLID WASTE PLANNING AND RECYCLING GRANT RULES

Purpose and Scope

340-083-0010

(1) These rules are intended to implement Oregon Revised Statute (ORS) ~~459.294(2)(e)~~ 459A.120(2)(b)&(c), under which grants are made available to local government units for recycling (including waste reduction) and solid waste planning activities.

(2) The purpose of the recycling and solid waste planning grants program is to provide grant funds to ~~cities and counties~~ local governments in Oregon ~~who~~ that are in need of financial assistance to plan for solid waste management options and to improve their recycling and waste reduction capabilities. ~~In addition to improved recycling capabilities these grant funds will be available for recycling demonstration projects that contribute to the development of new technology or advance new unproven concepts in recycling.~~

Definitions

340-083-0020

As used in these rules unless otherwise specified:

(1) "Applicant" -- The local government unit applying for a grant.

~~(2) "Commission" -- The Environmental Quality Commission.~~

~~(3) "Department" -- The Department of Environmental Quality. Decisions with respect to grants pursuant to this Division may be delegated to the Administrator of the Waste Prevention and Management Division.~~

~~(4) "Director" -- the Director of the Department of Environmental Quality.~~

~~(5) "Grant Round" -- The period of time in which the Department opens the acceptance of new applications for funding and ends with the disbursement of grant awards from available funds.~~

~~(6) "In Kind Contribution" -- Any documented contribution, other than cash, to a grant project of real estate, goods or services, which is provided by the grantee or another contributor.~~

~~(7) "Local Government Unit" -- A city, county, metropolitan service district formed under ORS Chapter 268, sanitary district or sanitary authority formed under ORS Chapter 450, county service district formed under ORS Chapter 451, regional air quality control authority formed under ORS ~~468.500 to 468.530~~ 468A.100 to 468A.130 and ORS ~~468.540 to 468.575~~ 468A.140 to 468A.175 or any other local government unit responsible for solid waste management.~~

~~(8) "Permanent Disposal Capacity" -- The local governing unit owns or has access for at least the next twenty years to a solid waste disposal facility meeting at least minimum Department standards.~~

~~(9) "Permit" -- A document issued by the Department, bearing the signature of the Director or the Director's authorized representative which by its conditions may authorize the permittee to construct, install, modify, or operate or close a disposal site in accordance with specified limitations.~~

~~(10) "Rolling Stock" -- Motorized vehicles on tires or wheels that have generalized usage such as collection trucks, garbage trucks, forklifts, trailers, tractors.~~

Eligible Applicants

340-083-0030

Eligible applicants include Any Oregon local government unit . may apply to the Department for a grant for solid waste planning, a general recycling project or a recycling demonstration project. Local governments Eligible applicants may enter into contracts with private citizens or companies to accomplish the work outlined in the grant agreement.

## Eligible Projects

340-083-0040

(1) ~~Eligible solid waste planning projects.~~ Grants may be awarded for up to 100 per cent of the cost of projects and project-related costs, including but not limited to the following types of projects:

- ~~(a) Evaluation of long term disposal options;~~
- ~~(b) Evaluation of disposal options due to imminent landfill closure or required upgrade;~~
- ~~(c) Planning disposal options for special wastes;~~
- ~~(da) Preparation of a solid waste management plan;~~
- ~~(e) Planning for new disposal options or sites;~~
- (b) Planning for diversion of recyclable, reusable, compostable, or energy recoverable materials;
- (c) Planning and implementing a community-wide recycling and collection program, or expanding existing collection operations;
- (d) Purchasing equipment or material to initiate or expand the recovery or processing of recyclable materials;
- (e) Enhancing or developing a reducing, reusing, recycling or composting promotion and education program;
- (f) Establishing and operating recycling depots;
- (g) Preparing cost analysis or rate studies which support development of variable weight-based rates for garbage collection and drop-off;
- (h) Preparing local and regional market development research and planning studies;
- (i) Researching and developing local and regional reuse options;
- (j) Initiating reuse and waste prevention programs;
- (k) Developing local material exchange programs;
- (l) Developing Buy Recycled campaigns;
- (m) Developing and implementing local government recycled product procurement programs;
- (n) Developing resource efficiency programs.

(2) ~~Eligible general recycling projects.~~ Grants may be awarded for up to 100 percent of the cost of projects and project-related costs, including but not limited to the following types of projects:

- ~~(a) Planning and implementing a community wide recycling and collection program, or expanding existing collection operations;~~
- ~~(b) Purchasing equipment or material to initiate or expand the recovery or processing of materials;~~
- ~~(c) Enhancement or development of a recycling reducing, reusing, recycling or composting promotion and education program;~~
- ~~(d) Establishing recycling depots. Preparing cost analysis or rate studies which support development of variable weight based rates for garbage collection and drop off campaigns;~~
- ~~(m) Developing and implementing local government recycled product procurement programs;~~
- ~~(n) Developing resource efficiency programs.~~

(3) ~~Eligible recycling demonstration projects.~~ Grants may be awarded for up to 100 percent of the cost of projects and project related costs, including but not limited to the following types of projects:

- ~~(a) Development of new technology in the field of recycling or waste reduction;~~
- ~~(b) Demonstration or pilot project for a new or unproven recycling concept;~~
- ~~(c) Developing methodologies or specialized equipment to increase collection, processing or utilization of materials;~~
- ~~(d) Waste reduction research aimed towards preventing generation of solid waste at source.~~

## Ineligible Activities and Costs

340-083-0050

The following are ineligible for grant money under these rules:

- (1) Disposal site engineering, design or hydrogeologic study required by Department permit or enforcement action.
- (2) Costs for which payment has been or will be received under another financial assistance program.

- (3) Capital expenditures for solid waste planning.
- (4) Costs incurred prior to issuance of a grant agreement by the Department.
- (5) Costs incurred after the expiration date of the grant agreement.
- (6) License applications or permit fees.
- (7) Ordinary operating expenses of local government, ~~such as salaries and expenses of a mayor or city council members,~~ that are not directly related to the project.
- ~~(8) Capital expenditures for rolling stock.~~
- (98) Costs incurred for landfill closures.

Grant Limitations  
340-083-0060

The Department may award up to 20 per cent of available grant moneys for recycling demonstration projects, and up to 100 percent of the available grant moneys for solid waste planning or general recycling projects.

Selection Criteria  
340-083-0070

(1) ~~Solid waste planning project grants will be awarded based on the following criteria. The Department shall coordinate evaluation of grant proposals. Grants will be awarded based on the criteria below in subsections (a) through (f) of this section. The Department will determine the relative value of each of these factors in deciding which projects will receive funding during a grant round. The criteria include:~~

~~(a) Degree of need. Preference will be given to:~~

- ~~(A) Applicants in need of environmentally sound permanent solid waste disposal capacity;~~
- ~~(B) Applicants facing imminent closure of local landfill or required upgrade;~~
- ~~(C) Communities with limited financial resources for solid waste planning.~~

~~(b) General:~~

- ~~(A) Applicant's proven ability to carry out project as evidenced by credentials, experience and degree of completeness provided in the application;~~
- ~~(B) Multi jurisdictional cooperation/multi jurisdictional approach;~~
- ~~(C) Transferability of project results to other governmental units;~~
- ~~(D) Degree to which the project will result in new information or will be addressing unanswered questions for the grantee;~~
- ~~(E) Evidence of cash or in-kind contribution from the community.~~

(a) Minimum qualifying score;

(b) Potential for environmental enhancement;

(c) Potential for continuity;

(d) Type of program;

(e) Program commitment;

(f) Need;

(g) Cost effectiveness;

(f) Preference points, if applicable.

(2) The Department may include, in the public notice announcing fund availability, a request for applications for specific projects or project areas that will be given priority for funding. Revised selection criteria, published in the public notice of fund availability, may be used.

~~(2) General recycling project grants will be awarded based on the following criteria. The Department will determine the relative value of each of these factors in deciding which projects will receive funding. The criteria include:~~

~~(a) Degree of need. Preference will be given to:~~

- ~~(A) Applicants farthest from markets;~~

- ~~(B) Applicants with limited recycling opportunities in the jurisdiction;~~
- ~~(C) Communities with limited financial resources for recycling activities.~~
- ~~(b) Impact on the waste management hierarchy:~~
  - ~~(A) Per cent of total solid waste stream reduced;~~
  - ~~(B) Extent to which project results in reduction or removal of a new material not previously separated from the solid waste stream;~~
  - ~~(C) Extent to which project may result in increased recycling, reuse, or source reduction resulting from increased participation of solid waste generators in the commercial, institutional, or residential sector.~~
- ~~(c) General:~~
  - ~~(A) Applicant's proven ability to carry out project as evidenced by credentials, experience and degree of completeness provided in the application;~~
  - ~~(B) Multi-jurisdictional cooperation/multi-jurisdictional approach;~~
  - ~~(C) Transferability of project results to other governmental units, nonprofit organizations or private business;~~
  - ~~(D) Evidence of cash or in-kind contribution from the community.~~

~~(3) Recycling demonstration projects will be awarded based on the following criteria. The Department will determine the relative value of each of these factors in deciding which projects will receive funding. The criteria include:~~

- ~~(a) Transferability of project results to other governmental units, nonprofit organizations or private businesses;~~
- ~~(b) Extent to which the project will result in new information or will address unanswered questions;~~
- ~~(c) Extent to which project results in the development of a new recycling market for use of a material that would otherwise be disposed;~~
- ~~(d) Adequate resources to go to the next step if the grant is for one phase of a project;~~
- ~~(e) Applicant's proven ability to carry out project as evidenced by credentials, experience and degree of completeness provided in the application;~~
- ~~(f) Evidence of cash or in-kind contribution;~~
- ~~(g) Impact on hierarchy: Extent to which project would impact source reduction or reuse.~~

Application and Procedures for Award  
340-083-0080

~~(1) The Department shall establish and publish notice of deadlines for submission of applications for each grant round at least once per biennium if revenue is available. The Department will determine the amount of funds available for the current grant round, and may set the amount of funding for general recycling grants, recycling demonstration grants, and solid waste planning grants.~~

~~(2) An applicant shall provide a complete application for each grant applied for. Application shall be made on a form provided by the Department. Each application shall include such information as shall be required by the Department, including but not limited to:~~

- ~~(a) Name and address of applicant;~~
- ~~(ab) Description of the project and the expected results;~~
- ~~(bc) Workplan and schedule for completion of project;~~
- ~~(cd) Complete budget, including breakdown of costs;~~
- ~~(de) Person responsible for the project; Signature of applicant's authorized agent;~~
- ~~(ef) A statement of compatibility with local land use requirements, if appropriate. Any other information required by the Department.~~

~~(3) If sufficient moneys are not available to fund all applications received during a grant round, the Department shall rank the applications within each grant category and award grants by descending order of ranked scores.~~

~~(4) Qualified applicants who do not receive a grant award can apply again during the next grant round.~~

~~(5) The Department may award some, none or all of the grant moneys available in any grant rounds.~~

~~(6) The Department reserves the right to award grants in amounts less than requested by the applicant. The Department shall make that determination based on the merits of the application, the project proposed, and the availability of grant moneys.~~

Review and Approval

340-083-0090

~~(1) A completed grant application must be reviewed by the Department prior to approval. The Department shall review all completed grant applications and approve or deny them.~~

~~(2) To get For a grant application to be considered for approval, the following criteria must be met:~~

- ~~(a) Application must be complete;~~
- ~~(b) Grant money must be available; and~~
- ~~(c) Project must be eligible under these rules.~~

~~(3) Grants shall be awarded to applicants based on approved applications ranking highest in selection criteria, for solid waste planning, for general recycling projects, or recycling demonstration projects.~~

~~(4) The Department may award at least one grant in each program area during each grant round.~~

~~(5) When applications in any one grant category have the same score, the grant will be offered to the applicant whose complete application was received on the earliest date.~~

~~(4) The Department may award some, none or all of the grant moneys available in any grant round.~~

~~(5) The Department may award grants in amounts less than requested by the applicant. The Department shall make that determination based on the merits of the application, the project proposed, and the availability of grant moneys.~~

~~(6) Qualified applicants who do not receive a grant award can apply again during the next grant round.~~

Grant Agreements and Conditions

340-083-0100

(1) Following approval and selection of the application, the Department and the applicant shall enter into an agreement. The agreement shall include but is not limited to the following conditions:

- ~~(a) Applicant's responsibility for pProgress reports;~~
- ~~(b) Monitoring requirements;~~
- ~~(c) Authorized activities for rolling stock, purchased in whole or in part with grant funding, during its expected service life;~~
- ~~(ed) End date -- term of project and grant;~~
- ~~(de) Method of payment;~~
- ~~(ef) Terms and conditions of the grant;~~
- ~~(fg) Requirement for sharing of information resulting from project; and~~
- ~~(gh) Final report. Project Completion Report.~~

(2) The Department may allow an extension of time for a grantee to complete a project, upon receipt from the grantee of acceptable documentation of need.

(3) The Department may at any time review and audit requests for payment and make adjustments for, but not limited to, math errors, items not built or bought, unacceptable constructions, or lack of progress under the grant.



Attachment B-1

Secretary of State  
**NOTICE OF PROPOSED RULEMAKING HEARING**

A Statement of Need and Fiscal Impact accompanies this form.

DEQ –Waste Management & Cleanup Division  
Agency and Division

Chapter 340  
Administrative Rules Chapter Number

Susan M. Greco  
Rules Coordinator

(503) 229-5213  
Telephone

811 S.W. 6th Avenue, Portland, OR 97213  
Address

February 23, 2000	1:00 p.m.	1 <sup>st</sup> floor conference room, State Office Building 700 S.E. Emigrant, Pendleton	Julia Austin
Hearing Date	Time	Location	Hearings Officer
February 29, 2000	1:00 p.m.	Oregon Parks & Recreation Dept. 1115 Commercial St. NE, Salem	Jacque Moon
Hearing Date	Time	Location	Hearings Officer

Are auxiliary aids for persons with disabilities available upon advance request?  
 Yes       No

**RULEMAKING ACTION**

**ADOPT:**

Secure approval of rule numbers with the Administrative Rules Unit prior to filing.

**AMEND:** OAR 340-083-0010, 340-083-0020, 340-083-0030, 340-083-0040, 340-083-0050, 340-083-0070, 340-083-0080, 340-083-0090, & 340-083-0100

**REPEAL:** OAR 340-083-0060

**RENUMBER:**

Secure approval of rule numbers with the Administrative Rules Unit prior to filing.

**AMEND AND RENUMBER:**

Secure approval of rule numbers with the Administrative Rules Unit prior to filing.

Stat. Auth.: ORS 459A.120(2)(b) & (e)  
Stats. Implemented: ORS 459A.120(2)(b) & (e)

## **RULE SUMMARY**

The Solid Waste Planning and Recycling Grant program has operated for nine years with objectives established in 1990. These objectives pre-dated important legislation and policy decisions, specifically:

- The 1991 Recycling Act, which, among other things, adopted the statewide recovery goal of 50% for the year 2000, and set 1995 watershed recovery rates to measure each watershed's progress toward achieving the statewide goal
- The adoption of the Oregon Integrated Resource and Solid Waste Management Plan, 1995 – 2005. The primary focus of this plan was on moving up the solid waste hierarchy to emphasize waste prevention programs
- The development of DEQ's Strategic Plan, which established waste prevention and achieving a statewide 50% recovery rate as key objectives for the state's Solid Waste program

Together, these policy decisions and legislation advance programs that have the environmental protection benefits of reducing waste, conserving material resources and energy, and avoiding water and air pollution. Preventing waste in the first place avoids the environmental costs of producing the product, as well as transporting the discarded product to a recovery or disposal site. Removing more materials from the wastestream for the purposes of recycling also conserves resources and avoids both the environmental and financial cost of permanent disposal.

The main purpose of the proposed rule amendments is to amend the solid waste grant rules to allow the Department to fund projects that advance conservation of material resources. Awarding grants based on expected environmental benefit, rather than on financial need, will have the potential to produce significant positive environmental results. DEQ believes that part of the reason for not giving preference for financial need anymore is that grants have been awarded to nearly all the rural counties.

March 3, 2000

\_\_\_\_\_  
Last Day for Public Comment

\_\_\_\_\_  
Authorized Signer and Date

State of Oregon  
DEPARTMENT OF ENVIRONMENTAL QUALITY

Rulemaking Proposal  
for  
Solid Waste Rule Amendments: Solid Waste Planning and Recycling Grants,  
OAR 340-083-0010 to 340-083-0100

## Fiscal and Economic Impact Statement

### Introduction

The solid waste grant program has been in effect since 1991. It was created in response to the 1989 Legislature's authorization to use tipping fees for grants to local governments (ORS 459A.120(2)(b) & (e)). Grants have been awarded for nine consecutive years.

Since 1991, DEQ has set aside approximately \$500,000 each biennium for Solid Waste Planning and Recycling grants. A total of \$2,024,773 has been awarded to local governments. An additional \$122,376 has been awarded to local governments for Household Hazardous Waste grants. Administrative rules (OAR 340-083-0010 to 0100) govern the administration of these grants.

In 1999 the Solid Waste Policy and Program Development section initiated a review of several programs that had not been evaluated since their inception. The Solid Waste Planning and Recycling Grant program was one of these.

The solid waste grant program operated for nine years with the objectives established in 1990. These objectives pre-dated important legislation and policy decisions, specifically:

- The 1991 Recycling Act, which, among other things, adopted the statewide recovery goal of 50% for the year 2000, and set 1995 watershed recovery rates to measure each watershed's progress toward achieving the statewide goal
- The adoption of the Oregon Integrated Resource and Solid Waste Management Plan, 1995 – 2005. The primary focus of this plan was on moving up the solid waste hierarchy to emphasize waste prevention programs
- The development of DEQ's Strategic Plan, which established waste prevention and achieving a statewide 50% recovery rate as key objectives for the state Solid Waste program

The main purpose of the proposed rule amendments is to amend the Solid Waste Planning and Recycling Grant rules to allow the Department to award grants to projects that advance these objectives. The selection criteria, the main tool used to determine which projects are funded, are broadened and revised. The revised selection criteria may have an economic impact on some local governments.

**General Public**

The general public is not affected economically by these rule amendments.

**Small Business**

Small businesses are not affected economically by these rule amendments.

The grants are available only to local governments. The current rules allow a local government to enter into contracts with private citizens or companies in order to implement an approved project. In that case small businesses may benefit by being the indirect recipient of some of the grant revenue. The proposed rule amendments are not changing this.

**Large Business**

The same remarks made under the "Small Business" section are true for large businesses.

**Local Governments**

Only local governments are eligible to apply for these grants. The rule amendments may have an economic impact on certain categories of local governments in the form of decreased or increased grant funding.

When the original rules were adopted, the selection criteria specifically gave preference to financially needy local governments with few recycling opportunities located far from markets for recyclable materials. Funds have largely gone to the rural Oregon communities least able to support solid waste planning and waste reduction activities. Forty-four percent of the grant funds were awarded to communities located in counties with populations less than 25,000, that is, "small local governments". Twenty-nine percent of the grant funds were awarded to communities located in counties with populations 25,000 to 99,999, that is, "medium local governments".

**Small Local Governments**

Small local governments received \$893,500 in solid waste grant money during the nine years of the grant program. Slightly more than 25% - - \$234,450 - - of the funds went to projects to develop or enhance recycling depots in rural communities, 44% to projects to prepare solid waste management plans, with the remaining 31% to projects for general recycling and education activities.

With the new selection criteria proposed in the amended grant rules, it is possible that some projects that develop or enhance recycling depots in small communities may not score competitively. This may happen because the potential for environmental enhancement is small, and the amount of material and the expense to recover it may not be cost effective relative to larger communities.

Loss of grant funds to develop or enhance recycling depots would not be a regulatory issue for local governments. Although the Opportunity to Recycle Act, passed in 1983, requires every city, county or metropolitan service district responsible for solid waste management to provide a place for collecting recyclable materials, all communities in Oregon are already meeting this requirement.

Small local governments that are able to set their priorities to match those of the grant program will still be able to compete for grant funds.

**Medium Local Governments**

The rule amendments should not significantly impact medium sized local governments as a category. They will be able to compete for grant funds if the objectives of proposed projects match those of the grant program.

**Large Local Governments**

Twenty-seven percent of the grant funds have been awarded to communities located in counties with populations over 100,000, that is, "large local governments". If large local governments set their priorities to match those of the grant program, they will likely experience a positive economic impact from the grant amendments, as the selection criteria will no longer give preference to small local governments with few recycling opportunities located far from markets for recyclable materials. The large local governments may be the recipients of some portion of the funding no longer given to small local governments.

**State Agencies**

DEQ does not expect to experience any fiscal impact from the proposed rulemaking. No other state agencies are directly affected.

**Housing Cost Impact Statement**

The Department has determined that this proposed rulemaking will have no effect on the cost of development of a 6,000 square foot parcel and the construction of a 1,200 square foot detached single family dwelling on that parcel.

State of Oregon  
DEPARTMENT OF ENVIRONMENTAL QUALITY

Rulemaking Proposal  
for

Solid Waste Rule Amendments: Solid Waste Planning and Recycling Grants, OAR 340-083-0010 to 340-083-0100

## Land Use Evaluation Statement

### 1. Explain the purpose of the proposed rules.

The Solid Waste Policy and Program Development Section in the Waste Management and Cleanup Division is proposing to amend Oregon Administrative Rules 340-083-0010 to 340-083-0100.

In 1999 the Solid Waste Policy and Program Development Section initiated a review of several programs that had not been evaluated since their inception. The Solid Waste Planning and Recycling Grant program was one of these.

The Solid Waste grant program operated for eight years with the objectives established in 1991. These objectives pre-dated important legislation and policy decisions, specifically:

- The 1991 Recycling Act, which, among other things, adopted the statewide recovery goal of 50% for the year 2000, and set 1995 watershed recovery rates to measure each watershed's progress toward achieving the statewide goal
- The adoption of the Oregon Integrated Resource and Solid Waste Management Plan, 1995 – 2005. The primary focus of this plan was on moving up the solid waste hierarchy to emphasize waste prevention programs
- The development of DEQ's Strategic Plan, which established waste prevention and achieving a statewide 50% recovery rate as key objectives for the state Solid Waste program

During the review process, new goals and objectives were identified for the Solid Waste grant program, which reflect current policy and legislation in the Solid Waste program. The proposed rule amendments will amend the Solid Waste Planning and Recycling Grant Rules to incorporate these changes.

### 2. Do the proposed rules affect existing rules, programs or activities that are considered land use programs in the DEQ State Agency Coordination (SAC) Program? Yes No

a. If yes, identify existing program/rule/activity:

b. If yes, do the existing statewide goal compliance and local plan compatibility procedures adequately cover the proposed rules?  Yes  No (if no, explain):

**c. If no, apply the following criteria to the proposed rules.**

Staff should refer to Section III, subsection 2 of the SAC document in completing the evaluation form. Statewide Goal 6 - Air, Water and Land Resources is the primary goal that relates to DEQ authorities. However, other goals may apply such as Goal 5 - Open Spaces, Scenic and Historic Areas, and Natural Resources; Goal 11 - Public Facilities and Services; Goal 16 - Estuarine Resources; and Goal 19 - Ocean Resources. DEQ programs and rules that relate to statewide land use goals are considered land use programs if they are:

1. Specifically referenced in the statewide planning goals; or
2. Reasonably expected to have significant effects on
  - a. resources, objectives or areas identified in the statewide planning goals, or
  - b. present or future land uses identified in acknowledged comprehensive plans.

In applying criterion 2 above, two guidelines should be applied to assess land use significance:

- The land use responsibilities of a program/rule/action that involved more than one agency, are considered the responsibilities of the agency with primary authority.
- A determination of land use significance must consider the Department's mandate to protect public health and safety and the environment.

**In the space below, state if the proposed rules are considered programs affecting land use. State the criteria and reasons for the determination.**

Not applicable. The Department has evaluated the Solid Waste Grant Program against the above criteria and determined it is not a program that significantly affects land use.

**3. If the proposed rules have been determined a land use program under 2. above, but are not subject to existing land use compliance and compatibility procedures, explain the new procedures the Department will use to ensure compliance and compatibility.**

Not applicable.

\_\_\_\_\_  
Waste Management Divison

\_\_\_\_\_  
Intergovernmental Coordinator

\_\_\_\_\_  
Date

22

**Questions to be Answered to Reveal  
Potential Justification for Differing from Federal Requirements.**

**1. Are there federal requirements that are applicable to this situation? If so, exactly what are they?**

No

**2. Are the applicable federal requirements performance based, technology based, or both with the most stringent controlling?**

NA

**3. Do the applicable federal requirements specifically address the issues that are of concern in Oregon? Was data or information that would reasonably reflect Oregon's concern and situation considered in the federal process that established the federal requirements?**

NA

**4. Will the proposed requirement improve the ability of the regulated community to comply in a more cost effective way by clarifying confusing or potentially conflicting requirements (within or cross-media), increasing certainty, or preventing or reducing the need for costly retrofit to meet more stringent requirements later?**

NA

**5. Is there a timing issue which might justify changing the time frame for implementation of federal requirements?**

NA

**6. Will the proposed requirement assist in establishing and maintaining a reasonable margin for accommodation of uncertainty and future growth?**

NA

**7. Does the proposed requirement establish or maintain reasonable equity in the requirements for various sources? (level the playing field)**



NA

**8. Would others face increased costs if a more stringent rule is not enacted?**

NA

**9. Does the proposed requirement include procedural requirements, reporting or monitoring requirements that are different from applicable federal requirements? If so, Why? What is the "compelling reason" for different procedural, reporting or monitoring requirements?**

NA

**10. Is demonstrated technology available to comply with the proposed requirement?**

NA

**11. Will the proposed requirement contribute to the prevention of pollution or address a potential problem and represent a more cost effective environmental gain?**

NA

**State of Oregon**  
**Department of Environmental Quality**

**Memorandum**

**Date:** January 18, 2000

**To:** Interested and Affected Public

**Subject:** Rulemaking Proposal and Rulemaking Statements - Rulemaking Proposal and Rulemaking Statements - Solid Waste Rule Amendments - Solid Waste Planning and Recycling Grants OAR 340-083-0010 to 340-083-0100

This memorandum contains information on a proposal by the Department of Environmental Quality (DEQ) to adopt rule amendments regarding solid waste grants to local governments. This memorandum also provides information about the Environmental Quality Commission's intended action to adopt a rule.

The Solid Waste Planning and Recycling Grant program has operated for nine years with objectives established in 1990. These objectives pre-dated important legislation and policy decisions, specifically:

- The 1991 Recycling Act, which, among other things, adopted the statewide recovery goal of 50% for the year 2000, and set 1995 watershed recovery rates to measure each watershed's progress toward achieving the statewide goal
- The adoption of the Oregon Integrated Resource and Solid Waste Management Plan, 1995 – 2005. The primary focus of this plan was on moving up the solid waste hierarchy to emphasize waste prevention programs
- The development of DEQ's Strategic Plan, which established waste prevention and achieving a statewide 50% recovery rate as key objectives for the state's Solid Waste program

Together, these policy decisions and legislation advance programs that have the environmental protection benefits of reducing waste, conserving material resources and energy, and avoiding water and air pollution. Preventing waste in the first place avoids the environmental costs of producing the product, as well as transporting the discarded product to a recovery or disposal site. Removing more materials from the wastestream for the purposes of recycling also conserves resources and avoids both the environmental and financial cost of permanent disposal.

The main purpose of the proposed rule amendments is to amend the solid waste grant rules to allow the Department to fund projects that advance conservation of material resources. Awarding grants based on expected environmental benefit, rather than on financial need, will have the potential to produce significant positive environmental results. DEQ believes that part of the reason for not giving preference for financial need anymore is that grants have been awarded to nearly all the rural counties.

Specifically, this proposal would amend the grant rules to:

- Change the selection criteria, making them broader than current selection criteria, and adding criteria that will help meet the Solid Waste program's objectives
- Remove all grant categories
- Add a provision for focused grants, which will allow the Department to target, and give priority for

- funding, defined types of projects intended to achieve specific environmental objectives
- Include rolling stock as an eligible expenditure

The Department has the statutory authority to address this issue under ORS 459A.120(2)(b) & (e).

#### **What's in this Package?**

Attachments to this memorandum provide details on the proposal as follows:

- Attachment A The official statement describing the fiscal and economic impact of the proposed rule.
- Attachment B A statement providing assurance that the proposed rules are consistent with statewide land use goals and compatible with local land use plans.
- Attachment C Questions to be Answered to Reveal Potential Justification for Differing from Federal Requirements
- Attachment D The actual language of the proposed rule amendments.

#### **Hearing Process Details**

The Department is conducting two public hearings at which comments will be accepted either orally or in writing. Please notify DEQ about any special physical or language accommodations you may need as far in advance of the hearing as possible. To make these arrangements, please contact Julie Schmitt at 1-800-452-4011 in Oregon or (503) 229-6922. People with hearing impairments may call DEQ's TDD number at (503) 229-6933. Julia Austin will be the Presiding Officer at the hearing in Pendleton, and Jacquie Moon will be the Presiding Officer at the hearing in Salem. The hearings will be held:

**Date:** Wednesday, February 23, 2000

**Time:** 1:00 p.m.

**Place:** State Office Building, 1<sup>st</sup> floor conference room, 700 SE Emigrant

AND

**Date:** Tuesday, February 29, 2000

**Time:** 1:00 p.m.

**Place:** Oregon Parks and Recreation Department, 1115 Commercial St. NE, Salem, OR.

**Deadline for submittal of Written Comments:** 5:00 p.m. Friday, March 3, 2000.

Written comments can be presented at the hearing or to the Department any time prior to the date above. Comments should be sent to: Department of Environmental Quality, Attn: Jacquie Moon, 811 S.W. 6th Avenue, Portland, Oregon 97204-1390.

No comments can be accepted after the deadline. The Department recommends that comments are submitted as early as possible to allow adequate review and evaluation of the comments submitted.

#### **What Happens After the Public Comment Period Closes**

Following close of the public comment period, the Presiding Officer will prepare a report which

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January 18, 2000  
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summarizes the oral testimony presented and identifies written comments submitted. The Environmental Quality Commission (EQC) will receive a copy of the Presiding Officer's report. The public hearing will be tape recorded, but the tape will not be transcribed.

The Department will review and evaluate the rulemaking proposal in light of all information received during the comment period. Following the review, the rules may be presented to the EQC as originally proposed or with modifications made in response to public comments received.

The EQC will consider the Department's recommendation for rule adoption during one of their regularly scheduled public meetings. The targeted meeting date for consideration of this rulemaking proposal is May 18 - 19, 2000. This date may be delayed if needed to provide additional time for evaluation and response to testimony received in the hearing process.

You will be notified of the time and place for final EQC action if you present oral testimony at the hearing or submit written comment during the comment period. Otherwise, if you want to be advised of this proceeding, request that your name be placed on the mailing list.

### **Background on Development of the Rulemaking Proposal**

#### **Why is there a need for the rule?**

When DEQ created the grant program in response to 1989 legislation, it established four key objectives for the program. They were, in order of importance:

- Target funds to areas of greatest financial and environmental need
- Stretch limited dollars - award a larger number of small grants
- Equitably distribute funds among the grant categories and communities
- Provide for innovative and improved solid waste management in the form of demonstration grants

The main purpose of the proposed rule amendments is to allow the Department to award grants to projects that will assist the Solid Waste program in meeting its objectives. Consequently, the selection criteria, the main tool used to determine which projects will be funded, have been broadened and revised.

The new objectives for the solid waste grant program are to award grants that will:

- Assist the state to meet and exceed its 50% recovery goal
- Increase waste prevention and reuse
- Encourage local market development and the purchase of recovered materials
- Encourage solid waste management planning

#### **How was the rule developed**

The Solid Waste Policy and Program Development section formed a Grants Analysis Team, comprised of three regional technical assistance staff and two headquarters staff to review the grant program. The team met six times between February and September of 1999. Internal and external stakeholders were invited to participate in a process of reviewing and commenting on the proposed objectives. DEQ

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Page 4

regional and headquarters staff had several opportunities to provide input. Twelve local governments were formally surveyed, and team members informally discussed many of the issues with additional local government representatives. A facilitated stakeholder meeting was held in March 1999. Written comments were solicited as well.

The final recommendations were proposed and agreed to by the Solid Waste program management team.

Copies of the documents relied upon in the development of this rulemaking proposal can be reviewed at the Department of Environmental Quality's office at 811 S.W. 6th Avenue, Portland, Oregon. Please contact Jacquie Moon for times when the documents are available for review.

**Whom does this rule affect including the public, regulated community or other agencies, and how does it affect these groups?**

This rule amendment affects local governments. They are the eligible applicants for the grants.

Small local governments located in counties with populations less than 25,000 may be impacted. Because the previous selection criteria gave preference to financially needy local governments with few recycling opportunities located far from markets for recyclable materials, they received 44% of the grant funds since 1990. The new selection criteria are based on broader environmental objectives rather than the earlier preference for financial need factors. However, sparsely populated counties and the larger communities within them should be able to compete for funding on an equal basis with all local governments across the state for project proposals in the areas of waste prevention and local market development.

Small local governments received \$893,501 in solid waste grant money during the nine years of the grant program. Slightly more than 25% - - \$234,451 - - of the funds went to projects to develop or enhance recycling depots in rural communities, 44% to projects to prepare solid waste management plans, with the remaining 31% to projects for general recycling and education activities.

With the new selection criteria proposed in the amended rules, it is possible that some projects that develop or enhance recycling depots in small communities may not score competitively. This may happen because the potential for environmental enhancement is small, and the amount of material and expense to recover it may not be as cost effective as other projects. Thus, small local governments may receive relatively less funding in the future for recycling depots.

Local governments located in counties with a population of 100,000 and over have an increased chance of receiving grant funding because they are no longer disadvantaged by the selection criteria.

All local government projects will be selected based on meeting the new criteria that give more "weight" to environmental and less to financial need factors.

**How will the rule be implemented**

Once the rules are adopted, DEQ will send a mailing to all local governments alerting them to the

Memo To: Interested and Affected Public  
January 18, 2000  
Page 5

amended rules and what these amended rules might mean to them. Additionally, examples of the types of projects the Solid Waste program hopes to fund will be provided. The Department will open a new round of grants, tentatively in August 2000, closing the first of November, with awards announced by the first of March 2001. The new selection criteria will be used to select the grants.

**Are there time constraints**

There are no formal deadlines in state or federal law for this rule amendment. However, in order to offer grants in a timely manner, and to give local governments advance time to prepare proposals in line with the revised grant objectives, the proposed rule amendments need to be adopted on a schedule with some lead time.

**Contact for more information**

If you would like more information on this rulemaking proposal, or would like to be added to the mailing list, please contact:

Jacquie Moon, phone (503) 229-5479  
[Moon.Jacquelyn.L@deq.state.or.us](mailto:Moon.Jacquelyn.L@deq.state.or.us)  
DEQ 9<sup>th</sup> floor  
811 SW 6<sup>th</sup> Avenue  
Portland, OR 97204

THIS PUBLICATION IS AVAILABLE IN ALTERNATE FORMAT (E.G. LARGE PRINT, BRAILLE) UPON REQUEST. PLEASE CONTACT DEQ'S PUBLIC AFFAIRS AT 503-229-5317 TO REQUEST AN ALTERNATE FORMAT.

**State of Oregon  
Department of Environmental Quality**

**Memorandum**

**Date:** March 6, 2000  
**To:** Environmental Quality Commission  
**From:** Inez Julia Austin, Hearings Officer,  
DEQ Eastern Region, Solid Waste Program  
**Subject:** Presiding Officer's Report for Rulemaking Hearing  
Hearing Date and Time: February 23, 2000, beginning at 1:00  
Hearing Location: State Office Building, Pendleton, Oregon

Title of Proposal: Solid Waste Rule Amendments, Solid Waste Planning and Recycling Grants OAR 340-083-0010 to 340-083-0100

The rulemaking hearing on the above title proposal was convened at 1:00 p.m. People were asked to sign witness registration forms if they wished to present testimony. People were also advised that the hearing was being recorded and of the procedures to be followed.

Two people were in attendance, one person signed up to give testimony.

Prior to receiving testimony, Linda Hayes-Gorman briefly explained the specific rulemaking proposal, the reason for the proposal, and responded to questions from the audience.

Summary of Oral Testimony

Karen King, Regulatory Specialist for the City of Pendleton, provided oral testimony. She read a letter prepared by the Mayor of Pendleton, Bob Ramig. She expressed concern that the information DEQ had prepared for Public Comment indicated that DEQ will no longer give extra consideration to small rural communities that apply for grants and will now bias the program toward large governments who already have a large tax base and are capable of providing their own funding.

She believes the proposed amendments will have significant negative impacts on rural socially and economically disadvantaged Eastern Oregon communities, already faced with critically limited resources, because they will no longer score competitively when the grants are awarded.

**State of Oregon**  
**Department of Environmental Quality**

**Memorandum**

**Date:** March 6, 2000

**To:** Environmental Quality Commission

**From:** Jacquie Moon

**Subject:** Presiding Officer's Report for Rulemaking Hearing  
Hearing Date and Time: February 28, 2000, beginning at 1:00  
Hearing Location: Oregon Parks and Recreation Department, Salem, Oregon

Title of Proposal: Solid Waste Rule Amendments, Solid Waste Planning and  
Reccling Grants OAR 340-083-0010 to 340-083-0100

The rulemaking hearing on the above title proposal was convened at 1:00 p.m. No one attended the hearing. The hearing was closed at 2:00 p.m.



Attachment C-3

List of Written Comments Received

1. Robert Ramig, Mayor, City of Pendleton, Pendleton, Oregon; 2/28/00

## Attachment D

### Response to Public Testimony

The Department held two public hearings on the proposed solid waste planning and recycling grant rule amendments in Pendleton and Salem February 23 and 29, 2000 respectively. Two people attended the hearing in Pendleton. Karen King, Regulatory Specialist for the City of Pendleton, provided oral testimony. She read a letter prepared by the Mayor of Pendleton, Bob Ramig, who also attended the hearing. They subsequently submitted the letter as a written comment. No one attended the public hearing in Salem, and only the one written comment was submitted.

The comments were not supportive of the rule amendments because the rule amendments were perceived to be detrimental to rural eastern Oregon communities. The comments follow.

#### 1. Selection Criteria – who should receive a grant

**Comment:** The Department should not pursue the rule amendments because the proposed amendments will have significant negative impacts on economically disadvantaged eastern Oregon communities, already faced with critically limited resources, because they will no longer score competitively when the grants are awarded.

**Comment:** Because DEQ will no longer give extra consideration to small rural communities, a majority of grant funds will be diverted away from small east-side local governments to large west-side local governments which already have a large tax base and are capable of providing their own funding.

- **Response:** The Department has awarded grants for nine consecutive years. One of the initial objectives of the program was to provide funds to financially needy local governments with few recycling opportunities. The Department conducted a review of the grant program in 1999. This review led to the conclusion that the grant program had largely met this objective. Seventy-three percent of the grant funds were awarded to communities located in counties with populations less than 100,000. These communities were able to prepare comprehensive solid waste management plans, establish recycling depots, and fund general recycling and education activities. Only two of the 27 counties in this population range did not receive any grant funding, one of which never applied for a solid waste grant. Many small communities received multiple grants.

Additionally, since 1996 there has been a decrease in the number of applications each year from small local governments located in counties with populations less than 100,000, resulting in fewer grants awarded to them. At the same time, since 1994 there has been an increase in the number of applications from large local governments located in counties with populations over 100,000, resulting in more grants awarded to them.

Very small local governments located in counties with populations less than 25,000 may be impacted. They received \$893,501 in solid waste grant money during the nine years of the grant program. Slightly more than 25% - - \$234,451 - - of the funds went to projects to develop or enhance recycling depots in rural communities, 44% to projects to prepare solid waste management plans, with the remaining 31% to projects for general recycling and education activities. Since the new selection criteria proposed in the rule amendments are based on broader environmental objectives that will advance solid waste program goals, it is

possible that some projects that develop or enhance recycling depots in small communities may receive relatively less funding. Because of this, the sixteen counties with populations less than 25,000 may collectively lose up to \$26,050 annually in grant funding. This may happen because the potential for environmental enhancement is small, and the amount of material collected at the depots and expense to recover it may not be as cost effective as other projects.

Still, the Department believes it is time to shift the focus of the grant program in order to make it a more effective tool for supporting solid waste environmental goals. The two major goals - - helping the state meet its 50% recovery goal, and encouraging waste prevention and reuse - - apply across all Oregon communities, and nothing in the proposed rule amendments prohibits small local governments from applying for and receiving grant funding.

2. Miscellaneous

**Comment:** The Department has concluded that “funding small rural communities is a bad thing”.

- **Response:** This is not the Department’s position. Rather, it is that the current grant rules and program objectives actively discriminate against large local governments, and potentially against projects of significant environmental benefit. The proposed rule amendments simply end this policy of discriminating against large jurisdictions. The Department’s goal is to achieve the greatest environmental results for the resources expended, and to equitably distribute the grant funds around the state.

**Comment:** Small local governments will not be able to compete for household hazardous waste collection events at a time when they are facing increased Clean Water Act regulations.

- **Response:** The proposed rule amendments apply to the solid waste planning and recycling grant program, including household hazardous waste planning and education grants. They do not apply to household hazardous waste collection events. That program is administered under a separate statute, and has its own funding. The Department will continue to offer household hazardous waste collection events, as well as augment them with grants to assist local governments to plan for local systems for the collection and disposal of household hazardous waste. The proposed changes will in no way diminish the opportunity for small Oregon communities to properly collect and dispose of household hazardous waste at collection events.

**Comment:** Local governments who can afford to hire professional grant writers to prepare applications would receive increased funding, which would work against small local governments because of often lack the resources to hire grant writers.

- **Response:** The Department agrees that grants should not be awarded simply on the basis of sophisticated presentations. The intent is to award grants based on evidence that the proposed projects have the potential to produce significant and durable environmental results, and are well planned. As in the past, Department Technical Assistance staff are available to assist local governments develop sound project proposals.

Attachment E

State of Oregon  
DEPARTMENT OF ENVIRONMENTAL QUALITY

Rulemaking Proposal  
for  
Solid Waste Rule Amendments – Solid Waste Planning and Recycling Grants  
OAR 340-083-0010 to 340-083-0100

Rule Implementation Plan

Summary of the Proposed Rule

The main purpose of the proposed rule amendments is to amend the solid waste grant rules to allow the Department to use the grant program as a tool to implement current solid waste program goals and to fund projects that are expected to produce significant and durable environmental benefits.

Specifically, this proposal would amend the grant rules to:

- *Change the selection criteria, making them broader than current selection criteria.* Specific criteria will be developed for each grant category and publicized before the grant round is opened in the Public Notice of Fund Availability. This will allow the solid waste program to solicit a wide range of grant projects
- *Add a provision for focused grants,* which will allow the solid waste program to target, and give priority for funding, to defined types of projects intended to achieve specific environmental objectives
- *Remove grants categories from rule.* This will allow the solid waste program to tie grant categories to its strategic objectives
- *Include rolling stock as an eligible expenditure.* Rolling stock such as a forklift is no different than other equipment used for processing recyclable materials. Additionally, using the grant program to purchase a truck would allow rural Oregon communities to band together to centralize the collection of recyclable materials. “Exclusive” use of this equipment for recycling and waste reduction activities will be delineated in the grant contract

These rules affect local governments, which are the eligible recipients of the grants.

Proposed Effective Date of the Rule

Upon adoption by the Environmental Quality Commission, scheduled for May 17, 2000.

Proposal for Notification of Affected Persons

All local governments will be notified of the rule amendment and what these amended rules might mean to them. The notification will include examples of the types of projects the Solid Waste program hopes to fund, the general selection criteria, and a schedule for the upcoming grant round.

### Proposed Implementing Actions

- The Department will determine if there is to be a grant focus for the year 2000 grant round, and if so, what the focus will be
- Selection criteria will be developed for the specific type of grants to be offered
- New program materials, such as applications and Applicant Handbooks will be developed
- The Department will open a new round of grants in late August 2000. The Public Notice of Fund Availability announcing the opening of the grants will be mailed to all local governments and other interested parties. The notice will include the specific selection criteria that will be used to select the grants
- The grants will be closed for application November 1, 2000
- A team of solid waste technical assistants and headquarters staff will evaluate the grant applications, assigning scores to each application
- The team will meet and develop a list of funding recommendations
- Funding recommendations will be presented to the solid waste program management team
- Grant awards will be announced by March 1, 2001
- The Department's Solid Waste Policy and Program Development section will take steps to ensure that these rule changes do not reap any negative unintended consequences. These steps include monitoring the distribution of grant awards, and selecting a grant focus with the goal in mind that all local governments will be able to participate

### Proposed Training/Assistance Actions

Regional solid waste technical assistants will be involved in determining if there is to be a grant focus, and if so, what the focus will be. They will also participate in developing or responding to drafts of the specific selection criteria to be used, as well as the new program material.

Regional solid waste technical assistants will also work with local governments to further inform them of the changes in the grant program and to offer technical assistance in developing sound grant proposals that further solid waste program objectives.

# Environmental Quality Commission

- Rule Adoption Item
- Action Item
- Information Item

**Agenda Item G**  
**May 17, 2000 Meeting**

**Title:**

Report to the Environmental Quality Commission --Hazardous Waste-Derived Fertilizer and Related Issues

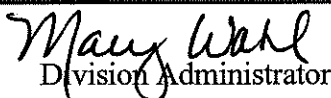
**Summary:**

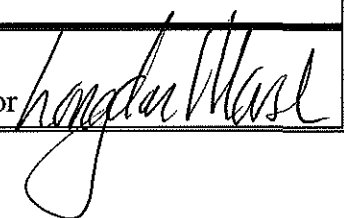
Metal concentration limits set last year for K061 hazardous waste-derived zinc micronutrient fertilizer became effective March 31, 2000. During the registration of zinc-containing fertilizer products, the Oregon Department of Agriculture (ODA) will ask the registrant whether its zinc fertilizer is waste-derived. If the registrant acknowledges that its fertilizer is waste-derived, then the registrant will be advised that contaminants in the fertilizer, for which there are regulatory limits, must be at or below those limits before the fertilizer may be used in Oregon. Many other fertilizer issues remain. Existing DEQ limits for other hazardous waste-derived fertilizers, industrial waste by-products and co-products, and "biosolids," all of which are applied to Oregon land, will likely serve as a baseline of discussions when ODA eventually proposes standards for non-nutritives in fertilizers, agricultural amendments, and agricultural minerals. DEQ expects to participate in that effort.

**Department Recommendation:**

Help develop limits for toxic contaminants in beneficial materials applied to land.

  
Report Author

  
Division Administrator

Director 

**Report to the  
Environmental Quality Commission --  
Hazardous Waste-Derived Fertilizer and Related Issues**

**SUMMARY: Metal concentration limits<sup>1</sup> set last year for K061 hazardous waste-derived zinc micronutrient fertilizer became effective March 31, 2000. During the registration of zinc-containing fertilizer products, the Oregon Department of Agriculture (ODA) will ask the registrant whether its zinc fertilizer is waste-derived. If the registrant acknowledges that its fertilizer is waste-derived, then the registrant will be advised that contaminants in the fertilizer, for which there are regulatory limits, must be at or below those limits before the fertilizer may be used in Oregon.**

Many other fertilizer issues remain. Existing DEQ limits for other hazardous waste-derived fertilizers, industrial waste by-products and co-products, and "biosolids," all of which are applied to Oregon land, will likely serve as a baseline of discussions when ODA eventually proposes standards for non-nutritives in fertilizers, agricultural amendments, and agricultural minerals. DEQ expects to participate in that effort.

**Report Purpose**

At the March 19, 1999 EQC meeting, the EQC closed a loophole in the federal hazardous waste regulations which allowed heavy-metal laden hazardous waste dust from steel manufacturing (K061) to be applied to land as a zinc micronutrient fertilizer, but without any limits on toxics along for the ride. The Commission accepted the Department's recommendations and established metal limits for the fertilizers. At the same time, the Commission asked for a report on the issue of toxics in fertilizers in one year. *The primary purpose of this report is to update the Commission on hazardous waste-derived fertilizer and related issues.*

**TOXICS IN FERTILIZERS: ISSUES BACKGROUND**

Most fertilizers contain at least one of these three basic plant nutrients: nitrogen, phosphorus and potassium; and liming agents contain calcium. These materials can be derived from a variety of virgin raw materials, composts or other organic matter, such as "biosolids" (treated sewage sludge) as well as from other materials such as certain industrial wastes<sup>2</sup>, including some "hazardous wastes."

Industrial waste materials, and some hazardous wastes, are sometimes used in fertilizers for their nutrient content (i.e., ammonium or zinc), or as soil amendments to make soil loose and friable. Other soil amendments include industrial waste-derived sludge from non-chlorine bleaching in paper manufacturing, and "biosolids," which contribute organic material to soils.

Most fertilizer or amendments applied to land contain measurable levels of metals such as lead, arsenic and cadmium. Some contain persistent, bioaccumulative, and toxic pollutants (PBTs)

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<sup>1</sup> Lead, cadmium, chromium, arsenic, selenium, silver, mercury and barium.

<sup>2</sup> Some industrial wastes applied to land as soils amendments include pulp sludge, cannery wastes, potato processing wastes, and fly ash.

such as dioxins, mercury, chlorinated dibenzo furans, and polychlorinated biphenyls. These pollutants have been found in cement kiln dust, a common liming agent, and in K061 hazardous waste-derived zinc micronutrient fertilizer. In 1999, Washington State measured dioxin content in cement kiln dust, in K061 hazardous waste-derived micronutrient fertilizer, and in zinc-containing tire ash, and found dioxin in all three materials. (Including relatively high dioxin concentrations in a sample of K061 zinc-micronutrient fertilizer in Oregon.)

Toxic pollutants are not limited to the industrial waste ingredients, however. Some naturally occurring fertilizer ingredients, such as phosphate rock mined in Idaho, and used in the Northwest, contain the highest known concentration of "mined" cadmium. This information is significant, because when ODA develops cadmium limits, naturally occurring cadmium will figure into the discussion, as will background levels, the Canadian Standards (those used in Washington State), and several other risk-based standards being developed.

Other contaminants in fertilizer include trace radioactivity, some of which is found in phosphate and phosphogypsum fertilizers applied to agricultural land. Trace radioactivity comes from phosphate rock. Industrial wastes used as fertilizer can contribute radioactivity, too. Recently, ODA learned that an unregistered ammonium hydroxide, low-level radioactive industrial waste was being marketed as fertilizer in Oregon. The waste was from a nuclear fuel loading facility in Richmond, Washington, and had been used as a fertilizer in Washington State since 1996, and possibly in Oregon.

While almost all states, including Oregon, currently have fertilizer testing and labeling requirements, such requirements typically address only the agriculturally beneficial (e.g., plant food) ingredients or nutrients, in fertilizers. Relatively few states require comprehensive testing and disclosure of all fertilizer components, including non-nutritives.

Certain types of wastes that are beneficially used for agricultural purposes and are subject to federal regulations, as administered by DEQ, include:

- Hazardous waste applied to land is regulated under the Resource Conservation and Recovery Act. There exist regulatory constituent concentration standards which hazardous waste-derived materials must meet prior to placement on the land.
- "Biosolids" used in agriculture are regulated under the 40 CFR, Part 503 Clean Water Act, and are currently subject to concentration limits for nine metal contaminants. EPA is proposing to set a 300 parts per trillion (ppt) total equivalents (TEQ) dioxin limit, above which the biosolids may not be applied to land.
- Industrial wastes, such as sludge from paper manufacturing, when applied to land is regulated under the Clean Water Act, through the NPDES and WPCF permit programs. Sludge may not be used on land if it fails hazardous waste tests, and DEQ Water Quality guidelines prescribe which contaminants need control, as well as application rates, frequencies, and cumulative loadings.



## WHAT'S HAPPENING WITH WASTE-DERIVED FERTILIZERS?

### Status of EQC 1999 Fertilizer Rule Implementation

The metal limits the Commission adopted last year went into effect on March 31, 2000. Because the Oregon Department of Agriculture (ODA) is the agency that most closely interacts with the manufacturers of the fertilizers, DEQ has worked closely with ODA to get the word out about the new standards. In an effort to identify hazardous waste-derived fertilizers, ODA will ask the registrant whether its zinc fertilizer is waste-derived. If it is waste derived, the registrant will be advised that the contaminants in the fertilizer, for which there are limits, must meet or be below those limits before the fertilizer may be used in Oregon.

In addition to this coordination with ODA, DEQ will continue to investigate any complaints or other leads in which hazardous waste-derived fertilizers may be involved. However, DEQ has determined that the most effective way to raise the awareness of the hazardous waste-related issues regarding fertilizer is to participate in the recent workgroup, lead by ODA, to reevaluate the Oregon statutes addressing fertilizer registration.

### Developments at ODA

In 1999, ODA proposed legislation that would have given it the authority to establish limits for non-nutritives in fertilizer, agricultural amendments, and agricultural minerals, including liming agents. The decision to pursue legislation was based on the general concern about non-nutritives in materials applied to land. The legislation did not succeed.

For the forthcoming legislative session, ODA is exploring with industry the possibility of developing legislation that will give ODA similar authority, but which will resolve some of the more basic issues in the statute itself. Currently, only the states of Washington, Idaho, and Texas have statutory authority to limit non-nutritives in these materials. So far, state limits have been based either on the Canadian<sup>3</sup> or EPA's "biosolids" standards for heavy metals. The Fertilizer Institute<sup>4</sup> recently released a report discussing the issue of toxics in fertilizers. The impact of this report is still being evaluated.

In any case, DEQ is participating on the workgroup developing the legislation. There is likely to be a significant overlap in jurisdiction because the DEQ already has limits on several contaminants found in hazardous waste-derived materials, industrial waste by-products, and "biosolids," all of which are used on land for beneficial purposes.

### EPA Developments

EPA is currently developing toxicity limits, including dioxin limits, for pollutants in hazardous waste-derived zinc micronutrient fertilizers, that have been exempt from any standards since 1988. EPA's proposed limits will be based on best manufacturing technology, i.e., that technology which produces the "cleanest" zinc micronutrient fertilizer with the lowest levels of metals and dioxin protective of human health and the environment. This approach to standard

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<sup>3</sup> Long-term (45 year) cumulative heavy metals additions to the soil.

<sup>4</sup> *Health Risk Evaluation of Select Metals in Inorganic Fertilizers Post Application*, The Fertilizer Institute, January 16, 2000.

setting contrasts with the approach which is based on risk, and resulting in annual pollutant loading rates for soils, i.e., lbs. toxics/acre/year. EPA's dioxin<sup>5</sup> limit of eight parts per trillion (ppt) toxicity equivalents (TEQ) for K061 derived fertilizer, is one of two other dioxin limits being proposed for other materials applied to land: EPA is proposing a 300 ppt TEQ maximum dioxin concentration limit<sup>6</sup> allowable in "biosolids" applied to land; and a 40 ppt TEQ dioxin limit for cement kiln dust, a common liming agent.

Although EPA suggests that their proposed toxics concentration limits for hazardous waste-derived zinc micronutrient fertilizers will be well below risk-based levels, it is important to note that their proposed maximum concentration level of eight ppt TEQ for dioxin is, nonetheless, far above background concentrations measured in Washington State soils (their background dioxin levels average between 0.14 ppt TEQ on agricultural land to 4.1 ppt TEQ average in an urban environment). Since there is no reason to believe that background concentrations of dioxin in Oregon are significantly different than those found in Washington State, EPA's proposal would, in essence, be approving anywhere from two to 60 times more dioxin to be added to Oregon soils as contaminants in waste-derived zinc micronutrient fertilizers. Given the current focus on elimination of the release of PBTs in Oregon and across the nation, EPA's proposal seems to fall far short of our goals.

### **Hazardous Waste Program: Next Steps**

Sometime next year, EPA will promulgate regulations addressing contaminants in hazardous waste derived fertilizers that are used for their zinc content, and for cement kiln dust used as a liming agent. Both regulations are expected to set limits on dioxins. The Department will need to evaluate the new rules for adoption because it (1) already has standards for waste-derived zinc fertilizer, but not for dioxin in the fertilizer, and (2) is working to implement the Governor's Executive Order on "Persistent, Bioaccumulative, and Toxic Pollutants"<sup>7</sup> which will also need to be considered. Also, the new EPA mandated rules for cement kiln dust will need to be adopted because there are currently no limits. Throughout all of this, the DEQ will continue to work with the ODA in its quest to set limits for non-nutritives in materials registered for use in Oregon, including waste-derived materials such as zinc micronutrient fertilizer.

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<sup>5</sup> EPA tentatively proposes to set regulatory levels that are background levels found in the East. Background levels in Washington State are much lower, averaging approximately 0.14 ppt TEQ on agricultural land, 1.0 ppt TEQ in open areas, 2.3 ppt TEQ in forests, and 4.1 ppt TEQ in urban areas. *A Study of Dioxins in Washington's Agricultural Soils*, November 1999.

<sup>6</sup> The highest documented in Oregon is 25 ppt TEQ applied to land. DEQ.

<sup>7</sup> *Elimination of Persistent, Bioaccumulative, and Toxic Pollutants*, Executive Order No. EO-99-13, September 24, 1999.

State of Oregon  
Department of Environmental Quality

Memorandum

Date: April 17, 2000

To: Environmental Quality Commission

From: Langdon Marsh, Director

Subject: Status of Oregon's TMDL Program

**Statement of Purpose**

The purpose of this report is to give the EQC an update on Total Maximum Daily Loads in Oregon.

**The Oregon Plan and Healthy Stream Partnership**

TMDLs are required under the Federal Clean Water Act whenever a surface waterbody such as a lake, stream, estuary or other waterbody does not meet public health or aquatic life water quality standards. Usually, a TMDL is necessary when a waterbody is impacted by multiple, rather than an individual source of pollution.

On April 15, 1997 and in response to the Healthy Stream Partnership, DEQ developed guidance to assist in the development of TMDLs. That guidance states in part:

*The Department believes that the best solutions to water quality problems are those with broad and active local support and involvement. Citizens all over Oregon are anxious to proceed- and in some cases already are proceeding-with ambitious watershed enhancement projects. However, in those areas with listed waters where an effective local commitment to water quality improvement is slow to form, the Department (or other agencies of state or federal government) will have to move ahead with whatever actions are necessary to implement the law and protect water quality. If we fail to do this in a timely manner, citizens may sue through the courts to force implementation of the law, a likelihood well documented by the citizen law suits of the past decade. The result could be watershed management plans developed and imposed with less local involvement and support than all of us prefer to see. The best way to avoid this unsatisfactory situation is for local citizens and government agencies to join in partnerships to sufficiently address water quality problems and to thus remove water from the 303(d) list as soon as possible.*

Oregon's TMDL schedule is aggressive. Under the Oregon Plan, DEQ is directed to complete TMDLs for all 91 sub-basin in a systematic fashion by the end of 2007.

DEQ staff are presently involved in 25 of Oregon's 91 sub-basins developing TMDLs and helping implement watershed projects that will clean up hundreds of miles of waterbodies through the hard work of local communities and private parties in those watersheds.

Our move to support this watershed based restoration effort by moving away from producing TMDLs through intensive studies of a single water quality parameter on a single water body to more sweeping efforts to address all the important water quality issues in whole watersheds is paying off. We are learning that comprehensive watershed based approaches that involve forestry, agriculture, municipal, and industrial sectors provide the best mechanism to equitably address the pollution problems in a watershed.

In addition, we have changed the way we do TMDLs in order to realistically meet the challenge of accelerating the completion rate for TMDLs from what it was in the late '80s and early '90s. These changes have been difficult to make, but they are necessary in order to address water quality issues at an effective geographic scale and to accomplish TMDLs at a rate sufficient to satisfy the water quality needs of Oregon.

Oregon's approach to establishing and implementing TMDLs includes working with two of our most important partners, Oregon Department of Agriculture and Oregon Department of Forestry. These agencies have worked with DEQ to develop the framework of how TMDLs are developed and implemented with respect to non-point sources of pollution related to forestry and agriculture. These agreements are important because these agencies have the primary and direct responsibility to work with their constituents and implement TMDL allocations. We have entered into formal MOUs with both agencies that define how TMDLs are linked with their programs.

### **Legal Action**

Following a lawsuit filed by Northwest Environmental Defense Center (NEDC) against the Environmental Protection Agency (EPA) based on EPA's failure to ensure DEQ's development of TMDLs, a Consent Order was entered into in 1987 between EPA and NEDC. The Consent Order committed DEQ to complete TMDLs on several specific waterbodies, and to complete a specific percent of TMDLs per year given the number of waterbodies identified as impaired at that time. In 1996 a second lawsuit was filed against EPA for not forcing DEQ to complete TMDL's on a faster schedule. Settlement discussions are ongoing in that case. The State of Oregon has made clear that the schedule and process of TMDL development as envisioned in the Oregon Plan must be the basis of any settlement.

The Oregon Plan TMDL schedule was agreed to by EPA in a Memorandum of Agreement signed by DEQ and EPA on February 1, 2000. On February 7, 2000, the Sierra Club and Jack Churchill re-initiated court action against EPA seeking to enforce the 1986 Consent Decree. The plaintiffs asked the court to establish an extremely aggressive six-month TMDL completion schedule for Oregon. It is extremely important for DEQ to maintain the staffing necessary to stay on the Oregon Plan schedule to avoid having a federal court impose a more onerous schedule.

On March 29, 2000, Daryl and Barbara Hawes, the Baker County Farm Bureau, and the Baker County Stockmen filed suit against DEQ, ODA and EQC. The complaint alleges DEQ, ODA and EQC exceeded its authority in by requiring TMDLs for streams with only non-point sources of pollution. They are citing our recently signed Memorandum of Agreement with EPA.

### **TMDL Development Scheduled by 2003**

Out of the 91 subbasins in Oregon, 49 are scheduled to be completed by the end of 2003. Following is that breakdown (sub-basin list attached):

- 1999        2 sub-basins
- 2000        6 sub-basins
- 2001        15 sub-basins
- 2002        7 sub-basins
- 2003        20 sub-basins

### **Evaluation of Progress and Staff Activities**

DEQ continues to work closely with Watershed Councils around the state in developing TMDLs. DEQ Basin Coordinators attend and participate in Watershed Council meetings, providing technical assistance as councils prepare water quality management plans. DEQ's laboratory provides technical assistance to Watershed Councils on water quality monitoring. The data collected from these water quality monitoring efforts is extremely useful and important in developing TMDLs.

The sub-basins scheduled for 1999 are the Tualatin and the Upper Grande Ronde.

The **Tualatin** sub-basin TMDL for ammonia and phosphorous addressing water quality concerns related to algal growth and pH were submitted and approved by EPA in 1992 and 1994. The remaining Tualatin sub-basin TMDLs for temperature, bacteria, dissolved oxygen and toxics are nearly complete. DEQ anticipates having these draft TMDLs available for public review and comment no later than summer 2000.

On December 10, 1999, DEQ released the draft **Upper Grande Ronde** TMDL and Water Quality Management Plan for public review and comment. This is one of the first sub-basin approaches to TMDL development. DEQ submitted the final TMDL and WQMP for the Upper Grande Ronde River Basin to EPA on April 24, 2000.

DEQ is on schedule to complete the 6 sub-basins scheduled for year 2000 (**Wallowa, Umatilla, Wilson-Trask-Nestucca, Williamson, Sprague, Upper Klamath Lake**). Most of the needed data for the sub-basins has been collected and development of allocations is underway. We are working closely with watershed councils, other agencies, stakeholders and interested parties as we develop these sub-basins TMDLs.

Focusing on salmon and water quality, the State of Oregon also has elected to complete 9 of the 12 sub-basins in the **Willamette Basin** faster than originally proposed to EPA. These 9 sub-basins are to be completed by the end of 2003 rather than during the 2005 to 2007 time frame contemplated in the original sub-basin TMDL schedule. DEQ has hired staff and developed a work plan for the Willamette Basin TMDLs. The work plan is being shared with other agencies and interested parties for further development. As a result, agencies are designing their seasonal monitoring to collect data that will aid in the development of TMDLs. DEQ has been meeting with watershed councils, local, state, and federal agencies and other stakeholders, including members of the Willamette Restoration Initiative, to discuss the Willamette Basin and TMDL process. These initial meetings are setting the framework for full participation by all parties in development of the TMDLs. A data summit has been scheduled for May 25, 2000. The summit will bring those in the Willamette Basin doing water quality technical work together in a forum to discuss and share data useful for TMDL development. More detail on recent activities is included in the attached Willamette Basin TMDL Project Monthly Report: February 2000.

The remaining 32 sub-basins (excluding the Willamette Basin sub-basins) are in the data collection and planning stages of TMDL development. The attached matrix provides a status of various TMDL development activities for all sub-basins scheduled to be completed by the end of 2003.

### Expenditures

DEQ's expenditures on the Oregon Plan from July 1999 through January 2000 were \$1.768 million dollars. This figure covers expenditures for TMDL development and coordination, monitoring studies for Steelhead and Coastal Salmon, and providing technical assistance and training to watershed councils and other organizations throughout the state. Of the \$1.768 million dollars expended to date, \$1.532 million was General Fund, \$227,000 was from federal funding sources, and \$8,000 was lottery dollars. This represents 35% of DEQ's total budget (\$5.123 million) for Oregon Plan and TMDLs.

**Department Recommendation**


It is recommended that the Commission accept this report, discuss the matter, and provide advice and guidance to the Department as appropriate.

**Attachments**

- Attachment 1: TMDL Sub-Basin Schedule Through 2003
- Attachment 2: TMDL Status Report
- Attachment 3: Willamette Monthly Report, March 2000
- Attachment 4: Sub-Basin Map

Approved:

Section : ML per

Division: 

Report Prepared By: Dick Pedersen

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Date Prepared: April 12, 2000

**Sub-Basin Target Dates for Completion By 2003  
of TMDL's for Waters Listed in the 1998 303(d) List**

<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
Tualatin (W)	Sprague	Applegate	Alvord Lake	Bully
Upper Grande Ronde	Umatilla	Columbia River	Little Deschutes	Chetco
	Upper Klamath Lake	Hells-Canyon	Lost	Clackamas (W)
	Wilson-Trask-Nestucca	Imnaha	North Umpqua	Coast Fork Willamette (W)
	Wallowa	Lower Grande Ronde	South Umpqua	Lower Malheur
	Williamson	Lower-Columbia-Clatsk.	Umpqua	Lower Willamette (W)
		Lower-Columbia-Youngs	Upper Deschutes	McKenzie (W)
		Lower-Snake-Asotin		Middle Fork John Day
		Middle Columbia-Hood		Middle Fork Willamette (W)
		Middle-Col.-Lake Wallula		Middle Willamette (W)
		Necanicum		Middle Snake-Payette
		Nehalem		North Fork John Day
		Upper Quinn		North Santiam (W)
		Walla Walla		Sixes
		Willow		Smith
				South Santiam (W)
				Warner Lakes
				Willow
				Upper Malheur
				Upper Willamette (W)

(W) = Willamette Basin



Task	Sub-basins																
	Tu-ala-tin	Up-pe-Gr-an-de-Rond-e	Sp-ra-gu-e	U-ma-till-a	Up-pe-Kl-am-ath-La-ke	Till-am-oo-k-Ba-y	Ne-stu-cc-a-Ba-y	W-all-ow-a	Wil-lia-ow-ms-on	Ap-ple-gat-e	Co-lu-ria-Ri-ver	He-lls-Ca-ny-on	Im-na-ha	Lo-we-r-Gr-an-de-Rond-e	L-Co-lu-ia-Cl-ats-k.	L-Co-lu-ia-Yo-un-gs	Lo-we-r-Sn-ak-e-As-oti-n
<b>Target Completion Year</b>	19	20	00							20						01	
<b>TMDL</b>																	
Develop individual TMDL workplan	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Review 303(d) listings	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	
Review beneficial uses	X	X	X	X	X	X	X	X	X	X	X	0			X	X	
Assemble available data	X	X		X		X	X	X	0	X	X				X	X	
Review/analyze available data	X	X		X	0	X	X	0	0	X	0				X	X	
Develop models for load calculations	X	X		X	0	X	X		0		0				X	X	
Develop monitoring plan	X	X	X	X		X	X	0	X	X	X				0	0	
Collect and Analyse Data	X	X	0	X		X	0		0								
Calculate numeric TMDLs	0	X		X		0											
Draft TMDL document	0	X		0		0											
Final TMDL document																	
<b>WQMP</b>																	
Contact organizations for WQMP impl.	0	X	X	X	X	0					X						
Develop WQMP goals & objectives	0	X	0	X		0											
Develop management measures	0	X	0	X		0					X						
Estimate time required for impl.		X	0								X						
Gather evidence of commitments	0	X		X		0											
Develop monitoring plan		X									X						
Public involvement plan		X															
Strategy for maintaining effort		X															
Estimate costs and identify funding		X															
Draft WQMP document		X	0														
Final WQMP document																	

## Willamette Basin TMDL Project Monthly Report: March 2000

*This monthly report provides DEQ managers and others with a quick overview of major activities and accomplishments pertaining to the Willamette Basin TMDL work. This report also contains projections regarding upcoming events and major activities.*

### **Project Scope:**

The DEQ's Willamette Basin team is committed to developing TMDLs and Water Quality Management Plans (WQMPs) for the main stem and 12 sub-basins of the Willamette River. The project team is identifying appropriate contacts and partners for technical review, data gathering, input on TMDL development, and ultimately WQMP implementation. Data gaps and critical monitoring needs are being evaluated and prioritized.

### **Work Completed in March:**

- Trained Willamette Basin team members on water quality monitoring and *Heat Source* modeling.
- Drafted detailed work plan for the Middle Fork of the Willamette sub-basin to be used as a template for subsequent work plan development.
- Prepared a standardized 'data collection' form to be used when collecting information for temperature modeling.
- Reviewed Corps of Engineers proposal for reservoir operations and minimal flow in the Willamette.
- Initiated contact with representatives of other State and Federal agencies working on TMDLs for mercury.
- Reviewed and finalized report on skeletal deformities in fish from the main stem of the Willamette.
- Advertised and promoted the upcoming Willamette Basin Water Quality Data Summit, scheduled for May 25<sup>th</sup> in Corvallis. Contacted potential participants and recruited presenters.

### **Coordination with Other Organizations:**

- Presented TMDL strategy to ACWA, WRI, City of Salem, and the Air and Waste Management Association.
- Assisted WRI with its integration of State and Federal measures for the Willamette Basin. Promoted the importance of TMDLs within this context.
- Met with ODA representatives to discuss TMDL/SB1010 coordination.
- Met with representatives of the BLM, USFS and USGS to discuss current and future monitoring efforts.
- Initiated contact with the North Santiam, McKenzie, and Mary's River Watershed Councils.
- Coordinated with NMFS regarding TMDL/Recovery Plan concerns and tasks.
- Participated in State-wide Oregon Plan and Community Solutions workshops.

### **Issues for consideration:**

- Establishing a formal mechanism for receiving input on main-stem Willamette TMDL development.

### **Coming Up:**

- Will update Willamette Basin webpage to include all finalized Willamette Basin reports and fact sheets.  
[http://waterquality.deq.state.or.us/willamet/will\\_hom.htm](http://waterquality.deq.state.or.us/willamet/will_hom.htm).
- Will develop detailed workplan for the South Santiam sub-basin. Will continue to assemble and review data from each of the other Willamette sub-basins.
- Will meet with representatives of OEC, NRCS, the private sector, watershed councils, Oregon Plan agencies, municipal groups and Federal partners to discuss Willamette Basin TMDL coordination.
- Will continue working with WRI on mutual goals.

*If you have any questions, suggestions or comments regarding the contents of this report please contact Dick Pedersen (503-229-6345), Manager, Watershed Management Division, or one of the two Willamette Basin Coordinators (in Portland: Beth Woodward @ 503-229-6351 or in Eugene: Jared Rubin @ 541-686-7838 x-261).*

### Completion of Planned Project Tasks (end of March 2000)

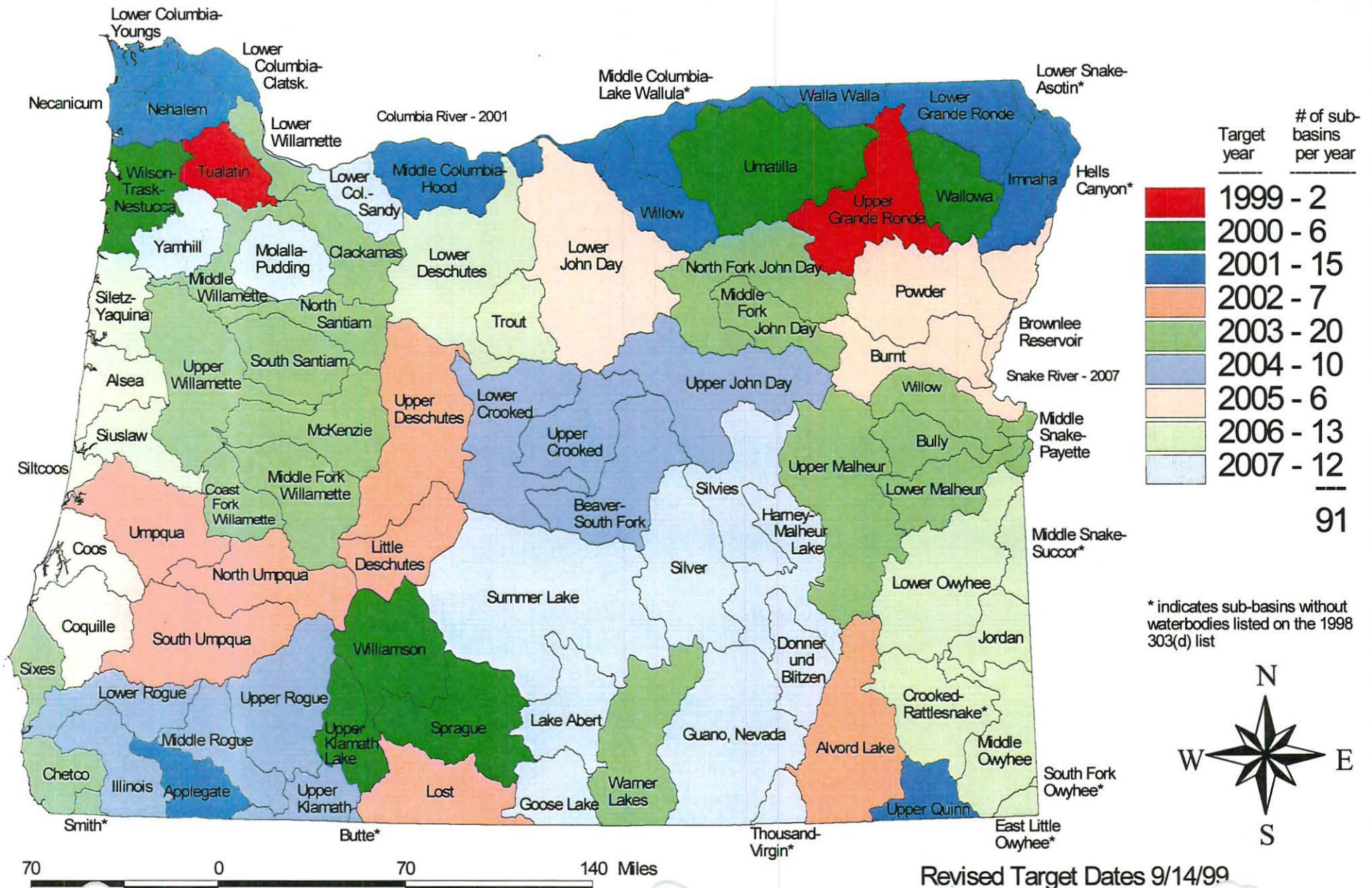
Task	TMDLs by Willamette River Sub-basin													
	MFW	McK	CFW	UW	SS	NS	MW	Clac	LW	MnSt	Merc	Yam	M/P	Tual
<b>TMDL</b>														
Develop individual TMDL workplan	•	•			•	•								✓
Review 303(d) listings	•													✓
Review beneficial uses														✓
Assemble available data	•								•	•				✓
Review/analyze available data														✓
Develop tools to calculate LCs														✓
Develop monitoring plan	•													✓
Calculate numeric TMDLs														•
Draft TMDL document														•
Final TMDL document														
<b>WQMP</b>														
Contact org. needed for WQMP impl.	•	•			•	•	•	•		•				✓
Develop WQMP goals and objectives														✓
Develop management measures														•
Estimate time required for TMDL impl.														•
Gather evidence of commitments														•
Develop monitoring plan														•
Public involvement plan														•
Strategy for maintaining effort														•
Estimate costs and identify funding														•
Draft WQMP document														•
Final WQMP document														

**Key:**

- = work has begun
- ✓ = task is substantially complete



# Sub-Basin Target Dates for Completion of TMDL's for Waters Listed in the 1998 303(d) List

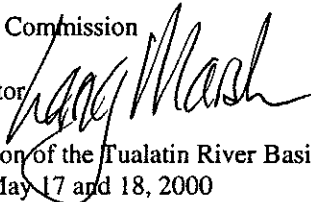


Revised Target Dates 9/14/99

State of Oregon  
Department of Environmental Quality

Memorandum

Date: May 3, 2000

To: Environmental Quality Commission  
From: Langdon Marsh, Director   
Subject: Agenda Item I, Extension of the Tualatin River Basin Total Maximum Daily Load Compliance Order, EQC Meeting May 17 and 18, 2000

**Statement of Purpose**

The Environmental Quality Commission (EQC) is requested to extend the existing Tualatin Basin Designated Management Agency Implementation and Compliance Order (Attachment 1) until December 31, 2000. Currently the compliance order is in effect until the end of May 2000.

The purpose of this extension is to allow time for review and formal public comment on proposed Total Maximum Daily Loads (TMDLs) for temperature, dissolved oxygen, bacteria and revisions to TMDLs for phosphorus and ammonia for the Tualatin Basin. Preliminary draft TMDLs are currently developed and are being reviewed with final drafts to be available in June 2000 for formal public comment. The Department anticipates finalizing the TMDLs, based on public comment, by early Fall 2000 and would take any proposed modifications of the phosphorus and ammonia TMDLs to the EQC for their approval at either their 9/28-29/2000 or 11/30-12/1/2000 meeting. Final TMDLs would be submitted to the Environmental Protection Agency (EPA) by end of 2000 for their approval.

**Background**

In 1988, the EQC promulgated rules to limit discharges of ammonia and total phosphorus to the Tualatin River in accordance with Section 303 of the Clean Water Act and 40 CFR, part 130.7. These rules were established to implement the first TMDLs that the Department had developed. Oregon Administrative Rules (OAR) 340-41-470 (9)(a) established total phosphorus concentrations for the Tualatin River and major tributaries to meet the 15 µg/L chlorophyll a action level (OAR 340-41-150) and to address high pH and, in part, low dissolved oxygen that the Tualatin River was experiencing at that time. The rule (Attachment 2) states:

*"After completion of wastewater control facilities and implementation of management plans approved by the Commission under this rule and no later than June 30, 1993, no activities shall be allowed and no wastewater shall be discharged to the Tualatin River or its tributaries without the specific authorization of the Commission that cause the monthly median concentration of total phosphorus at the mouths of the tributaries listed below and the specified points along the main-stem of the Tualatin River, as measured during the low flow period between May 1 and October 31, of each year, unless otherwise specified by the Department, to exceed the following criteria..."*

An EQC Order for Designated Management Agencies (DMAs) was adopted on July 23, 1993. The EQC required specific tasks of a number of government entities and agencies. The DMAs include: Unified Sewerage Agency of Washington County, Clackamas County, Washington County, Multnomah County, City of Lake Oswego, City of West Linn, City of Portland, Oregon Department of Agriculture and the Oregon Department of Forestry.

The Compliance Order listed tasks and responsibility of the DMAs in controlling nonpoint source water pollution in the Tualatin River Watershed. The intent of the Order was to improve water quality and to achieve all applicable water quality standards by December 31, 1995. A second goal was to promote ongoing communication among the jurisdictions in the basin. A third major consideration was to encourage and promote the involvement of interest groups of all kinds in the implementation of the Order.

Actions (completion of wastewater control facilities and implementation of management plans) have been implemented and significant improvements in dissolved oxygen and pH conditions and decreases in the total phosphorus and peak chlorophyll a concentrations have been documented in the main-stem of the Tualatin River. However, the total phosphorus concentrations specified in the rule have not been met. The compliance date has been extended by the EQC a number of times with the latest extension to the end of May 2000 (action taken at the June 11-12, 1998 EQC meeting, Attachment 1). This last extension was to allow time for updates and modifications to the Tualatin Basin TMDLs and basin plans. At that time, a new order was written (Attachment 1) which identified four ongoing tasks and two new tasks with specific deadlines. The new tasks were completed in a timely fashion.

The Department has been working on developing TMDLs for other parameters (temperature, bacteria, and dissolved oxygen in selected tributaries) and refining the earlier TMDLs for total phosphorus and ammonia. In May 1997, the Tualatin Basin Technical Advisory Committee developed a "Technical Review of Nonpoint Sources of Phosphorus and Total Maximum Daily Loads for Tributaries in the Tualatin Basin". In January 1998, the Tualatin Basin Policy Advisory Committee made recommendations to the Department on revisions of the ammonia and phosphorus TMDLs. In June 1998, a full-time DEQ Tualatin Basin Coordinator was hired using Receipt Authority funding from the Unified Sewerage Agency and other DMAs in the Tualatin Basin. In 1999, intensive temperature monitoring occurred in the basin using continuous temperature monitors and Forward Looking Infrared Radiometry (FLIR). In addition, additional storm water monitoring for bacteria runoff was conducted in the Fall 1999. Extensive temperature, bacteria and dissolved oxygen modeling of the basin are about completed. Results of this modeling are being used to develop TMDLs for the basin.

Preliminary Draft TMDLs have been developed and are in the process of being reviewed and finalized before formal public comment. Formal public comment is anticipated by this summer and any revision to the phosphorus and ammonia TMDLs would be taken to the EQC for their approval in the Fall 2000. Final TMDLs will be submitted to the Environmental Protection Agency before the end of 2000 for approval.

This proposed rulemaking action would extend the Tualatin Basin the current Designated Management Agency Implementation and Compliance Order (Attachment 1) until December 31, 2000 so that the TMDLs can be updated, implementation strategies modified and rulemaking (as appropriate) can occur to modify OAR 340-41-470 (9).

#### **Authority of the Commission with Respect to the Issue**

The 1988 rules promulgated by the EQC amend OAR 340-41-470 by establishing instream criteria (TMDLs) for both total phosphorus and ammonia-nitrogen at various locations on the main stem Tualatin River and at the mouths of selected tributaries.

Establishment of TMDLs is in accordance with Section 303 of the Clean Water Act and 40 CFR, part 130.7 and OAR 340-41-026(4)(d). ORS 468B.020, ORS 468B.035 and ORS 468B.048 provide authority for implementation of the Clean Water Act and the setting of water quality standards. ORS 183.310 to 183.550 provide authority to adopt, modify or repeal rules for the administration of water quality standards.

#### **Alternatives and Evaluation**

Options considered were:

1. Do not extend the deadline
2. Extend the deadline until 12/31/2000 when the TMDLs should be completed for the Tualatin
3. Extend the deadline until a different date.

The Department favors the second option to allow sufficient time to complete TMDLs and update the Water Quality Management Plan in the Tualatin. The first option could cause dischargers and other activities to be out of compliance with OAR 340-41-470 (9)(a) and create the potential for litigation. Several 60-day notices for "violations of Clean Water Act in continuing to permit violation of TMDLs for phosphorus and ammonia-nitrogen for the Tualatin River Basin in Oregon" have been submitted to the Department, EPA or Unified Sewerage Agency of Washington County.

### **Summary of Public Input Opportunities**

The Department issued a Public Notice on March 31, 2000 to receive any written comments by May 2, 2000 on the extension of current Compliance Order. A hearing was held at the Elsie J. Stuhr Center (5050 SW Hall Blvd, Beaverton, OR 97005) starting at 6:30 on Monday May 1, 2000. Comments were received from 5 respondents who supported the extension (Clackamas County, City of Portland, Multnomah County, Unified Sewerage Agency of Washington County, and the U.S. Geological Survey) and from 1 respondent who opposed the extension (Tualatin Riverkeepers). A summary of the comments and Department responses is given in Attachment 4 and written and summary of oral testimony (without attachments) is given in Attachment 5.

### **Conclusions**

An extension will allow DMAs to continue their existing programs to implement the current TMDLs and be in compliance with OAR 340-41-470 (9)(a) while the Department completes the update and revision of TMDLs for the basin. Issues such as incorporation of Waste Load Allocation into MS-4 permits will be dealt with during permit renewal. Both the review of TMDLs and development of permits have a public review process that is open to the public.

### **Intended Future Actions**

A schedule for completion of Tualatin Basin TMDLs is Attached (Attachment 3).

### **Department Recommendation**

It is recommended that the Commission accept this report, discuss the matter, provide advice and guidance to the Department as appropriate and extend the Compliance Order (Attachment 1) until December 31, 2000.

### **Attachments**

- Attachment 1 Tualatin Basin DMA Implementation and Compliance Order (June 11-12, 1998)
- Attachment 2 OAR 340-41-470 (9)(a)
- Attachment 3 Tualatin TMDL Timeline (5/3/2000)
- Attachment 4 Summary and Response to Testimony
- Attachment 5 Written and Summary of Oral Comments received (without attachments)

**Reference Documents (available upon request)**

- “Technical Review of Nonpoint Sources of Phosphorus and Total Maximum Daily Loads for the Tributaries in the Tualatin Basin; Submitted by Tualatin Basin Technical Advisory Committee, Nonpoint Source Subcommittee; May 1997.
- Tualatin Basin Policy Advisory Committee Recommendations to DEQ; Prepared by Jeanne Lawson Associates, Inc.; January 1998.

Approved:

Section:

Division:

Andrew L. Schaedel

Neil Mullane

Report Prepared By: Andy Schaedel

Phone: 503-229-6121

Date Prepared: 5/3/2000



**ATTACHMENT 1: Tualatin Basin DMA Implementation and Compliance Order, June 11-12, 1998**

Designated Management Agencies (DMAs):

The Unified Sewerage Agency of Washington County, representing participating cities  
Clackamas County and River Grove  
Washington County  
Multnomah County  
City of Lake Oswego  
City of West Linn  
City of Portland  
Oregon Department of Agriculture  
Oregon Department of Forestry

Purpose:

This order has three purposes.

- 1) The order assures continued implementation of plans developed under the Tualatin Basin TMDL and the ongoing activities contained in the Tualatin Sub-basin Nonpoint Source Management Implementation / Compliance Schedule and Order for Designated Management Agencies adopted by the EQC as Attachment A to Agenda Item F on January 9-10, 1997.
- 2) The order defines the specific reporting requirements which provide the enforceable mechanism for assuring implementation of the TMDLs during the period covered by the compliance order. The compliance period allows implementation of the schedule of activities identified in Agenda Item E of the June 11-12, 1998 EQC meeting. These activities are being conducted either by the DMAs or in cooperation with the DEQ to update the basin TMDLs and basin plans. The compliance order will be in effect until the completion of the activities in the schedule which will result in an updated basin plan and implementation strategy, but will not extend beyond the end of May 2000.
- 3) The compliance order represents the EQC policy for appropriate actions to continue implementation of pollution control efforts while the TMDLs and implementation strategies are being updated.

DMA Tasks

The first four (4) DMA tasks are ongoing tasks required by previous orders. Tasks 5 and 6 are new tasks.

1. The DMAs will continue existing monitoring programs in the basin. The data will be submitted to DEQ annually for upload into STORET data base. The DMAs will review data annually and submit a data analysis report in January of each year. The DMAs will submit a coordinated monitoring strategy to DEQ by the end of April of each year.
2. The DMAs will continue with existing Public Awareness / Education programs. A public awareness report will be submitted to DEQ by the end of January each year.

3. The DMAs will provide an annual report to DEQ. The annual report will describe:
  - 3.1. implementation of management practices;
  - 3.2. resolution of site specific problems;
  - 3.3. revision of rules and ordinances;
  - 3.4. evaluation of ongoing activities taken by the DMA to implement the TMDLs
  
4. The DMAs will continue the existing program for compliance with the Tualatin TMDL. These tasks include:
  - 4.1. the continued implementation of best management practices to insure widespread adoption and implementation of management measures;
  - 4.2. the continuing inventories to identify pollution problems and the development of the site specific solutions;
  - 4.3. the inventory, prioritization and development of schedules for the protection, enhancement or restoration of riparian areas;
  - 4.4. continue erosion control programs, plans and enforcement activities, review of the erosion control program for new development, investigation of the need for control of erosion and runoff from no-development activities throughout the basin, and review of the need to adopt or refine existing ordinances;
  - 4.5. continue implementation of program that on a priority basis maintains roadside ditches in such a way to minimize transportation of sediment, nutrients and other pollutants to waters of the state.

Tasks 5 and 6 are included in the scheduled TMDL and basin plan update:

5. By the end of February, 1999 the DMAs will provide DEQ a draft report describing how their existing programs for present and future development assures compliance with TMDLs, how their current programs for pollution control compares to the TMDLs and appropriate allocations. The draft report will describe any actions necessary to update their program to implement bacteria management plans, temperature management plans, and changes to achieve substantial compliance with METRO Goal 6, title 3 model ordinances as appropriate. This report will describe any modifications or updates to the existing plans that will be implemented prior to the final reports described in Task 6.
  
6. By the end of June, 1999 the DMAs will each provide a report to the DEQ that evaluates their existing programs, describes how the program will comply with existing allocations and water quality standards. The report will describe what actions are needed to update existing programs to comply with the TMDLs and a schedule of activities that will be taken to update existing programs as needed.

**ATTACHMENT 2: OAR 340-41-470 (9)(a)**

(9) In order to improve water quality within the Tualatin River subbasin to meet the existing water quality standard for dissolved oxygen and the 15 ug/l chlorophyll *a* action level stated in OAR 340-041-0150, the following special rules for total maximum daily loads, waste load allocations, load allocations, and implementation plans are established:

(a) After completion of wastewater control facilities and implementation of management plans approved by the Commission under this rule and no later than June 30, 1993, no activities shall be allowed and no wastewater shall be discharged to the Tualatin River or its tributaries without the specific authorization of the Commission that cause the monthly median concentration of total phosphorus at the mouths of the tributaries listed below and the specified points along the main-stream of the Tualatin River, as measured during the low flow period between May 1 and October 31\*, of each year, unless otherwise specified by the Department, to exceed the following criteria:

(A) Mainstream (RM) — ug/l:

- (i) Cherry Grove (67.8) — 20;
- (ii) Dilley (58.8) — 40;
- (iii) Golf Course Road (52.8) — 45;
- (iv) Rood Rd. (38.5) — 50;
- (v) Farmington (33.3) — 70;
- (vi) Elsner (16.2) — 70;
- (vii) Stafford (5.4) — 70.

(B) Tributaries — ug/l:

- (i) Scoggins Creek — 60;
- (ii) Gales Creek — 45;
- (iii) Dairy Creek — 45;
- (iv) McKay Creek — 45;
- (v) Rock Creek — 70;
- (vi) Fanno Creek — 70;
- (vii) Chicken Creek — 70.

\*Precise dates for complying with this rule may be conditioned on physical conditions (i.e., flow, temperature) of the receiving water and shall be specified in individual permits or memorandums of understanding issued by the Department. The Department shall consider system design flows, river travel times, and other relevant information when establishing the specific conditions to be inserted in the permits or memorandums of understanding. Conditions shall be consistent with Commission-approved program plans\*\* and the intent of this rule.

**ATTACHMENT 3: Tualatin TMDL Timeline (5/3/2000)**

**Tualatin TMDL Timeline  
 (5/3/2000) 2000**

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Draft Reports</b>											
Phosphorus	█										
Biol Criter	█										
Ammonia	█	█									
Toxics	█	█									
Temperature	█	█	█								
Bacteria	█	█	█								
Dis Oxygen (trib)	█	█	█								
<b>Informal Reviews</b>		█	█	█	█	█					
<b>Implementation Strategy Devel</b>		█	█	█	█	█					
<b>Finalize Drafts</b>		█	█	█	█	█					
<b>Formal Public Comment</b>						█	█				
<b>Finalize TMDLs</b>								█	█		
<b>EQC</b>				█						█	█
	Extend Schedule (5/18-19)					Modify Phos and NH3 Conc (11/30-12/1)					
<b>Submit to EPA</b>											█
									30 Day Approval		

**Basin Contact:** Rob Burkhart (503-229-5566, burkhart.robort@deq.state.or.us)

**ATTACHMENT 4: Summary and Response to Testimony**

The following is a summary of comments submitted both in favor and opposed to the extension of the Tualatin River Basin TMDL Compliance Order. The Department's response to some of the issues raised is given below the summary. Attachment 5 contains the testimony that was received by the Department.

**Comments in Support (Summarized from testimony of 5 respondents):**

- More time is needed to allow for appropriate revision of current TMDLs and to develop new TMDLs. This would include the time for development, review by DMAs and the interested general public, to insure that the approaches to address the various parameters are consistent and do not conflict with each other and to develop a watershed-wide approach for addressing all TMDLs.
- DMAs will continue to implement their current programs as called for under the Compliance Order and to work with DEQ and others in the development of TMDLs and addressing water quality problems.
- A great deal has been accomplished and a greater understanding of the watershed has been gained based on the earlier TMDLs and additional monitoring and studies. This new knowledge and understanding should be reflected in the TMDLs established for the basin.
- Not extending the deadline could place DMAs at risk of being out of compliance and result in the diversion of critical resources from working on the revisions and new TMDLs to potentially preparing responses to third party litigation.
- Support adaptive management strategy in the development and revision to the TMDLs coupled with a comprehensive watershed-wide approach to support all beneficial uses.
- While major reductions in the size of algal blooms have been realized, given naturally occurring phosphorus, current criteria will not be achieved and modeling indicates that the chlorophyll a guidance level will not be achieved and should be adjusted according the rule.

**Comments in Opposition (Summarized from testimony of 1 respondent):**

- Believe that the Compliance Order and subsequent extensions have served to delay compliance with the TMDLs and shield DMAs from any liability from potential third party lawsuits.
- Deadline for compliance with the TMDL criteria was June 30, 1993. The deadline has been extended several times since then and the phosphorus criteria are still not met.
- Concerned about public participation and oversight of TMDL implementation. The Riverkeepers were excluded from DMA meetings and do not currently receive notification of meetings or minutes.
- While oppose the extension, would suggest the following as a condition of any Compliance Order extension: future NPDES MS-4 Permits clearly include numeric Waste Load Allocations as an enforceable mechanism; collective meetings of DEQ and DMAs allow members of public to be present and receive notice of meetings, advanced copies of agendas and copies of minutes.
- It would be good to separate the issue of TMDL renewal from the Compliance Order. Its goal should be to comply with TMDL criteria defined in ORS 340-41-470.

**Department's General Response to Comments:**

- Addressing all TMDLs: It is the Department's intent to address all TMDLs at this time and to have management plans that will address the TMDLs on a watershed basis. Part of the reason for the extension is to provide sufficient time to insure that all components of the TMDLs (new and existing) fit together.
- Adaptive Management and extension of the Compliance Order: The Department recognizes that there is uncertainty both in the TMDL targets that are established and in results of implementation actions. However, it is important to initiate implementation as soon as possible to address water quality concerns. This topic received a great deal of discussion when the initial 5-year target date of June 30, 1993 was established by the EQC in 1988. The Department is employing an adaptive management approach to TMDLs and Water Quality Management Plans (WQMPs) as it sets out to develop TMDLs statewide. This process has been described in the *Upper Grande Ronde River Sub-Basin Total Maximum Daily Load and Water Quality Management Plan*,

April 2000, pg 3-4 (available on the DEQ website) that was recently submitted to the Environmental Protection Agency. The Department will be reviewing the progress of TMDLs and WQMPs on a five-year basis with benchmarks established to measure progress towards achieving standards. DMAs will monitor and document progress toward achieving these benchmarks and load or waste load allocations.

- Public Involvement: The DMAs have been meeting on a monthly basis to coordinate activities and share information and ideas. DEQ is often requested to attend these meetings to provide information. These meetings are DMA meetings and are not Department meetings. Many DMAs were concerned about the Tualatin Riverkeepers being present at many of these meeting due to threat of litigation that has occurred. The Department also meets with the Tualatin Riverkeepers and other groups in the Tualatin Basin (e.g. Tualatin Watershed Council, etc.) and has offered to meet frequently with the Riverkeepers and other member groups. In addition, the TMDL development and permit renewal processes all have opportunities for public comment.
- Including Waste Load Allocations in MS-4 Storm Water Permits: The Department is currently exploring options on how best to integrate TMDLs and Waste Load Allocations into MS-4 Storm Water Permits. The first round of storm water permits were developed in 1995 and referenced the TMDLs and Load Allocations. MS-4 permits in the basin will be renewed after EPA approves the TMDLs.

**ATTACHMENT 5: Written and Summary of Oral Comments received (without attachments)**

Summary of Hearing Testimony – May 1, 2000 held at the Elsie J. Stuhr Center, Beaverton Oregon. Andy Schaedel was the hearing officer and Rob Burkhart held a brief question and answer session on the report. No questions were asked.

Testimony presented at the hearing:

1. Charles Logue, Unified Sewage Agency testified in support of the extension. His written testimony is attached (two reports (*USA Program Status for Meeting Total Maximum Daily Load Requirements*, February 1999 and *Addendum #1* to that report, June 1999) were attached to the testimony but not included in this report).
2. Sue Marshall, Tualatin Riverkeepers testified in opposition of the extension. Her written testimony and subsequent e-mail submission are attached.
3. Amin Wahab, City of Portland testified in support of the extension. A summary of his major points are as follows (no written testimony was submitted):
  - Portland is a Designated Management Agency (DMA) in the Tualatin Basin and supports the DEQ recommendation for an extension of the compliance order to allow for completion of TMDLs;
  - Concerned that there still would not be sufficient time for DEQ and EQC to digest the data (technical information and scientific studies) and information on their implementation programs submitted by DMAs to develop TMDLs and Water Quality Management Plans, even with the extension;
  - The Tualatin Basin Program is one of the more expensive watershed programs for the City (second highest in terms of dollars spent by Portland for monitoring health of tributaries originating in Portland). Data is submitted to DEQ each year in January. Believe that Tualatin Basin is a success story and believe that health of the rivers and tributaries is improving as indicated by the data being collected;
  - Achieving standards is not a short process, it will also take time to address problems but we are making good progress. Public is aware of activities we are engaged in to improve the health of river and tributaries;
  - Improving the stream health of the Tualatin and other rivers within Portland is part the City's mission. Portland as a DMA is a public agency, accountable to ratepayers who pay hard-earned money and want accountability and results. TMDLs therefore need to be based on good science, used wisely and on something that makes sense. Money should not be spent on projects that will not give results or where there is uncertainty about the results. TMDLs should be based on all the data and information that has been submitted.

Additional Written Comment Received:

1. Dennis Lynch, U.S. Geological Survey submitted written testimony in support of the extension, which is attached
2. Clackamas County submitted written testimony in support of the extension, which is attached.
3. Multnomah County submitted written testimony in support of the extension, which is attached (a report (*Tualatin Basin Nonpoint Source Management Implementation/Compliance Schedule and Order Status Report (Task #6) – Multnomah County, June 1999*) was attached to the testimony but not included in this report).



# United States Department of the Interior

DEPT OF ENVIRONMENTAL QUALITY  
RECEIVED

U.S. GEOLOGICAL SURVEY

Water Resources Division  
Oregon District  
10615 S.E. Cherry Blossom Drive  
Portland, Oregon 97216  
<http://oregon.usgs.gov/>

APR 27 2000

NORTHWEST REGION

April 27, 2000

Mr. Andy Schaedel  
Oregon Department of Environmental Quality  
Northwest Regional Office  
2020 SW Fourth Avenue, Suite 400  
Portland, OR 97201-4011

Dear Mr. Schaedel:

As you know, the U.S. Geological Survey (USGS) has been studying the water quality of the Tualatin River and its tributaries since 1990. The purpose of this work is to better understand the basin-wide and instream processes that affect water quality, and to transfer that scientific knowledge to the managers and regulators of the river.

To that end, we have been pleased to participate in discussions with the Oregon Department of Environmental Quality (ODEQ) and the Unified Sewerage Agency (USA) that support the revision of the Tualatin River Total Maximum Daily Loads (TMDLs). As TMDLs are meant to be regulations based on sound science, the USGS supports the efforts of ODEQ, USA and others to incorporate recent data and knowledge into these regulations.

On May 18th, 2000, your agency plans to ask the Environmental Quality Commission to extend the Tualatin River TMDL implementation and compliance order to allow additional time for review and public comment on proposed and revised TMDLs. The USGS supports your efforts, and those of the designated management agencies, to revise the Tualatin River TMDLs and to create new TMDLs in accordance with the best available data and our current understanding of the relevant water-quality processes. The USGS will continue to work with all parties to deliver the data and knowledge necessary to support this public process.

If you have any questions about USGS data or investigations from the Tualatin River Basin, or require further information, please don't hesitate to contact me at 503/251-3265 or by email at [ddlynch@usgs.gov](mailto:ddlynch@usgs.gov).

Sincerely,

Dennis D. Lynch  
Oregon District Chief

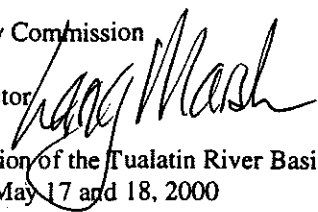
c: Robert Burkhart, DEQ  
William Gaffi, Unified Sewerage Agency



State of Oregon  
Department of Environmental Quality

Memorandum

Date: May 3, 2000

To: Environmental Quality Commission  
From: Langdon Marsh, Director   
Subject: Agenda Item I, Extension of the Tualatin River Basin Total Maximum Daily Load Compliance Order, EQC Meeting May 17 and 18, 2000

**Statement of Purpose**

The Environmental Quality Commission (EQC) is requested to extend the existing Tualatin Basin Designated Management Agency Implementation and Compliance Order (Attachment 1) until December 31, 2000. Currently the compliance order is in effect until the end of May 2000.

The purpose of this extension is to allow time for review and formal public comment on proposed Total Maximum Daily Loads (TMDLs) for temperature, dissolved oxygen, bacteria and revisions to TMDLs for phosphorus and ammonia for the Tualatin Basin. Preliminary draft TMDLs are currently developed and are being reviewed with final drafts to be available in June 2000 for formal public comment. The Department anticipates finalizing the TMDLs, based on public comment, by early Fall 2000 and would take any proposed modifications of the phosphorus and ammonia TMDLs to the EQC for their approval at either their 9/28-29/2000 or 11/30-12/1/2000 meeting. Final TMDLs would be submitted to the Environmental Protection Agency (EPA) by end of 2000 for their approval.

**Background**

In 1988, the EQC promulgated rules to limit discharges of ammonia and total phosphorus to the Tualatin River in accordance with Section 303 of the Clean Water Act and 40 CFR, part 130.7. These rules were established to implement the first TMDLs that the Department had developed. Oregon Administrative Rules (OAR) 340-41-470 (9)(a) established total phosphorus concentrations for the Tualatin River and major tributaries to meet the 15 µg/L chlorophyll a action level (OAR 340-41-150) and to address high pH and, in part, low dissolved oxygen that the Tualatin River was experiencing at that time. The rule (Attachment 2) states:

*"After completion of wastewater control facilities and implementation of management plans approved by the Commission under this rule and no later than June 30, 1993, no activities shall be allowed and no wastewater shall be discharged to the Tualatin River or its tributaries without the specific authorization of the Commission that cause the monthly median concentration of total phosphorus at the mouths of the tributaries listed below and the specified points along the main-stem of the Tualatin River, as measured during the low flow period between May 1 and October 31, of each year, unless otherwise specified by the Department, to exceed the following criteria..."*

An EQC Order for Designated Management Agencies (DMAs) was adopted on July 23, 1993. The EQC required specific tasks of a number of government entities and agencies. The DMAs include: Unified Sewerage Agency of Washington County, Clackamas County, Washington County, Multnomah County, City of Lake Oswego, City of West Linn, City of Portland, Oregon Department of Agriculture and the Oregon Department of Forestry.

The Compliance Order listed tasks and responsibility of the DMAs in controlling nonpoint source water pollution in the Tualatin River Watershed. The intent of the Order was to improve water quality and to achieve all applicable water quality standards by December 31, 1995. A second goal was to promote ongoing communication among the jurisdictions in the basin. A third major consideration was to encourage and promote the involvement of interest groups of all kinds in the implementation of the Order.

Actions (completion of wastewater control facilities and implementation of management plans) have been implemented and significant improvements in dissolved oxygen and pH conditions and decreases in the total phosphorus and peak chlorophyll a concentrations have been documented in the main-stem of the Tualatin River. However, the total phosphorus concentrations specified in the rule have not been met. The compliance date has been extended by the EQC a number of times with the latest extension to the end of May 2000 (action taken at the June 11-12, 1998 EQC meeting, Attachment 1). This last extension was to allow time for updates and modifications to the Tualatin Basin TMDLs and basin plans. At that time, a new order was written (Attachment 1) which identified four ongoing tasks and two new tasks with specific deadlines. The new tasks were completed in a timely fashion.

The Department has been working on developing TMDLs for other parameters (temperature, bacteria, and dissolved oxygen in selected tributaries) and refining the earlier TMDLs for total phosphorus and ammonia. In May 1997, the Tualatin Basin Technical Advisory Committee developed a "Technical Review of Nonpoint Sources of Phosphorus and Total Maximum Daily Loads for Tributaries in the Tualatin Basin". In January 1998, the Tualatin Basin Policy Advisory Committee made recommendations to the Department on revisions of the ammonia and phosphorus TMDLs. In June 1998, a full-time DEQ Tualatin Basin Coordinator was hired using Receipt Authority funding from the Unified Sewerage Agency and other DMAs in the Tualatin Basin. In 1999, intensive temperature monitoring occurred in the basin using continuous temperature monitors and Forward Looking Infrared Radiometry (FLIR). In addition, additional storm water monitoring for bacteria runoff was conducted in the Fall 1999. Extensive temperature, bacteria and dissolved oxygen modeling of the basin are about completed. Results of this modeling are being used to develop TMDLs for the basin.

Preliminary Draft TMDLs have been developed and are in the process of being reviewed and finalized before formal public comment. Formal public comment is anticipated by this summer and any revision to the phosphorus and ammonia TMDLs would be taken to the EQC for their approval in the Fall 2000. Final TMDLs will be submitted to the Environmental Protection Agency before the end of 2000 for approval.

This proposed rulemaking action would extend the Tualatin Basin the current Designated Management Agency Implementation and Compliance Order (Attachment 1) until December 31, 2000 so that the TMDLs can be updated, implementation strategies modified and rulemaking (as appropriate) can occur to modify OAR 340-41-470 (9).

#### **Authority of the Commission with Respect to the Issue**

The 1988 rules promulgated by the EQC amend OAR 340-41-470 by establishing instream criteria (TMDLs) for both total phosphorus and ammonia-nitrogen at various locations on the main stem Tualatin River and at the mouths of selected tributaries.

Establishment of TMDLs is in accordance with Section 303 of the Clean Water Act and 40 CFR, part 130.7 and OAR 340-41-026(4)(d). ORS 468B.020, ORS 468B.035 and ORS 468B.048 provide authority for implementation of the Clean Water Act and the setting of water quality standards. ORS 183.310 to 183.550 provide authority to adopt, modify or repeal rules for the administration of water quality standards.

#### **Alternatives and Evaluation**

Options considered were:

1. Do not extend the deadline
2. Extend the deadline until 12/31/2000 when the TMDLs should be completed for the Tualatin
3. Extend the deadline until a different date.

The Department favors the second option to allow sufficient time to complete TMDLs and update the Water Quality Management Plan in the Tualatin. The first option could cause dischargers and other activities to be out of compliance with OAR 340-41-470 (9)(a) and create the potential for litigation. Several 60-day notices for "violations of Clean Water Act in continuing to permit violation of TMDLs for phosphorus and ammonia-nitrogen for the Tualatin River Basin in Oregon" have been submitted to the Department, EPA or Unified Sewerage Agency of Washington County.

### Summary of Public Input Opportunities

The Department issued a Public Notice on March 31, 2000 to receive any written comments by May 2, 2000 on the extension of current Compliance Order. A hearing was held at the Elsie J. Stuhr Center (5050 SW Hall Blvd, Beaverton, OR 97005) starting at 6:30 on Monday May 1, 2000. Comments were received from 5 respondents who supported the extension (Clackamas County, City of Portland, Multnomah County, Unified Sewerage Agency of Washington County, and the U.S. Geological Survey) and from 1 respondent who opposed the extension (Tualatin Riverkeepers). A summary of the comments and Department responses is given in Attachment 4 and written and summary of oral testimony (without attachments) is given in Attachment 5.

### Conclusions

An extension will allow DMAs to continue their existing programs to implement the current TMDLs and be in compliance with OAR 340-41-470 (9)(a) while the Department completes the update and revision of TMDLs for the basin. Issues such as incorporation of Waste Load Allocation into MS-4 permits will be dealt with during permit renewal. Both the review of TMDLs and development of permits have a public review process that is open to the public.

### Intended Future Actions

A schedule for completion of Tualatin Basin TMDLs is Attached (Attachment 3).

### Department Recommendation

It is recommended that the Commission accept this report, discuss the matter, provide advice and guidance to the Department as appropriate and extend the Compliance Order (Attachment 1) until December 31, 2000.

### Attachments

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Approved:

Section:

Andrew L. Schaedel

Division:

Geil Mullane

Report Prepared By: Andy Schaedel

Phone: 503-229-6121

Date Prepared: 5/3/2000

**ATTACHMENT 1: Tualatin Basin DMA Implementation and Compliance Order, June 11-12, 1998**

Designated Management Agencies (DMAs):

The Unified Sewerage Agency of Washington County, representing participating cities  
Clackamas County and River Grove  
Washington County  
Multnomah County  
City of Lake Oswego  
City of West Linn  
City of Portland  
Oregon Department of Agriculture  
Oregon Department of Forestry

Purpose:

This order has three purposes.

- 1) The order assures continued implementation of plans developed under the Tualatin Basin TMDL and the ongoing activities contained in the Tualatin Sub-basin Nonpoint Source Management Implementation / Compliance Schedule and Order for Designated Management Agencies adopted by the EQC as Attachment A to Agenda Item F on January 9-10, 1997.
- 2) The order defines the specific reporting requirements which provide the enforceable mechanism for assuring implementation of the TMDLs during the period covered by the compliance order. The compliance period allows implementation of the schedule of activities identified in Agenda Item E of the June 11-12, 1998 EQC meeting. These activities are being conducted either by the DMAs or in cooperation with the DEQ to update the basin TMDLs and basin plans. The compliance order will be in effect until the completion of the activities in the schedule which will result in an updated basin plan and implementation strategy, but will not extend beyond the end of May 2000.
- 3) The compliance order represents the EQC policy for appropriate actions to continue implementation of pollution control efforts while the TMDLs and implementation strategies are being updated.

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The first four (4) DMA tasks are ongoing tasks required by previous orders. Tasks 5 and 6 are new tasks.

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3. The DMAs will provide an annual report to DEQ. The annual report will describe:
  - 3.1. implementation of management practices;
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  - 3.4. evaluation of ongoing activities taken by the DMA to implement the TMDLs
  
4. The DMAs will continue the existing program for compliance with the Tualatin TMDL. These tasks include:
  - 4.1. the continued implementation of best management practices to insure widespread adoption and implementation of management measures;
  - 4.2. the continuing inventories to identify pollution problems and the development of the site specific solutions;
  - 4.3. the inventory, prioritization and development of schedules for the protection, enhancement or restoration of riparian areas;
  - 4.4. continue erosion control programs, plans and enforcement activities, review of the erosion control program for new development, investigation of the need for control of erosion and runoff from no-development activities throughout the basin, and review of the need to adopt or refine existing ordinances;
  - 4.5. continue implementation of program that on a priority basis maintains roadside ditches in such a way to minimize transportation of sediment, nutrients and other pollutants to waters of the state.

Tasks 5 and 6 are included in the scheduled TMDL and basin plan update:

5. By the end of February, 1999 the DMAs will provide DEQ a draft report describing how their existing programs for present and future development assures compliance with TMDLs, how their current programs for pollution control compares to the TMDLs and appropriate allocations. The draft report will describe any actions necessary to update their program to implement bacteria management plans, temperature management plans, and changes to achieve substantial compliance with METRO Goal 6, title 3 model ordinances as appropriate. This report will describe any modifications or updates to the existing plans that will be implemented prior to the final reports described in Task 6.
  
6. By the end of June, 1999 the DMAs will each provide a report to the DEQ that evaluates their existing programs, describes how the program will comply with existing allocations and water quality standards. The report will describe what actions are needed to update existing programs to comply with the TMDLs and a schedule of activities that will be taken to update existing programs as needed.

**ATTACHMENT 2: OAR 340-41-470 (9)(a)**

(9) In order to improve water quality within the Tualatin River subbasin to meet the existing water quality standard for dissolved oxygen and the 15 ug/l chlorophyll *a* action level stated in OAR 340-041-0150, the following special rules for total maximum daily loads, waste load allocations, load allocations, and implementation plans are established:

(a) After completion of wastewater control facilities and implementation of management plans approved by the Commission under this rule and no later than June 30, 1993, no activities shall be allowed and no wastewater shall be discharged to the Tualatin River or its tributaries without the specific authorization of the Commission that cause the monthly median concentration of total phosphorus at the mouths of the tributaries listed below and the specified points along the main-stream of the Tualatin River, as measured during the low flow period between May 1 and October 31\*, of each year, unless otherwise specified by the Department, to exceed the following criteria:

(A) Mainstream (RM) — ug/l:

- (i) Cherry Grove (67.8) — 20;
- (ii) Dilley (58.8) — 40;
- (iii) Golf Course Road (52.8 — 45;
- (iv) Rood Rd. (38.5) — 50;
- (v) Farmington (33.3) — 70;
- (vi) Elsner (16.2) — 70;
- (vii) Stafford (5.4) — 70.

(B) Tributaries — ug/l:

- (i) Scoggins Creek — 60;
- (ii) Gales Creek — 45;
- (iii) Dairy Creek — 45;
- (iv) McKay Creek — 45;
- (v) Rock Creek — 70;
- (vi) Fanno Creek — 70;
- (vii) Chicken Creek — 70.

\*Precise dates for complying with this rule may be conditioned on physical conditions (i.e., flow, temperature) of the receiving water and shall be specified in individual permits or memorandums of understanding issued by the Department. The Department shall consider system design flows, river travel times, and other relevant information when establishing the specific conditions to be inserted in the permits or memorandums of understanding. Conditions shall be consistent with Commission-approved program plans\*\* and the intent of this rule.

**ATTACHMENT 3: Tualatin TMDL Timeline (5/3/2000)**

**Tualatin TMDL Timeline  
 (5/3/2000)**

**2000**

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Draft Reports</b>											
Phosphorus	■										
Biol Criter	■										
Ammonia		■									
Toxics			■								
Temperature			■								
Bacteria				■							
Dis Oxygen (trib)					■						
<b>Informal Reviews</b>		■	■	■	■	■					
<b>Implementation Strategy Devel</b>		■	■	■	■	■					
<b>Finalize Drafts</b>		■	■	■	■	■					
<b>Formal Public Comment</b>						■	■				
<b>Finalize TMDLs</b>								■	■		
<b>EQC</b>				■						■	■
		Extend Schedule (5/18-19)				Modify Phos and NH3 Conc (11/30-12/1)					
<b>Submit to EPA</b>											■
									30 Day Approval		

**Basin Contact:**

Rob Burkhart (503-229-5566, burkhart.robert@deq.state.or.us)



**ATTACHMENT 4: Summary and Response to Testimony**

The following is a summary of comments submitted both in favor and opposed to the extension of the Tualatin River Basin TMDL Compliance Order. The Department's response to some of the issues raised is given below the summary. Attachment 5 contains the testimony that was received by the Department.

**Comments in Support (Summarized from testimony of 5 respondents):**

- More time is needed to allow for appropriate revision of current TMDLs and to develop new TMDLs. This would include the time for development, review by DMAs and the interested general public, to insure that the approaches to address the various parameters are consistent and do not conflict with each other and to develop a watershed-wide approach for addressing all TMDLs.
- DMAs will continue to implement their current programs as called for under the Compliance Order and to work with DEQ and others in the development of TMDLs and addressing water quality problems.
- A great deal has been accomplished and a greater understanding of the watershed has been gained based on the earlier TMDLs and additional monitoring and studies. This new knowledge and understanding should be reflected in the TMDLs established for the basin.
- Not extending the deadline could place DMAs at risk of being out of compliance and result in the diversion of critical resources from working on the revisions and new TMDLs to potentially preparing responses to third party litigation.
- Support adaptive management strategy in the development and revision to the TMDLs coupled with a comprehensive watershed-wide approach to support all beneficial uses.
- While major reductions in the size of algal blooms have been realized, given naturally occurring phosphorus, current criteria will not be achieved and modeling indicates that the chlorophyll a guidance level will not be achieved and should be adjusted according the rule.

**Comments in Opposition (Summarized from testimony of 1 respondent):**

- Believe that the Compliance Order and subsequent extensions have served to delay compliance with the TMDLs and shield DMAs from any liability from potential third party lawsuits.
- Deadline for compliance with the TMDL criteria was June 30, 1993. The deadline has been extended several times since then and the phosphorus criteria are still not met.
- Concerned about public participation and oversight of TMDL implementation. The Riverkeepers were excluded from DMA meetings and do not currently receive notification of meetings or minutes.
- While oppose the extension, would suggest the following as a condition of any Compliance Order extension: future NPDES MS-4 Permits clearly include numeric Waste Load Allocations as an enforceable mechanism; collective meetings of DEQ and DMAs allow members of public to be present and receive notice of meetings, advanced copies of agendas and copies of minutes.
- It would be good to separate the issue of TMDL renewal from the Compliance Order. Its goal should be to comply with TMDL criteria defined in ORS 340-41-470.

**Department's General Response to Comments:**

- Addressing all TMDLs: It is the Department's intent to address all TMDLs at this time and to have management plans that will address the TMDLs on a watershed basis. Part of the reason for the extension is to provide sufficient time to insure that all components of the TMDLs (new and existing) fit together.
- Adaptive Management and extension of the Compliance Order: The Department recognizes that there is uncertainty both in the TMDL targets that are established and in results of implementation actions. However, it is important to initiate implementation as soon as possible to address water quality concerns. This topic received a great deal of discussion when the initial 5-year target date of June 30, 1993 was established by the EQC in 1988. The Department is employing an adaptive management approach to TMDLs and Water Quality Management Plans (WQMPs) as it sets out to develop TMDLs statewide. This process has been described in the *Upper Grande Ronde River Sub-Basin Total Maximum Daily Load and Water Quality Management Plan*,

April 2000, pg 3-4 (available on the DEQ website) that was recently submitted to the Environmental Protection Agency. The Department will be reviewing the progress of TMDLs and WQMPs on a five-year basis with benchmarks established to measure progress towards achieving standards. DMAs will monitor and document progress toward achieving these benchmarks and load or waste load allocations.

- Public Involvement: The DMAs have been meeting on a monthly basis to coordinate activities and share information and ideas. DEQ is often requested to attend these meetings to provide information. These meetings are DMA meetings and are not Department meetings. Many DMAs were concerned about the Tualatin Riverkeepers being present at many of these meetings due to threat of litigation that has occurred. The Department also meets with the Tualatin Riverkeepers and other groups in the Tualatin Basin (e.g. Tualatin Watershed Council, etc.) and has offered to meet frequently with the Riverkeepers and other member groups. In addition, the TMDL development and permit renewal processes all have opportunities for public comment.
- Including Waste Load Allocations in MS-4 Storm Water Permits: The Department is currently exploring options on how best to integrate TMDLs and Waste Load Allocations into MS-4 Storm Water Permits. The first round of storm water permits were developed in 1995 and referenced the TMDLs and Load Allocations. MS-4 permits in the basin will be renewed after EPA approves the TMDLs.

**ATTACHMENT 5: Written and Summary of Oral Comments received (without attachments)**

Summary of Hearing Testimony – May 1, 2000 held at the Elsie J. Stuhr Center, Beaverton Oregon. Andy Schaedel was the hearing officer and Rob Burkhart held a brief question and answer session on the report. No questions were asked.

Testimony presented at the hearing:

1. Charles Logue, Unified Sewage Agency testified in support of the extension. His written testimony is attached (two reports (*USA Program Status for Meeting Total Maximum Daily Load Requirements*, February 1999 and *Addendum #1* to that report, June 1999) were attached to the testimony but not included in this report).
2. Sue Marshall, Tualatin Riverkeepers testified in opposition of the extension. Her written testimony and subsequent e-mail submission are attached.
3. Amin Wahab, City of Portland testified in support of the extension. A summary of his major points are as follows (no written testimony was submitted):
  - Portland is a Designated Management Agency (DMA) in the Tualatin Basin and supports the DEQ recommendation for an extension of the compliance order to allow for completion of TMDLs;
  - Concerned that there still would not be sufficient time for DEQ and EQC to digest the data (technical information and scientific studies) and information on their implementation programs submitted by DMAs to develop TMDLs and Water Quality Management Plans, even with the extension;
  - The Tualatin Basin Program is one of the more expensive watershed programs for the City (second highest in terms of dollars spent by Portland for monitoring health of tributaries originating in Portland). Data is submitted to DEQ each year in January. Believe that Tualatin Basin is a success story and believe that health of the rivers and tributaries is improving as indicated by the data being collected;
  - Achieving standards is not a short process, it will also take time to address problems but we are making good progress. Public is aware of activities we are engaged in to improve the health of river and tributaries;
  - Improving the stream health of the Tualatin and other rivers within Portland is part the City's mission. Portland as a DMA is a public agency, accountable to ratepayers who pay hard-earned money and want accountability and results. TMDLs therefore need to be based on good science, used wisely and on something that makes sense. Money should not be spent on projects that will not give results or where there is uncertainty about the results. TMDLs should be based on all the data and information that has been submitted.

Additional Written Comment Received:

1. Dennis Lynch, U.S. Geological Survey submitted written testimony in support of the extension, which is attached
2. Clackamas County submitted written testimony in support of the extension, which is attached.
3. Multnomah County submitted written testimony in support of the extension, which is attached (a report (*Tualatin Basin Nonpoint Source Management Implementation/Compliance Schedule and Order Status Report (Task #6) – Multnomah County*, June 1999) was attached to the testimony but not included in this report).



United States Department of the Interior  
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U.S. GEOLOGICAL SURVEY

Water Resources Division  
Oregon District  
10615 S.E. Cherry Blossom Drive  
Portland, Oregon 97216  
<http://oregon.usgs.gov/>

APR 27 2000

NORTHWEST REGION

April 27, 2000

Mr. Andy Schaedel  
Oregon Department of Environmental Quality  
Northwest Regional Office  
2020 SW Fourth Avenue, Suite 400  
Portland, OR 97201-4011

Dear Mr. Schaedel:

As you know, the U.S. Geological Survey (USGS) has been studying the water quality of the Tualatin River and its tributaries since 1990. The purpose of this work is to better understand the basin-wide and instream processes that affect water quality, and to transfer that scientific knowledge to the managers and regulators of the river.

To that end, we have been pleased to participate in discussions with the Oregon Department of Environmental Quality (ODEQ) and the Unified Sewerage Agency (USA) that support the revision of the Tualatin River Total Maximum Daily Loads (TMDLs). As TMDLs are meant to be regulations based on sound science, the USGS supports the efforts of ODEQ, USA and others to incorporate recent data and knowledge into these regulations.

On May 18th, 2000, your agency plans to ask the Environmental Quality Commission to extend the Tualatin River TMDL implementation and compliance order to allow additional time for review and public comment on proposed and revised TMDLs. The USGS supports your efforts, and those of the designated management agencies, to revise the Tualatin River TMDLs and to create new TMDLs in accordance with the best available data and our current understanding of the relevant water-quality processes. The USGS will continue to work with all parties to deliver the data and knowledge necessary to support this public process.

If you have any questions about USGS data or investigations from the Tualatin River Basin, or require further information, please don't hesitate to contact me at 503/251-3265 or by email at [ddlynch@usgs.gov](mailto:ddlynch@usgs.gov).

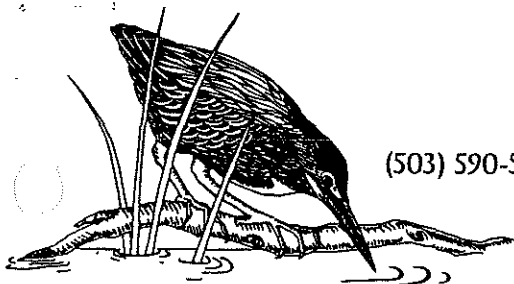
Sincerely,

Dennis D. Lynch  
Oregon District Chief

c: Robert Burkhart, DEQ  
William Gaffi, Unified Sewerage Agency

# TUALATIN Riverkeepers

16340 SW Beef Bend Rd. Sherwood, OR 97140  
(503) 590-5813 • fax: (503) 590-6702 • www.tualatinriverkeepers.org  
email: info@tualatinriverkeepers.org



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May 1, 2000

MAY 01 2000

Andy Schaedel  
Water Quality Manager  
Oregon Department of Environmental Quality  
2020 SW 4<sup>th</sup> Ave., Suite 400  
Portland, Or. 97201

**NORTHWEST REGION**

Re: Proposed Extension of the Tualatin River Basin TMDL Compliance Order

Dear Mr. Schaedel:

Thank you very much for the opportunity to provide testimony regarding implementation of the Tualatin River Basin TMDLs. My name is Sue Marshall and I am here representing the Tualatin Riverkeepers, a citizen based environmental organization with 700 members working to restore and protect the Tualatin River system.

The Tualatin Riverkeepers opposes an extension of the Tualatin River Basin TMDL Compliance Order. The TMDLs were set 12 years ago with an Oregon Administrative Rule (OAR 340-41-470) imposed deadline of June 30, 1993. We believe that the Compliance Order and subsequent extensions have served to delay compliance with the TMDLs and have provided an effective shield to the Designated Management Agencies from any liability from potential third party lawsuits.

The TMDLs provide the prescriptive means of restoring and maintaining the physical chemical and biological properties of the waters of the Tualatin Basin. As such the Riverkeepers have a high interest in see that the TMDLs are set and enforced.

In considering a proposed extension of the Tualatin River Basin TMDL Compliance Order it is important to examine the history of the order itself.

Prior to the Compliance Order, a 1988 Oregon Administrative Rule (OAR 340-41-470) set criteria for ammonia and phosphorus TMDLs for the mainstem and five tributaries in the Tualatin Basin. The Rule also set a deadline by which the criteria must be achieved. The deadline for compliance with the TMDL criteria was June 30, 1993. As this deadline approached back in 1993, DEQ prepared a Tualatin Sub-basin Nonpoint Source Management Compliance Order to extend the deadline beyond June 30, 1993. The new "deadline" allowed 18 months by which the DMAs must comply with the TMDL criteria.

Again, as the deadline approached, the Environmental Quality Commission (EQC) extends the deadline. This occurred again in 1997 for a six month period and again in 1998 for one month and yet again one month later that brings us up to the present consideration of an extension of the Tualatin River Basin TMDL Compliance Order. I have attached a compilation of significant Tualatin River TMDL milestones for your information.

The compliance order has been extended 4 times in five years and fails to meet OAR 340-41-470 required criteria for phosphorus intended to be met by June 30, 1993.

Another significant aspect of the compliance order is that it does not specify compliance with the TMDL load allocations. This may account for the failure of the DMAs to meet the phosphorus criteria. The Compliance order does not require them to do so.

Our final concern in consideration of this proposed extension involves public participation and oversight of TMDL implementation. I was a member of DEQ's Tualatin Basin Policy Advisory Committee (TBPAC) in 1997/1998. I participated in the development of recommendations that were included in a report to the EQC and also in support of a subcommittee report. I appreciated the opportunity, as a citizen, to participate in what was an enlightening process. In an attempt to continue to follow TMDL implementation I discovered that my involvement at the local level was not welcome. In the fall of 1998 I attended a collective meeting of the Tualatin Designated Management Agencies (DMAs) in order to hear a presentation from DEQ Tualatin Basin Coordinator. The first hour of business was dedicated to a discussion among the DMAs about whether or not it was a public meeting and whether or not they would continue to meet if I was present. They agreed to continue the meeting in order to hear the DEQ presentation. I voluntarily left immediately following the DEQ presentation. I have not been notified of any subsequent DMA meetings or DEQ presentations to the DMAs.

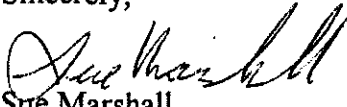
It is from this backdrop that the Tualatin Riverkeepers considers the Proposed Extension of the Tualatin River Basin TMDL Compliance Order. While we oppose this extension, we respectfully suggests the following apply as conditions of any Compliance Order extension:

- 1) All future NPDES MS-4 Permits will clearly include the TMDL numeric Waste Load Allocations. Without inclusion of TMDL numeric limits we believe there is no enforceable mechanism by which to assure the adequacy of water quality management plans.
- 2) Collective meetings of DEQ and the DMAs will allow members of the public to be present and as requested receive notice of meetings, advanced copies of meeting agendas, and copies of meeting minutes.

To look at this history of extensions and the failure of the DMAs to meet the TMDL load allocations 12 years after they were established, it would appear that there is a lack of fortitude when it comes to DEQ enforcement. The Clean Water Act provides powerful tools to meet its goal "to restore and maintain the chemical, physical, and biological integrate of the Nation's waters". We urge the Environmental Quality Commission to bolster DEQ's enforcement resolve and instruct DEQ to apply specific TMDL numeric limits to all new NPDES Stormwater permits.

Thank you very much for your consideration.

Sincerely,

  
Sue Marshall  
Public Policy Director

## Tualatin River TMDL Milestones

- August 16, 1986** Northwest Environmental Defense Center [NEDC] sends a Clean Water Act 60-day notice to the Environmental Protection Agency [EPA], based on failure of the Department of Environmental Quality [DEQ] to complete TMDL's [Total Maximum Daily Load] in Oregon.
- December 12, 1986** NEDC and Jack Churchill file suit in Federal District Court in Oregon, under the Clean Water Act, against EPA and its administrator Lee Thomas, based on DEQ failure to set TMDL's. Case name is NEDC v. Thomas. Complaint identifies Tualatin River as one of the many waters needing TMDL's.
- January 6, 1987** NEDC sends a second Clean Water Act 60-day notice to EPA for DEQ failure to set TMDL's in Oregon. Notice specifically identifies the Tualatin River.
- June 3, 1987** Consent Decree in NEDC v. Thomas entered by court. Decree requires DEQ/EPA to complete a Loading Capacity analysis for the Tualatin River and submit it to EPA by May 1987. Tualatin is first water on list of required TMDL work. The Decree also requires DEQ/EPA to complete adoption of TMDL's for all waters listed then and in the future by DEQ as Water Quality Limited, at the rate of 20% of all Water Quality Limited Streams annually.
- 1988** Oregon Administrative Rule, 340-41-470, sets criteria for ammonia and phosphorus TMDL's for the main stem and 5 tributaries. The criteria must be achieved by June 30, 1993.
- 1988** NEDC gives a Clean Water Act 60-day notice to USA for failure to comply with NPDES permits and unauthorized discharges. Over 13,800 treatment plant violations are cited.
- December 1988** NEDC, Tualatin Riverkeepers, Lower Tualatin Valley Home Owners Association, Tualatin Dam Park Home Owners League, and others file suit in federal court against USA. Case name is NEDC v. USA.
- 1989** TMDL's, Waste Load Allocations [WLA's], Load Allocations [LA's] for the Tualatin River established by DEQ and approved by EPA, for ammonia and phosphorus.
- August 2, 1990** A Consent Decree in NEDC v. USA is entered. Requires submission by USA of a draft compliance schedule for compliance with NPDES permit by 12/1/90 and creation by DEQ of a final compliance schedule due by 12/29/90.
- 1992** USA achieves WLA's for treatment plant discharges.
- 1993** As the June 30th deadline approaches, USA and DEQ prepare a "nonpoint source compliance order" which does not include a requirement for compliance of the Load Allocations for nonpoint. The Environmental Quality Commission [EQC] approves this "compliance order/schedule" for 18-months.

- Nov. 16-17, 1995** EQC extends the "Non-Point Source Compliance Order" for an additional 18 months. DEQ appoints a Technical Advisory Committee.
- 1997** EQC again extends the "Non-point Source Compliance Order", this time for 6 months. DEQ appoints a Policy Advisory Committee. The Designated Management Agencies through USA hire staff to facilitate and set the agenda for those meetings.
- February 27, 1998** A Subcommittee on TMDL Implementation issues a report to DEQ clarifying persistent confusion regarding natural vs. human caused sources of phosphorus and the relationship of TMDL's to water quality programs of the DMA's. Subcommittee members include Jack Smith of Omicron Associates, Sue Marshall of TRK, Kevin Curry of the Homebuilders Association of Metropolitan Portland, Bart Brush of NEDC, and Rosalie Morrison of Clackamas County Lower Tualatin River Citizens Advisory Committee.
- April 4, 1998** EQC extends the "Non-point Source Compliance Order" for one month and directs DEQ to provide a plan and schedule for implementing TMDL's for the Tualatin. The EQC further directed DEQ to incorporate the recommendations developed by the TMDL Subcommittee of the Tualatin Basin Policy Advisory Committee.
- June 11, 1998** EQC adopts a new "Compliance Order" that must be implemented by July 1999. Rather than laying out an actual schedule by which the non-point source Load Allocations will be met, the "Compliance Order" describes a process for developing a new implementation program for non-point source, updating existing WLA's for phosphorus and ammonia and developing additional TMDL's for temperature, pH, bacteria.
- June 1998** DEQ, with USA funding and assistance, hires a Tualatin basin Coordinator to accomplish the new "Compliance Order".

### Summary

- Oregon Administrative Rules require that the TMDL criteria for phosphorus and ammonia be met by June 30, 1993.
- In 1993 USA and DEQ prepare a "non-point source compliance order" which does not include a requirement for compliance with the non-point Load Allocations.
- The "compliance order" was extended four times over the course the next five years.
- The "new compliance order" still does not include non-point source Load Allocations or a schedule to achieve the Load Allocations.



## **SCHAEDEL Andrew L**

---

**From:** Sue Marshall[SMTP:Sue.Marshall@tualatinriverkeepers.org]  
**Reply To:** Sue.Marshall@tualatinriverkeepers.org  
**Sent:** Tuesday, May 02, 2000 01:50 PM  
**To:** 'Burkhart Rob'; 'Schaedel Andy'  
**Subject:** Additional Comments TMDL Compliance Order

May 2, 2000

Dear Andy and Rob,

Again, thank you for the opportunity to present the Tualatin Riverkeepers view point at the public hearing last night. I do have a few additional thoughts regarding the Compliance Order. Also, I respectfully request that the Tualatin Riverkeepers full testimony be distributed to the members of the Environmental Quality Commission.

At some point in the series of extensions to the original Compliance Order that occurred over the last five years, the goal of the Compliance Order became entwined with development of the new TMDLs. Perhaps it would be wise to separate the issues.

As we view the Compliance Order, it's goal should be to comply with the TMDL criteria defined in ORS 340-41-470. We believe that is the legal obligation.

It appears that the goal of the Compliance Order was never stated to meet ORS 340-41-470.

Further, the Compliance Order itself has been a moving target with no actual enforceable deadline. We believe this lack of enforcement of a Compliance Order which never addressed actual compliance with the TMDL load allocations is not how the TMDLs are intended to be implemented.

To a great extent it is the successful enforcement of the TMDLs via the NPDES wastewater permits and the resulting improvements to water quality, that raise our expectations that the same success is possible through enforcement of the NPDES Stormwater permits. In fact, we believe TMDL enforcement via NPDES Stormwater permits is a requirement of the Clean Water Act.

Further, we believe that the public's trust is eroded when the permit holders are not held accountable by the regulatory agencies. There is an opportunity at hand, with the renewal of the Designated Management Agency's NPDES MS 4 Permits to better assure compliance by including the TMDL numeric limits within those permits. We urge the EQC to direct DEQ to include TMDL numeric limits within these permits.

Thank you for your consideration.

Sincerely,

Sue Marshall  
Public Policy Director  
Tualatin Riverkeepers  
16340 SW Beef Bend Road  
Sherwood, OR 97140  
Ph: (503) 590-7484  
Fax: (503) 590-6702  
[www.tualatinriverkeepers.org](http://www.tualatinriverkeepers.org)

Testimony from Multnomah County  
May 1, 2000

MAY 01 2000

DEQ Public Hearing re: Extension of Tualatin Basin TMDL  
Compliance Order

**NORTHWEST REGION**

Multnomah County is a Designated Management Agency (DMA) subject to the Tualatin Basin TMDL Implementation and Compliance Schedule and Order. The County supports DEQ's request for extension of the phosphorus TMDL, to allow for appropriate revisions to this TMDL.

As explained in the attached "February and June 1999 Reports" which document attaining water quality standards, this DMA agrees with DEQ that existing TMDL's need revision, and require more time to appropriately develop.

Furthermore, new TMDL parameters for bacteria, temperature, and dissolved oxygen are currently under development and scientific review. These TMDLs should be accomplished in concert with the phosphorus TMDL to avoid any potential conflict and scientific inconsistency.

In support of the DMA's position on this extension, Multnomah County submits this list of key commitments and accomplishments to be continued.

Key Implementation Measures for Multnomah County/Tualatin Basin Program

- Continue to sample streams in Multnomah County portion of the Tualatin Basin during compliance periods of May through October and report laboratory findings to EPA STORET system.
- Continue to implement Best Management Practices (BMPs) from Prioritized List of sites for water quality management purposes.
- Continue to submit Annual Reports on status of Nonpoint Source Management Program.
- Continue to participate in and support Public Awareness and Public Education activities specific to the Tualatin Basin Water Quality Programs.
- Continue to require and enforce County Grading and Erosion Control ordinances specific to the Tualatin Basin for any new development and land disturbing activities.
- Continue innovative Roadside Vegetation Management Programs to increase low-growing vegetation for water quality purposes.

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MAY 01 2000



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**NORTHWEST REGION**

**J. Michael Read**  
Director

**Testimony**

**Public Hearing on DEQ Request to Extend**

**Tualatin TMDL Compliance Order**

**May 1, 2000**

Clackamas County, Water Environment Services (WES), as a Designated Management Agency (DMA) representing the Surface Water Management Agency of Clackamas County and the City of Rivergrove, supports the Department of Environmental Quality's (DEQ) request to extend the Tualatin Basin Total Maximum Daily Load (TMDL) implementation and compliance schedule from May 31, 2000 to December 31, 2000. It is important for the DEQ to complete the process of updating the TMDL for Phosphorus and Ammonia and to complete the remaining TMDLs for temperature, dissolved oxygen, and bacteria.

WES is committed to continue to work on implementation of Best Management Practices identified in the Compliance Schedule. WES is also actively involved in working with DEQ, other DMAs, and stakeholders (such as our Lower Tualatin Citizens' Advisory Committee) to address water quality issues within the Basin.

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MAY 02 2000

NORTHWEST REGION



**UNIFIED SEWERAGE AGENCY OF WASHINGTON  
COUNTY**

May 2, 2000

Mr. Andy Schaedel  
Department of Environmental Quality  
2020 SW 4<sup>th</sup> Avenue, Suite 400  
Portland, OR 97201-4011

Re: Proposed Extension of the Tualatin River Basin TMDL Compliance Order

Dear Mr. Schaedel:

The Unified Sewerage Agency (USA), as a listed Designated Management Agency (DMA) representing itself and its participating member cities, supports the Department of Environmental Quality's (DEQ) request to extend the Tualatin Basin Total Maximum Daily Load (TMDL) implementation and compliance schedule from May 31, 2000 to December 31, 2000. This will allow more time for DEQ, with input from the DMAs and the interested general public, to develop a comprehensive, watershed-wide approach for addressing 1) revisions to the current TMDLs for ammonia and total phosphorus, and 2) proposed new TMDLs for temperature, dissolved oxygen, and bacteria.

USA, both individually and in conjunction with the other DMAs, has been actively involved in working with DEQ and other stakeholders to help craft a watershed-wide, holistic approach to the remaining water quality issues within the Tualatin River basin. Significant progress has been and is continuing to be made. USA has provided financial support and the majority of the data being utilized in the continuing evaluation of the Tualatin River basin. Doing what is right for the watershed is of utmost importance to USA.

In part as a result of the implementation of the 1988 TMDLs, the Tualatin River has become a much healthier environment for fish and other aquatic organisms and a recreational asset to the citizens of Washington County and the region. These accomplishments occurred while the region was experiencing extremely rapid population growth and economic development.

A great deal of effort has been expended on the ammonia and total phosphorus TMDLs over the last 12 years by not only the USA and the other DMAs but other watershed groups as well. Over this period of time, a far greater understanding of the watershed system has been gained. USA

Letter to Schaedel  
May 2, 2000  
Page Two

strongly believes that it is appropriate that this new knowledge and understanding be reflected in the TMDLs established for the Tualatin basin. We believe it is appropriate that we collectively; DEQ, the public, and the DMA's, celebrate the successes we have achieved in this basin. Now the resources in the basin should be focused towards correcting the problems identified in the newly proposed TMDLs. Alternative #1 (Do not extend the deadline) as stated in the DEQ Staff report could place the DMAs to be at risk of being out of compliance with OAR 340-41-470(9)(a) through no direct fault of their own. More importantly, it could result in the diversion of critical resources from working on the revisions and new TMDLs in a holistic, watershed-wide manner to potentially preparing responses to third party litigation. USA and the DMAs do not support Alternative #1 as it has the potential to divert resources from finalizing the current work, which is building on the knowledge and experience gained over the last 12 years to develop a scientifically supportable, integrated watershed management strategy for the Tualatin River basin.

USA supports DEQ in the implementation of an adaptive management strategy in the development of, and revisions to, the TMDLs. Under this approach, as new information and knowledge becomes available, corrections should take place. An adaptive management strategy coupled with a comprehensive watershed-wide approach, that optimizes the overall potential of the Tualatin Basin to support its beneficial uses, will provide the best results for the dollars spent. USA knows the public wants us to deal with all the issues of water quality improvements at the same time, not one at a time. For these reasons, USA supports DEQ's request for an extension. The extension should allow DEQ adequate time to develop the entire framework of water quality issues within the Tualatin basin so that a holistic, watershed-wide implementation strategy can be effectively developed.

Decisions need to be based on good data and thoughtful analysis to insure success. This takes time. As an example, scientific studies conducted since the TMDLs were established in 1988 have identified significant sources of naturally occurring phosphorus in ground water. This results in tributary concentrations during the critical summer periods that are higher than the current TMDL criteria. While major reductions in the size of algal blooms have been realized as a result of the reductions in phosphorus by the wastewater treatment plants, given the naturally occurring phosphorus, it will not be possible to achieve the current criteria. Modeling work done by the United States Geological Survey (USGS) and supported by actual data on the Tualatin River indicates that the Oregon chlorophyll a guidance level will not be achieved even if the existing TMDL criteria were met. The Nuisance Phytoplankton Growth Rule (OAR 340-41-150) allows for the chlorophyll a guidance level to be adjusted when natural, background conditions of nutrients exist which exceed the "action-level" concentrations. This is an example of adaptive management process being used in the revisions to the current phosphorus TMDL and an example of why the extension is justified.

Letter to Schaedel  
May 2, 2000  
Page Three

USA, in conjunction with the other DMA's, has accomplished the underlying water quality goals that were the basis of the 1988 work. The Agency is in full compliance with the existing Implementation and Compliance Order and it is our continued commitment to stay in compliance. The attachments (Attachments 1 & 2) summarize the achievements and progress made by USA in meeting the goals and requirements of the previous Compliance Orders. The Agency does not see the requested extension as having any impact on that continued commitment. Rather we see the extension as fully justified to allow for the full integration of the knowledge we have gained over the last 10-12 years into a holistic, watershed-wide strategy for achieving the water quality goals we all want.

The DEQ staff recommendation allows all of us to be smarter today and tomorrow and assures the public that we are spending their surface water management dollars wisely. It provides the mechanisms to answer the remaining questions in a fully integrated management structure, rather than on a single parameter by single parameter basis which most likely will not be the most effective approach.

The Tualatin River and its tributaries will let us all know ultimately how well we have done. USA believes the DEQ recommendation continues the correct course of action today that will allow all of us to celebrate the successes tomorrow. USA, and the other DMAs, all want and are prepared to actively participate in the discussions to continue the water quality improvements. We have good data and we have the administrative programs to deliver realistic and effective strategies on the ground. All that appears to be needed is a little more time to allow for the fitting of the pieces together into a scientifically supported, holistic, watershed approach.

The Unified Sewerage Agency and its participating member cities appreciate the opportunity to support DEQ's request for an extension to the Tualatin Basin Implementation and Compliance Order until December 31, 2000.

Sincerely



Charles L. Logue, P.E.  
Director, Technical Services Department

Attachment 1 – USA Program Status for Meeting TMDL Requirements, February, 1999  
Attachment 2 – USA Program Status for Meeting TMDL Requirements, Addendum #1,  
June 1999

Cc: Bill Gaffi, Tom VanderPlaat  
Jan Miller, Jerry Linder



# Early Overview of Budget Proposed for 2001-03

## The Director's Instructions

### Shift resources to highest priority work

The Director asked DEQ managers to identify options within each program, including fee increases and fund shifts, to provide flexibility in addressing agency priorities. In reviewing these options with staff, he chose to move about \$2.5 million general fund dollars within DEQ's budget to higher priority activities. These shifts are described in each program's budget discussion.

### Use existing resources in a different way

The Director asked that the agency use existing resources to:

- Select at least six geographic areas, where we would partner with local governments, business and citizens to solve environmental problems locally.
- Provide a local presence either through satellite offices, or by assigning existing staff to be routinely available for particular neighborhoods or cities
- Re-examine whether any staff, presently at headquarters, would serve our constituents and the public better by being located in one of the regions.

### Management Improvements

Programs were directed to:

- Identify a schedule where each major subprogram of the agency would undergo process improvement within the next five years.
- Develop performance measures for our activities, so we know we're achieving environmental results with the resources we're given.
- Work to develop environmental indicators, which over time, will show us that Oregon is being successful in protecting the environment.

The budget discussed today is that which the agency will present to the Governor for review. We anticipate that no final decisions will be made by the Governor until after the November elections because of ballot measures.

## Budget Comparison

<b>Budget 1999-01</b>	<b>792 FTE</b>
Contract VIP	75 FTE
Total	867 FTE
<b>Estimated Affordable</b>	
<b>Budget 2001-03</b>	<b>715 FTE</b>
Restorations	23 FTE
Continued Limited Duration	25 FTE
VIP	75 FTE
New	49 FTE
Total	887 FTE



# Early Overview of Budget Pro

Our present figures are early estimates, with several issues still outstanding, such as what can be included in our current service level budget, staff costs allowed, and inflation. Once these issues are resolved, we will develop precise figures, enter the proposed budget in the state computer controlled budget development system and have DAS audit our budget to confirm the accuracy of our submittal.

operator certification efforts and EPOC. (Those previously generally funded or subsidized programs now show as program option packages on fees.) The Director also asked that Water Quality shift general fund resources to fund a high level ESA coordination effort. The Director also shifted general funds from Hazardous Waste compliance and technical assistance to Water Quality to establish a Stormwater Phase II permitting program and to allow toxics monitoring on the Willamette River.

## Air Quality

The Director asked the Air Quality program to replace one-time general fund with proposed Air Contaminant Discharge Permit fees and proposed new open burning fees. He also asked the program to shift existing general fund to area and mobile source work and toxic program work.

### Budget Packages

- Restoration of up to 10.5 ACDP FTE:
  - 4.0 due to loss of one time general fund.
  - Up to 3.0 due to estimated increases in costs.

- 2.5 due to shift of general fund to area and mobile sources.
- 1.0 due to shift of fund to proposed toxics program.
- Maintain existing PM 2.5 federally funded monitoring network, 8 FTE.
- Restore 1 FTE open burning program staff.
- Create limited duration positions for currently contracted VIP staff, 75 FTE.
- Create an Air Toxics Program adding 3 grant funded positions and shifting 2 FTE in base budget to this effort.
- Add LRAPA requested general fund increase in their "pass-through" support.

Air Quality Permit Program		
	No additional funding 01-03	85% fee support to restore current level
Staffing Level	26	36
% Fee Increase	--	~45%

## Water Quality

The Director asked the Water Quality Program to seek fees for some specific program activities, shifting that general fund to maintenance of NPDES/WPCF permitting. This includes UIC efforts,

### Budget Packages

- Water Quality permit restoration and enhancement, with fund shifts to maintain most of existing staff with some minor fee increases, and suggesting an enhanced program at the workload model level, with additional fee increases.
- UIC fees to replace general fund of about \$200,000.
- EPOC program shift to municipal fee surcharge, to replace general fund of about \$350,000 moved to NPDES/WPCF permitting in base budget.
- Operator certification fees of about \$150,000 to replace general fund shifted to permitting.
- Stormwater Phase II program, 6 FTE phased in on fees from increased permit volume, plus some future fee increases, program startup staff in base budget from general fund shifts.



# posed for 2001-03

- Stormwater federal pass through money for cities of about \$10 million, 1 FTE to administer.
- Oregon Plan monitoring and approved TMDL maintenance and implementation efforts of approximately 15 federally funded FTE and 2 general fund FTE transferred from the Hazardous Waste Compliance and Assistance.
- Willamette Basin TMDL and permits, continuation of 8 general fund staff committed for four years last session.
- Drinking water source protection, continuation of 7 federally funded staff.

the base budget to increase spill prevention and preparedness staff in regional offices. He also directed the program to seek an increase in fees to enhance marine spill prevention and preparedness efforts.

## Budget Packages

- Shift existing 1.5 FTE spill prevention and preparedness staff to regional offices.
- Increase comprehensive spill preparedness, approximately 1 FTE.

## Waste Prevention & Management

The Director asked the Waste programs to use existing resources to focus efforts to address toxics, reduce waste generation, and continue seeking solid waste recovery improvements. The Director also asked the Tank program to request adequate resources to assure the state's 6000 + tanks

do not again threaten Oregon's ground and surface water.

## Budget Package

- Maintain approximately 3 FTE and enhance the Underground Tanks program by 2 FTE through fee.

## Agency Management

The Director asked agency management to make significant progress toward the three priorities by making environmental information more available, measuring performance and increasing agency accountability.

## Budget Packages

- Information Systems improvements, geographic capabilities, 7 FTE.
- Other management improvements, 2 FTE.

We are currently analyzing other agency management needs generated by programs. An additional agency management package may be requested to fill these needs.

Water Quality Permit Program			
	No additional funding 01-03	GF shift plus fee increase to restore current level	GF shift plus fee increase to support enhanced level
Staffing Level	47	56	68
% Fee Increase	--	~20%	~60%

## Cleanup

The Director wants to ensure Oregon has a comprehensive statewide approach to spill prevention and preparedness. He asked that the Cleanup program shift about \$200,000 within



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# DEQ Priority: Protect and Restore Oregon's Rivers and Streams

## Good News for Oregon's Rivers and Streams

- The National Wildlife Federation has identified Oregon as one of six states in the nation improving water quality management .
- DEQ has completed 74 TMDLs (water quality management plans) and received EPA approval on 73, with a recent submission pending.
- All major industries and municipal sewage system discharges are controlled through permits.
- DEQ is now synchronizing the update of wastewater permits in each watershed.
- DEQ is working with other natural resource agencies to implement the Oregon Plan for Salmon and Watersheds.



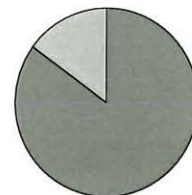
Oregonians enjoy rafting on the Owyhee River in Southeast Oregon. One of DEQ's priorities is to keep Oregon's rivers clean for many uses, including recreation.

Oregon has over 110,000 miles of rivers and streams. Oregonians expect these rivers to be clean and healthy for people and fish. DEQ has reviewed clean water data for about 1/3 of Oregon's rivers and streams — and of those we've reviewed, about 30% don't meet clean water standards. That's over 13,000 miles of rivers and streams.

The results of not meeting these standards are clear. Many of our native salmon are threatened with extinction and are formally listed under the Endangered Species Act. Some waters, like the Willamette, have fish consumption advisories posted because of contamination with hazardous chemicals like mercury. Oregon's waters have problems with temperature, bacteria, sedimentation, dissolved oxygen, growth of aquatic weeds, toxic chemicals, and habitat and flow modification.

## Estimated Sources of Water Pollution in Oregon

15% Point Sources  
e.g. Industrial and Municipal Discharges



85% Nonpoint Sources  
e.g. Urban Runoff, Agriculture, Forestry, Natural Causes



# DEQ Proposed Solutions

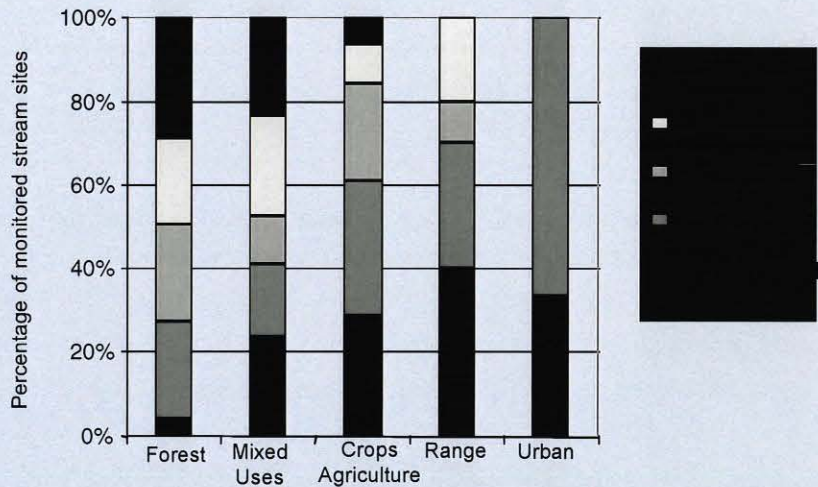
- Legislation to establish a Willamette River Conservation and Restoration Act.
- Shift existing resources within the water quality program to coordinate our efforts with federal agencies on the Endangered Species Act.
- Create two levels of permitting effort, one from shifting of resources within the agency plus moderate fee increases, and the second with a greater fee increase for an enhanced program to eliminate the current permit backlog.
- Shift agencywide resources and increase fees to implement Phase II stormwater permitting.
- Request federal funds to provide assistance to local governments and landowners to implement approved water quality management plans.
- Request federal funds for pass through money to local government urban stormwater permitting and compliance efforts.
- Enhance the spill response program by shifting existing program resources.
- Propose fees to keep EPOC, UIC, and wastewater operator certification at current level of effort.



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## State Water Quality Conditions

### Conditions Based on Oregon Water Quality Index, by Land Use Type



Categories based on dominant land use within a 5-mile radius of the monitoring site. If no land use type represented at least 50%, the site was designated as "Mixed Uses". Data based on 133 monitored stream sites.



New and revised TMDLs will be completed for the Tualatin watershed this year. DEQ plans to complete TMDLs for all 91 Oregon watersheds by 2007.



# 2001 DEQ Legislative Concepts

DEQ submitted the following legislative concepts to the Department of Administrative Services on April 14, 2000. The Department is discussing the concepts with state and local agencies and stakeholders, and will continue to refine the proposals. DEQ's goal is to gain consensus on each of these concepts before the legislative session begins.

## 340-1 Willamette River Conservation and Restoration Act

Placeholder concept for addressing "gaps" in controlling urban sources of pollution in the Willamette Basin.

- Set specific goals and timelines for Willamette River restoration and protection
- Voluntary environmental audit and education of households to encourage "River Friendly Homes" in the Willamette Basin
- Support and enhance local government efforts for urban stormwater control
- Incentives and education for "River Friendly Development"
- Funding proposal

**Contacts:** Steve Greenwood, (541) 686-7838 ext. 224; Lauri Aunan, (503) 229-5327

## 340-2 Environmental Cleanup Financing and Structure

This is a placeholder concept that can be used to propose any changes recommended by DEQ's Environmental Cleanup Financing Committee chaired by Gail Achterman. The Committee held its initial meeting in March and will meet monthly through 2000.

**Contacts:** Bob Danko, (503) 229-6266; Paul Slyman, (503) 229-5332

## 340-3 Help Finance Landowner Salmon Protection Projects

The Oregon Plan for Salmon and Watersheds calls on DEQ to revise the Clean Water State Revolving Fund (CWSRF) to allow funding for non-point source pollution control projects, undertaken by non-public entities, which enhance and protect critical salmon habitat. The CWSRF currently provides direct loans to public entities for sewage treatment and stormwater control improvements. This concept would provide a mechanism for low-interest loans to private landowners for non-point source pollution control projects.

**Contacts:** Jan Renfroe, (503) 229-5589; Lauri Aunan, (503) 229-5327

## 340-4 Oregon Spill Preparedness

Three major events of the past year (the New Carissa grounding and spill, the toxic chemical spill at a wood treating facility in the Willamette Valley, and the oil pipeline explosion in Bellingham, Washington) demonstrate that Oregon needs a comprehensive statewide approach to spill prevention and response.

This concept places the state in a better position to address marine spills by implementing many of the recommendations of the New Carissa Review Committee and raising vessel and facility fees that support the Department's marine spill preparedness work. The concept also ensures operators of large inland oil pipelines work to prevent leaks and are ready when leaks occur. Finally, the concept addresses the risk of spills from fixed facilities.

**Contacts:** Bob Danko, (503) 229-6266; Paul Slyman, (503) 229-5332

### **340-5 Underground Storage Tank Leak Prevention**

The 1999 Legislature increased the fee on commercial gasoline storage tanks from \$35 to \$60 per year. This increase sunsets in 2001. Underground storage tanks have been upgraded to comply with federal law, but need ongoing maintenance and inspection to ensure that leak prevention systems work. This concept would establish per tank fees at the level needed to support inspection, technical assistance and enforcement to protect the public and private investment in new equipment, and prevent another round of leaks and expensive cleanups.

**Contact:** Bob Danko, (503) 229-6266

### **340-6 Dry Cleaner Waste Prevention and Cleanup**

This is a placeholder. The 1995 Legislature created a program to clean up and prevent contamination from dry cleaning facilities. The law created an insurance pool to pay cleanup costs, but the Department of Revenue and others have raised concerns about the fee structure that creates this insurance pool. Without revision, the fee structure will not support the cleanups that facility owners are counting on. DEQ is working with the dry cleaning industry to determine whether to propose changes to the law.

**Contacts:** Bob Danko, (503) 229-6266; Paul Slyman, (503) 229-5332

### **340-7 Community Solutions Team**

This is a placeholder arising out of the Governor's Community Solutions Team, for potential legislation required to implement the integrated investment strategy.

**Contact:** Peggy Halferty, (503) 378-6892 ext. 27



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# Permittees' Reply

## Agency Team Recommendations



- Raytheon - Mr. Sharp
  - Worker communication program
  - Medical clinic MOA
  - Good Shepherd Community Hospital MOA
  - Hermiston Fire Department MOA



# Permittees' Reply

## Agency Team Recommendations



- Recent practical experience
- May 10, 2000 CSEPP/CAIRA exercise
- Readiness training continues



# Management and Process Improvements

Process improvement needs to be a normal part of doing business at DEQ, according to Lang Marsh, Director. He asked each program to identify a five-year schedule, showing when each subprogram will undergo process improvement. These improvement initiatives will integrate with planned computer system modernization where appropriate. The process improvement initiatives will use state-of-the-art methods and every project will be evaluated for effectiveness.

## Process Improvement Efforts Underway or Completed

- The Air Quality permit program completed a process improvement exercise and is implementing the resulting improvements over a five year period. These improvements resulted in rule changes, permit formatting changes and other improvements which streamline and make AQ permitting more effective and efficient.
- The Voluntary Cleanup Program published standards for simple soil cleanups, eliminating bureaucratic processes, to allow people to move quickly in getting cleanups done.
- The Cleanup program also created a new process, called the Independent Cleanup Pathway, for property owners to conduct their own site cleanup, document the work and send their findings to DEQ for sign off.
- The Water Quality Program has started a process improvement project for permitting efforts. Some results are expected by the end of the biennium. Long term improvements are expected to take well into next biennium to complete.
- Eastern Region completed a pilot project for improved customer service in the on-site sewage disposal program, where applications are scanned into the electronic system and can be emailed to any DEQ office. Technical staff can answer questions from the public regardless of where they are.
- The Hazardous Waste Program completed field data collection improvements and annual reporting system improvements.
- Agency management modernized the budget development system, reducing the number of staff needed for budget work.

## Other Management Improvements

Agency management is working to complete a comprehensive time accounting system for all DEQ operations. This system will allow for transparent information about DEQ efforts for the agency and the public.

Performance measurement is also underway at DEQ, to allow us to know how effective we are in implementing the activities we undertake. Many of the process improvement efforts will produce ongoing performance measurement tools. DEQ will develop effectiveness measures that evaluate the outcome of actions, going beyond current evaluations of numbers of activities completed. This effort should be completed and put into action by June of 2001.

The agency also participates nationally with other states in developing environmental indicators, to allow us to confirm that the efforts we are all engaged in result in positive trends in the condition of the environment.

Year	Water Quality	Air Quality	Waste Prevention and Management	Environmental Cleanup	Agency Management
<b>Historic</b>		SPITT (AQ Permitting)	Hazardous waste field data management Hazardous waste annual reporting	Program principles Customer survey Voluntary Cleanup Independent Cleanup Pathway Spill exercise guidelines	Budget development
<b>2000</b>	Wastewater management On-site letter revisions (Eastern region)	SPITT Implementation	Tanks Solid waste	Spill prevention Site assessment Voluntary cleanup Orphan site cleanup Dry cleaner site cleanup Site response Spill response	Resources: Position management Recruitment Operating budgets
<b>2001</b>	Operator Certification On-site scanning; distribution	Nuisance/ open burning		Spill prevention Site assessment Voluntary cleanup Orphan site Dry cleaner site cleanup Site response Spill response	Computer purchasing Reclasses
<b>2002</b>	SRF/319 Grant Funding and Licensing Program for Land Application	Nuisance/ open burning		Spill prevention Site assessment Voluntary Cleanup	Contracting
<b>2003</b>	401/404 Permitting	AQ monitoring State Implementation Plan development		Spill prevention	Performance management User requirements analysis
<b>2004</b>	On-site Permitting	Asbestos			Configuration and version management
<b>2005</b>	Underground Injection Control				Grants reporting



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## Memo

To: Environmental Quality Commission  
From: Wayne C. Thomas, Administrator, Chemical Demilitarization Program  
CC: Langdon Marsh, Director, Larry Knudsen, EQC Counsel, Sue Oliver, Senior Hazardous Waste Specialist  
Date: May 18, 2000  
Re: Item K: "Permit Revocation Request Related to the Umatilla Chemical Agent Disposal Facility"

---

### Commissioners:

The official agenda for the May Environmental Quality Commission (EQC) meeting on May 18, 2000 does not include a break down of the schedule for Item K: Permit Revocation Request related to the Umatilla Chemical Agent Disposal facility. The agenda presented below describes the activities scheduled for Item K on May 18, 2000.

9:30 – 9:40	Department Staff Introduction/briefing on legal requirements by DOJ
9:40 – 10:30	Oral Testimony by Petitioners
10:30 – 10:40	Break
10:40 – 11:30	Oral Testimony by Permittees
11:30 – 12:00	Public Comment
12:00 – 1:00	Lunch Break
1:00 – 2:30	Presentation of Staff Report by Department
2:30 – 2:40	Break
2:40 – 4:15	Discussion, questions, and action by Commission



State of Oregon


Department of Environmental Quality

Memorandum

DEQ Item No. 00-0690 (92.93)

**Date:** May 18, 2000

**To:** Environmental Quality Commission and other Interested Parties

**From:** Sue Oliver   
Chemical Demilitarization Program  
DEQ, Hermiston

**Subject:** Correction Pages to Umatilla Staff Report for the May 18, 2000 Meeting

Agenda Item K, EQC Meeting, May 17-18, 2000  
Request for Revocation of Permit No. ORQ 000 009 431  
[Umatilla Chemical Agent Disposal Facility (UMCDF)]

An error was found in the Staff Report for the "Request for Revocation" of the UMCDF Hazardous Waste Permit. A section in the "Intended Future Actions" on Page 57 was inadvertently omitted. Please replace pages 57-58 of your copy with the attached replacement pages 57-58. The only change is additional information in the "Intended Future Actions" section, mostly related to the "Startup Checklist" that was included as Attachment X in the Staff Report.

My apologies for the error. Please call me at 541-567-8297 (ext. 26) if you have any questions.

### **Conclusions**

The Department has reviewed all of the Exhibits submitted during the legal proceedings for G.A.S.P., et al., v. Environmental Quality Commission, et al. (Case No. 9708-06159), the various arguments presented in the motions and oral arguments during the case, the written and oral comments of the Petitioners received during two public comment periods, and all other public comments received. The Department has concluded that the information reviewed does not meet the criteria established in either 40 CFR 270.41 or 40 CFR 270.43 for cause to unilaterally modify or terminate the UMCDF HW Permit.

### **Intended Future Actions**

The Department will complete its review of the documents related to the Dunnage incinerator (listed in Attachment V) prior to review of the Class 3 Permit Modification Request related to the Dunnage incinerator (expected to be received in August, 2000). The Department will continue to oversee the construction activities at UMCDF and to process other Permit Modification Requests submitted by the Permittees.

The Department considers the decision to start thermal operations to be as critical as the original decision to approve the Hazardous Waste Permit. On April 6, 2000 the Department sent a letter to the Permittees with an attached "UMCDF Startup Checklist" (See Appendix X). The Startup Checklist was developed as part of a process that the Department will use to assess the readiness of UMCDF to begin thermal operations. The Department is developing specific evaluation criteria for each item on the Checklist, and intends to open a public comment period prior to submitting a recommendation to the Commission on whether to allow the commencement of thermal operations at UMCDF.

### **Department Recommendation**

The Department recommends that the Commission deny the Request for Revocation dated December 14, 1998 from G.A.S.P., et al..

**Attachments** *See Table 2 on pages 7 and 8 for a list of Attachments.*

### **Reference Documents (available upon request)**

1. "Minutes of the Two Hundred and Eightieth Meeting of the Environmental Quality Commission, November 18-19, 1999," Environmental Quality Commission (DEQ Item No. 99-2276).
2. "Transcript of Proceedings, Public Comment on a Request to Revoke the Umatilla Chemical Weapons Depot Permits," before the Environmental Quality Commission, November 19, 1999 (DEQ Item No. 00-0181).



3. "Transmittal of comments received during the Umatilla Chemical Agent Disposal Facility (UMCDF) 'Request for Revocation' Comment Period," Memorandum from the Department of Environmental Quality (Hermiston office) to the Environmental Quality Commission, January 25, 2000 (DEQ Item No. 00-0129).
4. "Transmittal of documentation related to the 'Request for Revocation' of the Umatilla permits," Memorandum from the Department of Environmental Quality (Hermiston office) to the Environmental Quality Commission, November 3, 1999 (DEQ Item No. 99-1882).
5. "Documentation Related to Case No. 9708-06159," *G.A.S.P., et al., v. Environmental Quality Commission, et al.*, Volumes I and II, August, 1997 to June, 1999 (DEQ Item No. 99-1877).
6. "Minutes of the Two Hundred and Seventy-Eighth Meeting of the Environmental Quality Commission, August 18, 1999," Environmental Quality Commission (DEQ Item No. 99-2145).
7. "Carbon Filter System Pollution Abatement System (PFS) at the Umatilla Chemical Agent Disposal Facility (UMCDF)," Staff Report dated November 1, 1999 related to Agenda Item G, EQC Meeting, November 18-19, 1999 (DEQ Item No. 99-1815).
8. "Pre-Trial Burn Risk Assessment for the Proposed Umatilla Chemical Demilitarization Facility," prepared by Ecology and Environment, Inc., for the Oregon Department of Environmental Quality, February, 1997 (DEQ Item Nos. 2377 & 2388).
9. "Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities," Peer Review Draft, U.S. Environmental Protection Agency, July, 1998 (EPA 530-D-98-001A, B & C).
10. "Background Document on Gulf War-Related Research," by the Syracuse Research Corporation for U.S. Department of Health and Human Services Centers for Disease Control and Prevention, February, 1999 (See Attachment K to this Staff Report).
11. "Management Actions Needed to Answer Basic Research Questions," Government Accounting Office, January, 2000 (See Attachment K to this Staff Report).
12. "Findings and Conclusions of the Commission and Order," In the Matter of the Application of the United States Army for a Permit to Construct and Operate a Chemical Weapons Demilitarization Facility at the Umatilla Chemical Depot, February 10, 1997.
13. "Umatilla Chemical Agent Disposal Facility Phase 1 Quantitative Risk Assessment," Science Applications International Corporation, 1996 (DEQ Item No. 1830).
14. "Transcript of Proceedings," Meeting of the Environmental Quality Commission, November 15, 1996 (DEQ Item No. 2887)
15. "Transcript of Proceedings," Meeting of the Environmental Quality Commission, November 22, 1996 (DEQ Item No. 2351)
16. "Transcript of the Deposition of Gary Harris," In the Matter of the Tooele Chemical Agent Disposal Facility's Permit and Permit Modifications, before the State of Utah Solid and Hazardous Waste Control Board, Volumes 1-2, November 22-23, 1999 (DEQ Item Nos. 00-0376 and 00-0377).
17. "Transcript of the Deposition of Gary Harris," In the Matter of the Tooele Chemical Agent Disposal Facility's Permit and Permit Modifications, before the State of Utah Solid and Hazardous Waste Control Board, Volumes 3-6, February 2-5, 2000 (DEQ Item Nos. 00-0378, 0379, 0380, 0381).



**UMATILLA**  
chemical agent disposal facility



**PERMITTEE'S REPLY  
REQUEST FOR REVOCATION**

**UMATILLA CHEMICAL AGENT DISPOSAL FACILITY**

**BEFORE THE**

**OREGON ENVIRONMENTAL QUALITY COMMISSION**

**May 18, 2000**





# Permittees' Reply

## Outline of Presentation



- Introduction
- General Comments
- Agency Team Recommendations
- Conclusion
- LTC Connelly
- Mr. DePew
- Mr. Sharp and LTC Woloszyn
- LTC Woloszyn





# Permittees' Reply

## Introduction



- The Permittees generally concur with DEQ analysis and conclusions



# Permittees' Reply

## Introduction



- DEQ Staffing Report reflects exhaustive effort to address allegations and concerns:
  - Public comment not required
  - DEQ gathered and considered:
    - 100s of pages of exhibits
    - Additional reports and transcripts
    - Lengthy written and oral comments



UMATILLA  
chemical agent disposal facility

# Permittees' Reply

## Introduction



- DEQ Staffing Report reflects knowledgeable, even-handed approach to complex issues:
  - Low level exposures
  - Toxicity of CWA
  - Human HRA



# Permittees' Reply

## Comments on Report



- Army Commitments
  - Safe and environmentally responsible elimination of stockpile, waste generated during treatment, and nonstockpile waste
  - Continue to be open and forthright throughout the permit process.
  - Fielding best possible solution for each waste stream
  - Available to answer EQC questions





# Permittees' Reply

## Comments on Report



- Incineration Still Best Approach for Oregon
  - Independent Oregon DEQ review thorough, sound, and conclusions correct
  - NRC 2000 assessment that alternatives not reasonably available



# Permittees' Reply

## Agency Team Recommendations



- UMCDD - LTC Woloszyn
  - Incident notification MOA
  - Chemical storage area monitoring
  - Communication lines: RDC-UMCDD
  - Public outreach and awareness
  - Off-post notification procedures



# Permittees' Reply

## Conclusion



- Recognize EQC/DEQ's vigilance and diligence in administering the permits
- Shared commitment to safe, environmentally sound disposal of Umatilla stockpile and secondary wastes
- Shared commitment to protection of the environment and citizens of Oregon



Reply to:

**Technical Review of "Air-Quality Dispersion Modeling in Complex Terrain near the Umatilla Chemical Agent Disposal Facility",**

by E.T. Prater, S.A. Stage, and C. Fosmire, of Innovative Emergency Management, Inc., Baton Rouge, LA.

This Reply is by:

Halstead Harrison

Prof., Atmospheric Sciences, University of Washington

April 27, 2000 <harrison@atmos.washington.edu>

I. Introduction:

I am the author of the reviewed report "Air-Quality Dispersion Modeling in Complex Terrain ..", which I submitted to Langdon Marsh, the director of the Oregon State Department of Environmental Quality [ODEQ], on January 15<sup>th</sup> of this year. At my request Director Marsh submitted this report to internal and external reviews. The first of these reviews, by Wayne Thomas, dated January 24 [ODEQ file number 00-0110], made a number of useful comments and correctly pointed out a potential for confusion over differing definitions of stability indices. My reply to this review is attached below as Appendix I. In this present note I reply to the second of these reviews, by E.T. Prater and his colleagues at Innovative Emergency Management, to which I shall hereafter refer to as "IEM".

The IEM review is severe. It asserts that:

"The equations used by the model to simulate dispersion are in error. This prevents WPUFF from performing on par with scientifically-accepted models."

"WPUFF has not been validated, which means that its results have not been compared to the results generated by scientific experiments with actual releases. Without validation, results from WPUFF are highly suspect, and there is no way of knowing how accurate the model may be."



The discussion that follows responds to these objections, in separate sections. I conclude with a brief discussion and commentary. Other material is attached in Appendices.

## II. "Errors"

IEM presented figure 1, which summarizes their "comparison of concentrations predicted by the Pasquill-Gifford Model, D2PC, and WPUFF".

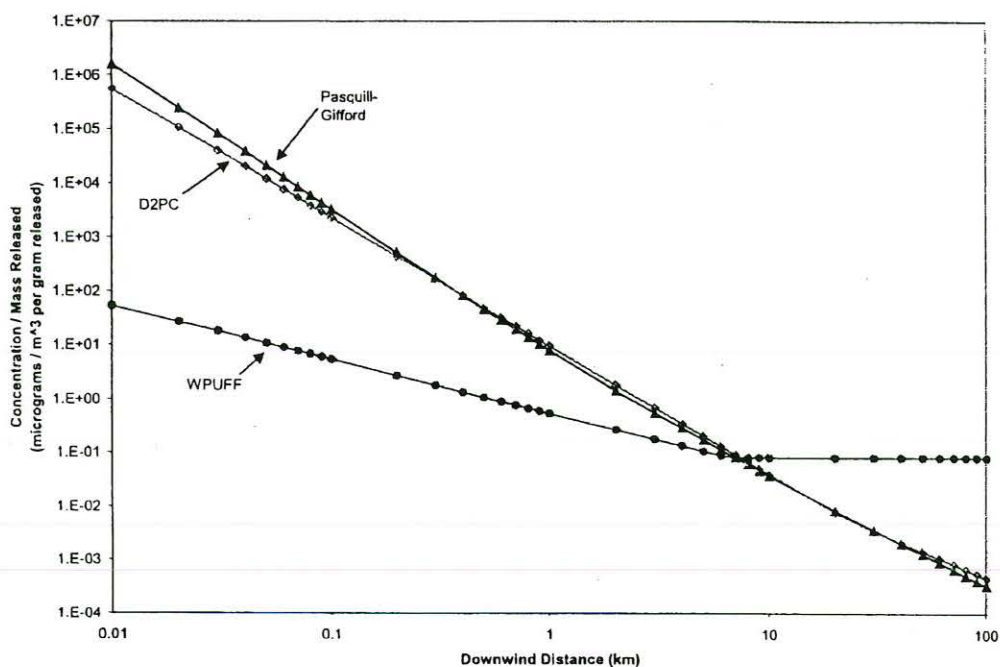


Figure 1: A comparison of concentrations predicted by the Pasquill-Gifford Model, D2PC, and WPUFF.

The apparent eccentricity of the curve labeled "WPUFF" is indeed striking. To understand what IEM have done, I have, ... after difficulties that I describe in Appendix II of the present note ... succeeded in reproducing two of these curves [WPUFF and Pasquill-Gifford]. I have not been able to reproduce the third, [D2PC], by the recipe described by IEM, which I summarize in Appendix II.

It appears that the two upper-left curves in figure 1 show computations by IEM to estimate tracer densities at the centers of diffusively expanding, three-dimensional Gaussian puffs [with those puff centers at the surface, where  $Z = 0$ ], as functions of downwind distance  $[X]$  from their point of emission. The lower curve in figure 1, labeled WPUFF, shows similar, center-point tracer densities of puffs that are also expanding diffusively, but only in the vertical dimension.

It appears from comments imbedded in IEM that those reviewers assumed that WPUFF simulated no horizontal dispersion. This is not so, as was explicitly stated on page 22 and elsewhere in the HH report<sup>1</sup>.."

To expand on this misunderstanding, for the present Reply:

All dynamic air-quality models have problems with numerical diffusion. Puff models minimize these problems during the transport phases of simulations, but at some point displays must be generated to show isopleths of concentrations averaged over some finite spatial scale,  $dX$ . If that scale is too small, some cells will contain few or no puffs, and the concentration fields will appear granular. Too large a scale sacrifices resolution.

WPUFF attempts to optimize  $dX$  by considering series of expanding puffs located with centers at the horizontal points,  $X, Y$ , within a cell of dimensions  $dX \cdot dY$  [ $dX = dY$  in most cases], and with a vertical height  $Z$ . Each puff advects in  $X, Y, Z$ , and may grow diffusively and anisotropically in three dimensions,  $\sigma_x, \sigma_y, \sigma_z$ . We wish to know the incremental contribution of the puff to the tracer concentrations at the surface,  $dC$ , expressed within a small two-dimensional increment of surface area,  $dx^2$ . [Note:  $dx \ll dX$ ]

To do this we must integrate the  $dC$ 's [that is, average them] over some larger, *finite*, unit cell on the surface, of area  $dX^2$ . Because many puffs exist over the field at all times, and all of them [at least in the Gaussian approximation] contribute to all the [small,  $dx$  by  $dy$ ] increments in every modeled cell, and because this integration must be repeated at

---

<sup>1</sup> " Dispersions owing to turbulence operating at larger scales are simulated by random "meander winds", superimposed on the mean trajectories." See also the discussion on diffusivities, beginning on page 24.



every time step, it becomes computationally expensive. All puff models that I know of make approximations to simplify and accelerate this essential task.

WPUFF approaches this problem by assuming that  $Z$ ,  $\sigma_x$ ,  $\sigma_y$ , and  $\sigma_z$  are all  $\ll dX$ . [That is,  $dX$  must be chosen to meet this criterion: more about this later in the paragraphs that follow.] With this approximation:

1. The tracer concentrations of each puff at the surface,  $\langle dC \rangle$ , averaged over  $dX^2$ , become proportional to their concentrations at the surface below each puff's center,  $C_0(X, Y, Z=0, \text{time})$ ;
2. Increments to  $\langle dC \rangle$  from puffs outside each unit cell contribute only in 2<sup>nd</sup> order, and may be neglected.

Thus:  $\langle dC \rangle \approx \kappa C_0(X=0, Y=0, Z)$

With these approximations, I have evaluated the proportionality coefficient,  $\kappa$ , through a Monte-Carlo integration over distributions of puff radii, altitude, and lateral positions. The resulting value is insensitive to those distributions, as expected, provided that  $dX > Z$ ,  $\sigma_x$ ,  $\sigma_y$ ,  $\sigma_z$ .

In the present special case of the HH report  $dX$  was 460 meters.  $\sigma_z$  is constrained by WPUFF to be less than or equal to  $H/2$ , where  $H$  is the height of a well mixed boundary layer. In the simulations of the Umatilla airshed that I discussed in my report to ODEQ,  $H$  varied with time of day between 100 and 700 meters. [IEM assumed a constant 200 meters]. Thus  $\sigma_z$  was  $\leq H/2 < dX$  at all times, though with aging, larger puffs the excess was not great; these cases, however, contribute little to the surface concentrations.

In the conditions of the HH report, however, some of the aging puffs do grow laterally [ $\sigma_x$  and  $\sigma_y$ ] to dimensions that are comparable to  $dX = 460$  meters, and some of these puffs wander near to the ground, where they may significantly affect the concentrations there. One sensible choice to minimize this problem might simply be to expand  $dX$ . This, however, would proportionally degrade the spatial resolution of the tracer's

concentration field at the surface. Another sensible choice, adopted with WPUFF, is to split the horizontal diffusivities into two scales, by the following algorithm.

Where  $\sigma_x$  and  $\sigma_y$  are less than  $\frac{1}{2} dX$ , WPUFF assumes Gaussian diffusion in the ordinary way. Additionally, however, an inner scale of  $\sigma_x$  and  $\sigma_y$  is constrained not to exceed  $\frac{1}{2} dX$ , and an outer-scale diffusion is simulated with increments of a random "zitterbewegung",  $\delta x$  and  $\delta y$ , added to the mean advective motions.

Specifically, WPUFF assumes:

$$\delta x = \delta y = \xi [2 \epsilon_h U dt \sigma]^{1/2}$$

In this equation

$\delta x$  &  $\delta y$  are increments of horizontal displacements added to every puff's mean advective motions, at every time step.

$\xi$  is a random variable with zero mean and unit standard deviation.

$\epsilon_h$  is an efficiency factor for horizontal diffusivities, discussed on page 24 and elsewhere in HH.

$U$  is the mean scalar wind velocity.

$dt$  is an increment of time-step [60 seconds, in HH].

$\sigma$  is a characteristic scale for the horizontal diffusion, computed for every puff at every time step as

$$\sigma(t) = \sigma(t-dt) + \epsilon_h U dt.$$

This recipe generates an effective outer-scale diffusivity

$$K = \frac{1}{2} d(\sigma^2)/dt = \epsilon_h U \sigma$$

Further discussion of this outer-scale diffusivity may be found in Appendix II of HH, equations 6-8 and table VII.

## II. Validation

The authors of IEM correctly point out that WPUFF has not been "validated" by direct comparison with observations. This also is stated explicitly in HH, page 26. Also as stated in HH I have compared WPUFF with a "simple Gaussian model". For this Reply I shall now expand upon those comparisons and outline a program to "validate" WPUFF with "real" observations.

That "simple Gaussian model" is from Turner's workbook, with

$$C(X,Y,0)/Q = [\pi U S_y S_z]^{-1} \exp \{-1/2[(y/\sigma_y)^2 + (H/\sigma_z)^2]\}$$

In one of many tests I assumed

$$Q = 1 \text{ gm / sec}$$

$$U = 1 \text{ m/s}$$

$$H = 60 \text{ meters, and}$$

$$\sigma_y \cong \epsilon_h X^\alpha \quad \sigma_z \cong \epsilon_v X^\beta$$

These last two equations approximate Turner's famous graphs, where  $\alpha \cong \beta \cong 0.92$ . As I discuss in HH these exponents are approximate and are known both theoretically and by observations to vary with X, with  $\alpha$  increasing from 0.5 at small scales [ $X < 1 \text{ m}$ ] to 2.00 [ $X > 10 \text{ km}$ ]. At  $X = 1 \text{ km}$  [roughly two grid cells in the Umatilla exercise described in HH] both  $\alpha$  and  $\beta$  do not significantly differ from unity. I have for simplicity and consistency adopted this value in both WPUFF and the "simple model".

In the comparison I am now describing the coefficients  $\epsilon_h$  and  $\epsilon_v$  were respectively 0.070 and 0.034, values roughly equivalent to the Pasquill-Turner stability class "D". For this comparison, only, simulations with both models assumed infinite mixing depths, H. The WPUFF model was run time increments of one minute, for 17 hours, after an initial "warm up" of 7 hours to allow an approximate steady state. With these conditions about 200 puffs were contained in the modeled field at all times.



With these parameters, figure 2 illustrates the steady-state isopleths of surface concentrations by the "simple Gaussian model", and the following figure similarly shows isopleths from WPUFF.

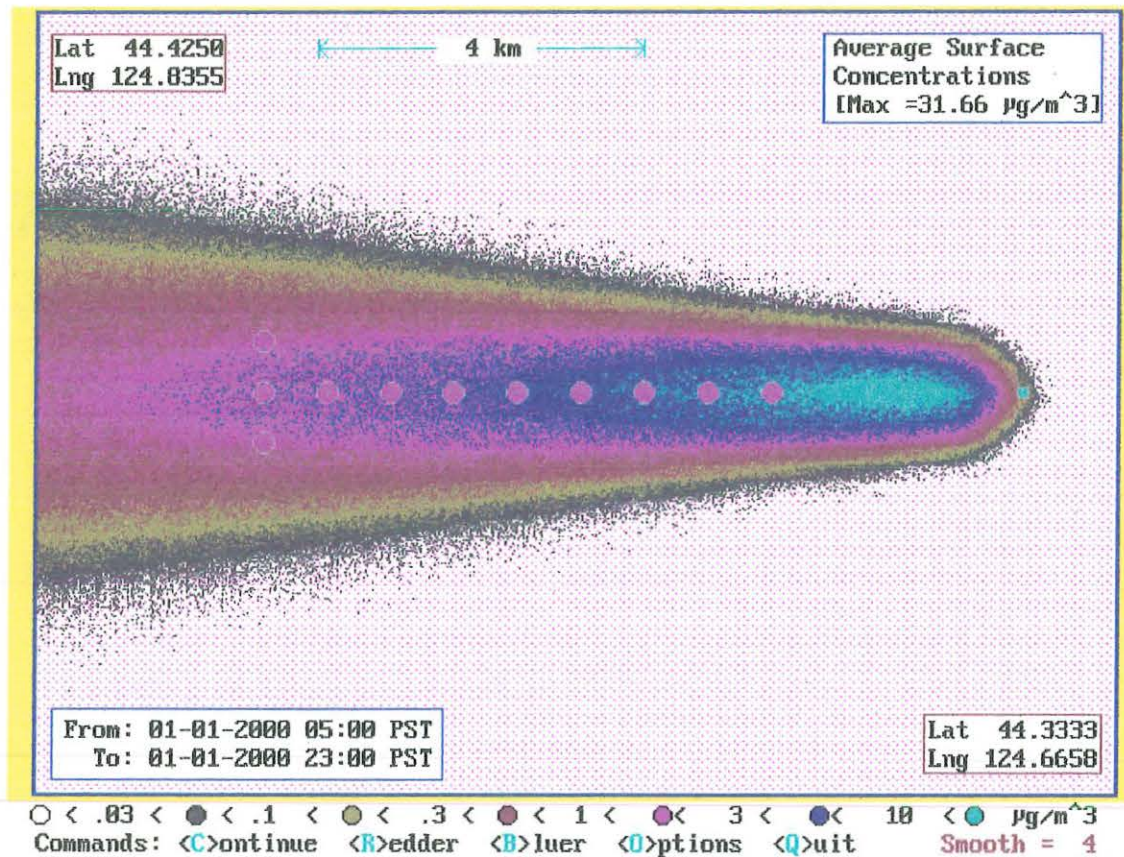


Figure 2:

Concentration Isopleths from a steady-state Gaussian Model. The source is at the right [small green box] and the wind is easterly. The purple circles locate fictitious "receptors sites".

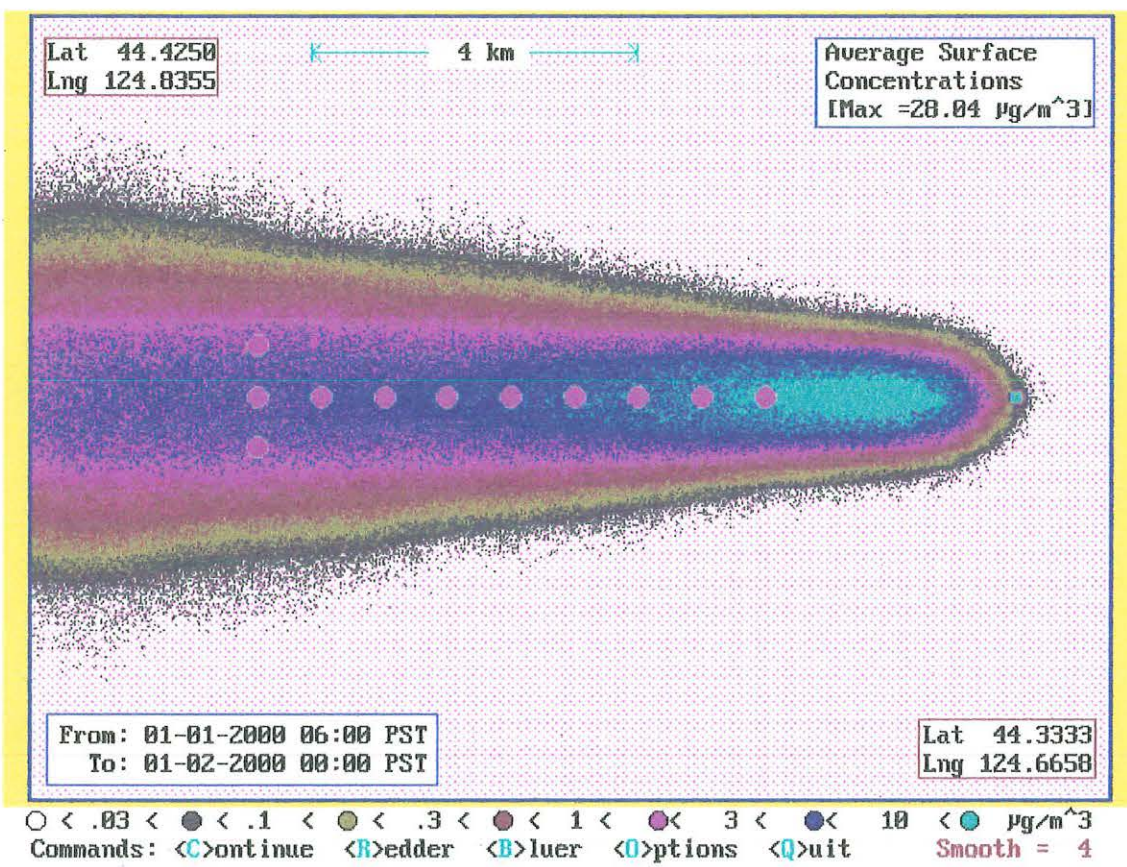


Figure 3

Similar concentration isopleths from WPUFF.



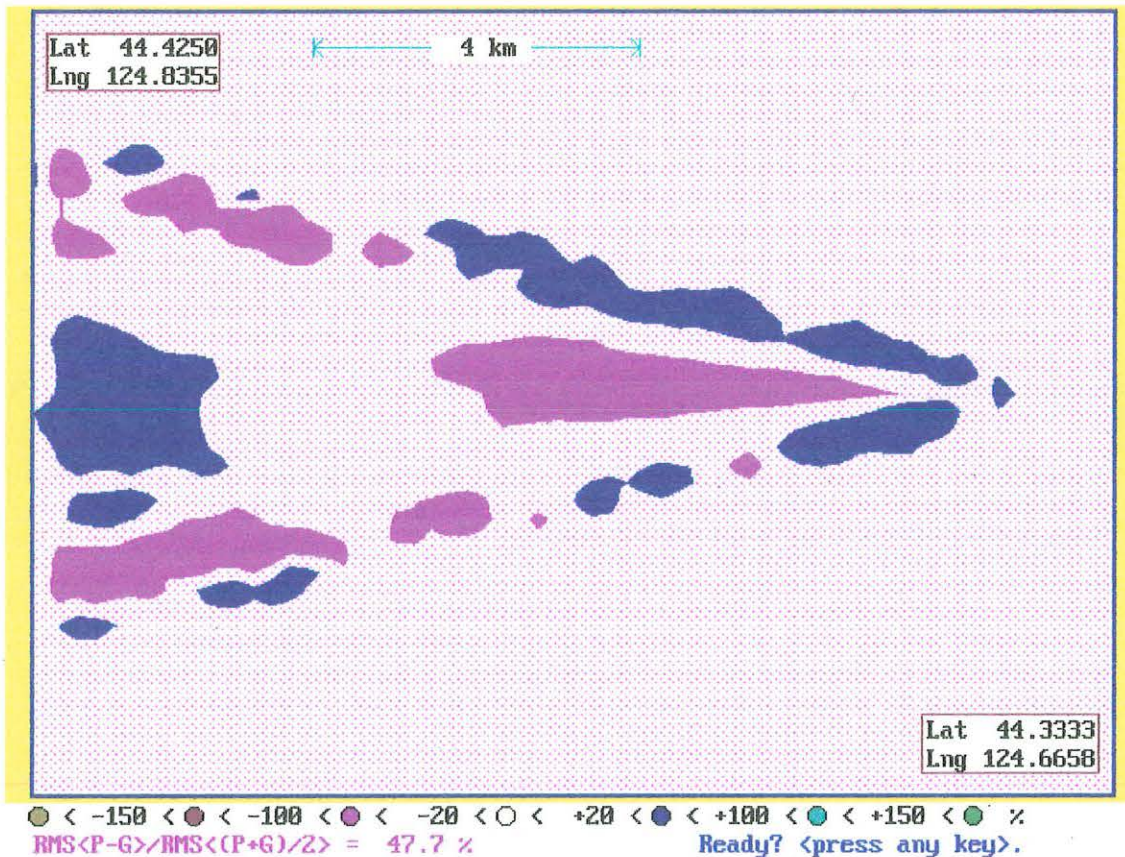


Figure 4

Relative Differences between the two models.  
 Plotted are isopleths of  $2[P-G] / [P+G]$  where "P"  
 are concentrations from the Puff model [figure 3] and  
 "G" are concentrations from the Gaussian Model [figure 2].

In the blue areas P exceeds G by ratios between 0.2 and 1.0.  
 In the purple areas G similarly exceeds P. In the blank areas  
 the differences are less than 20%.

The granularity in this figure results from sampling  
 fluctuations that are proportional to the square-root  
 of the puff numbers that are sampled by each cell. Caution  
 should be exercised in comparisons at the edges of this  
 figure, where both P and G are very small.



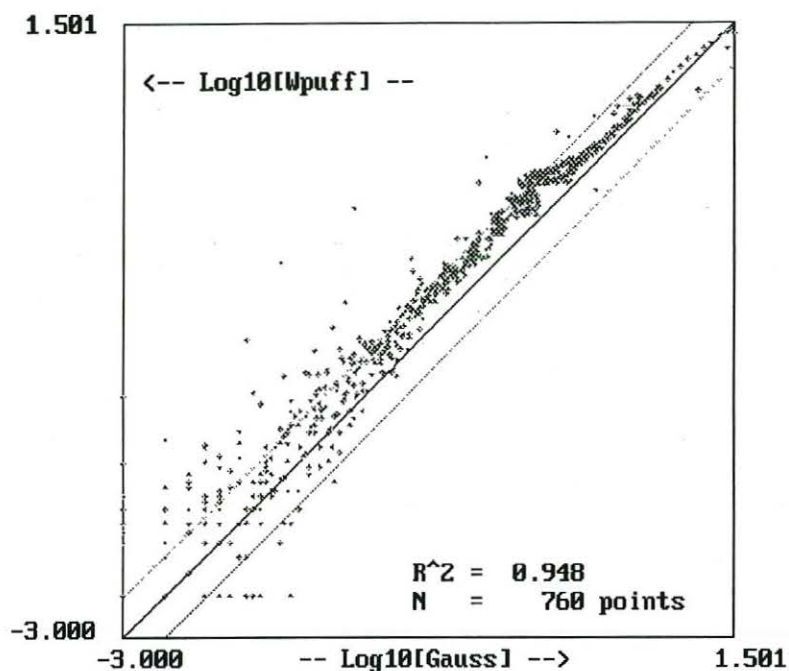


Figure 5

Log-Log scattergram of surface concentrations predicted by the two models. The central diagonal line shows the 1:1 slope. The two bracketing diagonals are displaced above and below the 1:1 slope by factors of 2.

In presenting the comparisons of figures 2-5, I emphasize that neither model is "correct". Both are approximate, and comparisons with real data are strongly to be preferred. I wish also to emphasize that the "factors of two" brackets shown in figure 5 are comparable to model comparisons with real data, where they exist [Olesen, 1994-1997]. This point is discussed in HH, and highlighted there in the boxed comment on page 13.

What, then, about true "validation" with real data? As mentioned in HH, WPUFF is work in progress. Comparisons of WPUFF with Olesen's data sets are now in train. The best such tests, however, are performed with fresh meteorological data

before concentration measurements are known, this to protect against the too-human tendency to "tune" the models for best agreement, *ex post facto*, and the too-human tendency to discount validation exercises by others who have not met this necessary precaution. One strong motivation for my report and subsequent efforts is a wish to use Umatilla data for controlled, blind, and *a priori* validation.

### III. Other Objections

IEM list other objections to the HH report, including challenges to the estimation of plume rise, stabilities and the effect of thermometry errors, and judgment of risks.

Responding to these, very briefly:

1. Stack temperatures and flow-rates are not presently available to compute plume rise: the plant is still under construction. The exercise of HH was not intended, nor was it advertised, as final. When better data are available better simulations will be exercised.
2. Please see Appendix I of this report for remarks about stabilities.

Thermometry errors are always of concern, and garbage-in is always followed by garbage-out. This rule is model independent, however. WPUFF is not more vulnerable to data errors than other air-quality models.

Mitigating this in the special case of temperature errors, however, is that temperature *differences* are used to compute stabilities and plume-rise: thus biased offsets of temperature measurements affect stability estimates in second order.

3. About judgments, clearly labeled, there can be no useful dispute.

### V. Discussion

It will perhaps be useful for me to reiterate here the highlighted points of my original report, all of which are robust to objections by IEM:

1. The Umatilla airshed experiences positive potential temperature gradients,  $d\theta/dZ$  [that is, the near-surface air is statically stable] in over 50% of all hours, and over 90% of nighttime hours. In 23% of all hours  $d\theta/dZ$  exceeds 0.06 degC/m, which is very stable, indeed.
2. In consequence of this high incidence of stable air, initially buoyant plumes emitted from the Umatilla facility are expected often to limit their rise and to be transported close to the surface over significant distances [km], with little dispersion.
3. Most of the time, the plume will miss populated targets.
4. Brief episodes, however, are to be expected at the surrounding populated centers [Hermiston, Umatilla, Plymouth, Irrigon, Boardman] with peak tracer concentrations that are many times the annual averages there.
5. For this reason, citing annual averages of tracer concentrations, only, obscures the extreme variations of the transport process.
6. For this reason also, short episodes dominate the potential for damage in the Umatilla airshed. It is not ordinary operations that should most concern us, but the potential for upsets and accidents.
7. Attention should especially be paid to off-design fugitive emissions that may, even if rarely, escape the demilitarization facility in non-buoyant plumes, near the surface.
8. Effects of topography, meandering winds, and recirculating trajectories are significant in the Umatilla airshed. These effects are not well simulated by steady-state air-quality models.

Enough.

It is unfortunate that IEM undertook its review in an aggressive mode. It is unfortunate that IEM did not contact me to clarify misunderstandings. It is unfortunate that IEM refused my similar requests for clarification. [Appendix III] This is not how science is best done.



#### IV. References

Olesen, H.R., 1997, "Tools for model evaluation"; NATO/CCMS International Technical Meeting on Air Pollution and its Applications.

<<http://dmu.dk/atmosphericenvironment/Harmoni/MEpapers.htm>>

Turner, D.B., 1970, "Workbook of Atmospheric Dispersion Estimates"; EPA Office of Air Programs, Research Triangle Park, N.C.

#### Appendix I:

Reply to comments by Wayne Thomas' ODEQ memorandum of January 24, 2000: file number 00-0110.

Atmospheric Sciences  
University of Washington  
Seattle, WA 98195-1640  
April 10, 2000

Langdon Marsh, Director  
Department of Environmental Quality  
811 SW Sixth Street  
Portland, OR 97204-1390

#### Friend Marsh:

I was greatly pleased to receive from Wayne Thomas, last Friday, a copy of his memorandum to you [DEQ item 00-0110(92.93), dated January 24, 2000] concerning my report to you of January 15th, "Air-Quality Dispersion Modeling in Complex Terrain near the Umatilla Chemical Agent Disposal Facility, Hermiston, Oregon" [DEQ item 00-0477(287)].

Together with Thomas' memorandum, enclosed also was a more extensive technical review of my report by E.T. Prater, S.A. Stage, and C. Fosmire, of Innovative Emergency Management, Inc. [DEQ item 00-0391]. This latter review is severely critical of my report. It merits and requires a careful and detailed reply, which I have started to prepare, and will soon forward to you and to Dr. Prater.

Meanwhile, I would like again to thank you and Wayne Thomas, to correct a misunderstanding, and to respond to a few of his comments.

1. In my report I did not compare WPUFF with the ISCST3 model, but with the very simplest of Gaussian plume models described by Turner in his classical workbook. My reason for this choice was to highlight the physical differences between WPUFF and that simplest Gaussian model, without complications from a number of ad hoc complexities that have been added to ISCST3 and other "guideline" models, as they evolved at EPA. The latter models are presumably more accurate than an elementary Gaussian plume, alone, but that, being simpler, permitted easier insight into what the WPUFF model was doing.
  
2. I strongly agree with Thomas' comment [#2, page 3 of 4] that "... potential impacts from an accidental release would probably be significantly higher than might be expected from just comparing modeled impacts between stack and accidental releases with unit emissions." That judgment is echoed at several points in my report. What is of most concern is the potential for accidental releases that escape incineration. Such releases might indeed greatly exceed those processed through the facility and emitted by the stack. And because such releases would be .. we hope .. brief and unplanned, I emphasize the need for appropriate models to follow them, and a management infrastructure to implement them predictively, or in real time, with short notice.
  
3. Perhaps the most interesting .. and controversial .. result of my modeling exercise with WPUFF was the very high ratios [100-400X] that were computed for hourly/annual exposures at the neighboring towns of Hermiston, Umatilla, Plymouth, Irrigon, and Boardman. Note that these ratios greatly exceed the EPA recommended conversion factor of 12.5 [1/0.08, as cited in Thomas' memorandum, paragraph 3, page 3 of 4]. This difference follows directly from the high incidence of static stabilities at the Umatilla Depot, as I shall discuss in the following paragraph. The air is more frequently stable in the western desert at Umatilla, than is typical in the mid-eastern US, where the EPA has focused most of its attention on the coal-fired power industry.
  
4. Some confusion exists about "stabilities" and the use of stability indices to predict plume lofting and near-surface pollutant concentrations. The definition of equation [1] of my report is for "static stability", and I should probably have labeled it so, explicitly. It derives back through the scientific literature at least as far as L.F. Richardson's use of the term in the early 1930s, and probably before then, and it was adopted by the US Atomic Energy Commission in monographs dating around 1950, and later. Static stabilities are the appropriate index to characterize plume buoyancies, and thus their tendencies to loft and disperse above the ground, or .. conversely .. to remain close to the surface and "garden hose" over relatively longer trajectories. Static stabilities are therefore appropriate to concerns about



the potential for long-range, near-surface plume transport at Umatilla, as I discussed in my report.

Another stability index was introduced in the 50s by Gifford, I believe, and adopted by Pasquill and Turner as useful for empirical estimates of the dispersivities of industrial plumes. These "Pasquill-Gifford" stability classes [A, B, ... F] were originally framed as useful engineering rules-of-thumb that depend on wind speeds, cloud cover, and insolation, all of which can be estimated without sophisticated instrumentation.

With the popularity of Turner's workbook and the EPA's canonical adoption of Gaussian plume models, Pasquill-Gifford stabilities have become widely adopted. Driven by comparisons of these models with observations, succeeding authors have suggested modifications to the original P-G stability-class definitions, and the EPA has adopted some of these. All of these definitions, however, are empirical. They have little theoretical underpinning, and tend to annoy snooty academics, like me.

Nevertheless, most engineers now think of "stabilities" as shorthand for what might better be labeled "Pasquill-Gifford stabilities", and these "stability classes" are indeed useful indices of the atmosphere's medium-range dispersive potential. "Static stabilities", however, remain the better indices of plume lofting, and long-range transport. Hence their use in my report.

Permit me, please, a final paragraph about dispersion models, generally, from an academic perspective:

Our measurement capabilities and our understanding of turbulent dispersion has increased greatly since Gifford, Pasquill, and Turner formulated their useful approximations. Among research scholars turbulence is now most often discussed in terms of similarity theories, the power spectra of horizontal and vertical eddies, Lagrangian autocorrelation spectra, and the production and decay of turbulent kinetic energy, and "transilience" [coherent jets]. Steady-state Gaussian plume models are less appreciated, except historically, and P-G stability classes are falling out of vogue: we have better measurements now, and the computer revolution permits us to adopt these in more sophisticated ways, than steady-state Gaussian plumes, to improve our estimates of tracers emitted at Umatilla.

Enough. In my report I should surely have specified "static stability", and explained why this index is appropriate to estimate the potential at Umatilla for long-range, near-surface plume transport.

5. WPUFF is indeed less sophisticated than CALPUFF; it is also easier to use. I wish to emphasize that I am not advocating one model over another: I do strongly advocate that real time and predictive modeling should be implemented at the Umatilla site.

6. Again, my report compared WPUFF to "a simple Gaussian plume model", that was not ISCST3.

Thank you once more for the attention you have given me and for the reviews of my report that you have solicited from Wayne Thomas and Prater et al, at Innovative Emergency Management, Inc. I shall reply to the latter review, soon, and carefully.

With friendly greetings,  
Halstead Harrison

Appendix II. How to compute the IEM curves of figure 1.

What IEM appear to be showing in figure 1 is a comparison of computations with equation 9 of my report [Appendix A, page 26]

$$dC = \{1.71 M / [(Z + \sigma_z) dx^2]\} \exp\{-1/2(Z/\sigma_z)^2\} \quad [\text{HH eqn 9}]$$

with equation 3, page 9, of IEM:

$$dC = 2 M / [(2\pi)^{1/2} \sigma_x \sigma_y \sigma_z] \cdot \exp \left[ -1/2 \left\{ (Z/\sigma_z)^2 + [(X-X_r)/\sigma_x]^2 + [(Y-Y_r)/\sigma_y]^2 \right\} \right]$$

[IEM eqn 3]

In both these equations

$dC$  is an increment of tracer concentration.

$M$  is a puff mass emitted during a short time,  $dt$ .

$X$  is a downwind distance from a puff's emission, meters, and

$Z$  is a puff-center height above the surface, meters. in IEM  $Z$  is assumed to be zero.

In [HH eqn 9], only:

$\sigma$  is a Gaussian puff radius, meters, [not at this point identified with a Cartesian coordinate].

$dx$  is the lateral dimension of a surface grid cell, [460 meters in the present case],

In [IEM eqn 3], only:

$\sigma_x$   $\sigma_y$   $\sigma_z$  are Gaussian puff radii, meters, identified with the X, Y, and Z Cartesian coordinates.

$x_r$  and  $y_r$  are the Cartesian coordinates of the puff centers.

For their comparisons in the computations leading to figure 1, above, it appears that IEM assumed:

$y = z = x_r = y_r = z_r = 0$  , and M is assumed to be a unit mass, in micrograms.

Thus the two equations leading to figure 1 greatly simplify to:

$$dC = 1.71 / [\sigma dx^2] \quad \text{[HH eqn 9']}$$

$$\text{and } dC = 2 / [(2\pi)^{1/2} \sigma_x \sigma_y \sigma_z] \quad \text{[IEM eqn 3']}$$

For  $\sigma$  in [9'] IEM assumed a Pasquill-Gifford stability class F, for which in Table VII of my report [HH, page 25] a vertical-mixing efficiency parameter,  $\epsilon_v$ , is defined as:

$$\begin{aligned} \epsilon_v = 0.015 \quad \text{and} \quad \sigma &= \epsilon_v x \quad \text{if } \sigma < \frac{1}{2} H \\ &= \frac{1}{2} H, \quad \text{otherwise.} \end{aligned}$$

For the computations of figure 1, IEM selected

$$H = 200 \text{ meters.}$$



For  $\sigma_x$   $\sigma_y$   $\sigma_z$  in [3'] IEM compare two recipes. The first of these is from the Gifford-Pasquill model, for which

$$\sigma_x = 465 X \tan(T) \quad [\text{meters}] ; X \text{ are kilometers.}$$

$$\sigma_y = \sigma_x$$

$$\sigma_z = a X^b$$

$$T = 4.1667 - 0.36191 \ln(X) \quad [\text{degrees}]$$

The parameters 'a' and 'b' are functions of X, from IEM's table 2, page 10. Typical and reasonable values are 21.6 and 0.63 meters. [Note that at X = 1 km.  $\sigma_x = 21.6$  meters].

For the second recipe used by IEM for their D2PC model, the  $\sigma$ 's are stated by IEM to have been computed with their equation 6, page 11, which are:

$$\sigma_x = 0.1522(X/1000)^{0.927}$$

$$\sigma_y = 0.079622(X/1000)^{0.7}$$

$$\sigma_z = 0.079057(X/1000)^{0.75}$$

No dimensions for these equations are stated by IEM, and this presents a problem. If X and the  $\sigma$ 's are meters then the  $\sigma$ 's are wildly small [0.15 m and 0.08 m at X=1 km]. Alternatively, if the  $\sigma$ 's are assumed to be kilometers then their values become awkwardly large [152 and 80 m at X=1 km]. Assuming the latter .. as marginally less unphysical, I have reproduced IEM's figure 1, as below. The upper-left and lower-left of these two figures [Pasquill-Gifford and WPUFF] agree closely with the IEM curves. The middle-left [D2PC] does not. Clearly some error is responsible for the discrepancy.

One other error is likely present in IEM eqn. 3 [see above], where the exponent of the  $2\pi$  in the denominator should be  $3/2$ , not  $1/2$ , as written. Neither of these errors is, I judge, relevant to the principal discussion of this Reply.

WPUFF  
Pasquill-Gifford  
D2PC

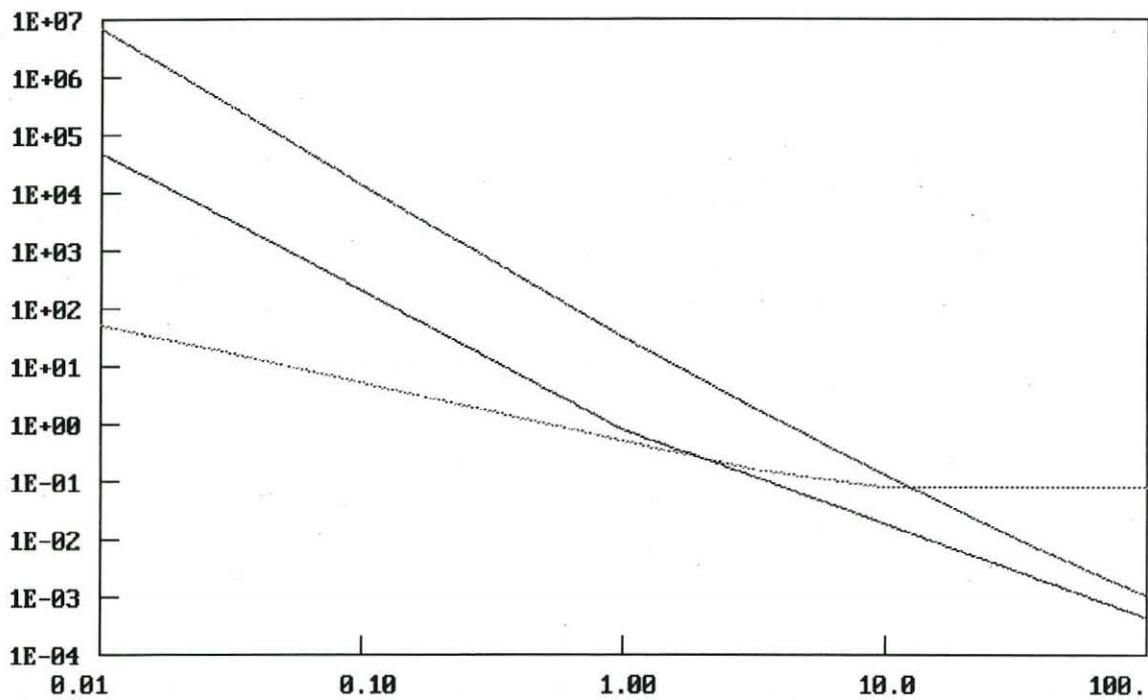


Figure 1a

A recomputation of IEM's figure 1. The middle-left curve [D2PC] is discordant, as described above.

Appendix III: An Email exchange with E. Prater, of IEM.

From erwin.prater@ieminc.com Tue May 9 15:46:41 2000  
 Date: Tue, 25 Apr 2000 12:33:53 -0500  
 From: "Prater, Erwin" <erwin.prater@ieminc.com>  
 To: 'Halstead Harrison' <harrison@atmos.washington.edu>  
 Subject: RE: Umatilla/WPUFF

Dear Dr. Harrison:

Thank you for writing. We prepared an independent review of WPUFF for ODEQ. With this in mind, we cannot address other issues regarding WPUFF unless directed by ODEQ.

Sincerely,

Dr. Erwin T. Prater, Ph.D., CCM

> -----Original Message-----  
 > From: Halstead Harrison [SMTP:harrison@atmos.washington.edu]  
 > Sent: Wednesday, April 19, 2000 3:40 PM  
 > To: Dr. Erwin T. Prater  
 > Subject: Umatilla  
 >  
 >  
 > Dear Dr. Prater,  
 >  
 > I am preparing a reply to your technical review of my report  
 > to the Oregon Department of Environmental Quality, entitled  
 > "Air-Quality Dispersion Modeling in Complex Terrain near the  
 > Umatilla Chemical Agent Disposal Facility". Central to our  
 > discussion, I believe, is your Figure 1, which I am unable  
 > to reproduce.  
 >  
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 > \*\*\*\*\*  
 > \* Halstead Harrison harrison@atmos.washington.edu \*  
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**UMATILLA**  
chemical agent disposal facility



**PERMITTEE'S REPLY  
REQUEST FOR REVOCATION**

**UMATILLA CHEMICAL AGENT DISPOSAL FACILITY**

**BEFORE THE**

**OREGON ENVIRONMENTAL QUALITY COMMISSION**

**May 18, 2000**





# Permittees' Reply

## Outline of Presentation



- Introduction
- General Comments
- Agency Team Recommendations
- Conclusion
- LTC Connelly
- Mr. DePew
- Mr. Sharp and LTC Woloszyn
- LTC Woloszyn



# Permittees' Reply

## Introduction



- The Permittees generally concur with DEQ analysis and conclusions



# Permittees' Reply

## Introduction



- DEQ Staffing Report reflects exhaustive effort to address allegations and concerns:
  - Public comment not required
  - DEQ gathered and considered:
    - 100s of pages of exhibits
    - Additional reports and transcripts
    - Lengthy written and oral comments



# Permittees' Reply

## Introduction



- DEQ Staffing Report reflects knowledgeable, even-handed approach to complex issues:
  - Low level exposures
  - Toxicity of CWA
  - Human HRA





# Permittees' Reply

## Comments on Report



- Army Commitments
  - Safe and environmentally responsible elimination of stockpile, waste generated during treatment, and nonstockpile waste
  - Continue to be open and forthright throughout the permit process.
  - Fielding best possible solution for each waste stream
  - Available to answer EQC questions



UMATILLA  
chemical agent disposal facility

# Permittees' Reply

Comments on Report



- Incineration Still Best Approach for Oregon
  - Independent Oregon DEQ review thorough, sound, and conclusions correct
  - NRC 2000 assessment that alternatives not reasonably available



# Permittees' Reply

## Agency Team Recommendations



- UMCDD - LTC Woloszyn
  - Incident notification MOA
  - Chemical storage area monitoring
  - Communication lines: RDC-UMCDD
  - Public outreach and awareness
  - Off-post notification procedures



UMATILLA  
chemical agent disposal facility

# Permittees' Reply

## Conclusion



- Recognize EQC/DEQ's vigilance and diligence in administering the permits
- Shared commitment to safe, environmentally sound disposal of Umatilla stockpile and secondary wastes
- Shared commitment to protection of the environment and citizens of Oregon



State of Oregon

Department of Environmental Quality


Memorandum

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**Date:** April 17, 2000

**To:** Environmental Quality Commission

**From:** Langdon Marsh, Director



**Subject:** Agenda Item K, EQC Meeting, May 17-18, 2000  
Request for Revocation of Permit No. ORQ 000 009 431  
[Umatilla Chemical Agent Disposal Facility (UMCDF)]

**Statement of Purpose**

The purpose of this staff report is to present to the Environmental Quality Commission (EQC or Commission) the results of the Department of Environmental Quality (DEQ or Department) review of public comments received October 18-December 17, 1999, and selected exhibits submitted during legal proceedings (G.A.S.P., et al., v. EQC, et al., Case No. 9708-06159, Multnomah County Circuit Court). The Department undertook this review in response to a request for reconsideration and/or revocation of the Umatilla Chemical Agent Disposal Facility (UMCDF) Hazardous Waste Storage and Treatment Permit (approved by the Commission in February, 1997).

**Background**

In August 1997 a legal challenge to the UMCDF permits was filed in Multnomah County Circuit Court (Case No. 9708-06159) by G.A.S.P. (a local Hermiston organization), the Sierra Club of Oregon, Oregon Wildlife Federation, and 22 individuals (collectively referred to as "G.A.S.P., et al.," or the "Petitioners"). The Petitioners challenged the validity of the hazardous waste and air permits ("UMCDF Permits") issued by the Commission and the Department ("Agencies") in February, 1997.

On December 14, 1998, the Petitioners (through Counsel) sent a letter to the Commission and the Department requesting a "Contested Case Hearing and Other Relief" (see Attachment A). The Department denied the clearly stated request for a contested case hearing (see Attachment B), but did not at the time interpret the remainder of the letter as a request for revocation or reconsideration of the UMCDF Permits. During the final hearing before the Multnomah County Circuit Court on June 1, 1999, the Agencies agreed to treat the December 14, 1998 letter from the Petitioners as a Request for Revocation.

Because of the volume of material, and the complexities of the subjects, the Agencies have held two public comment periods (including oral testimony before the Commission) and conducted several meetings and worksessions.

### **Authority of the Commission with Respect to the Issue**

The criteria for unilateral modification of the UMCDF permit are set forth at 40 CFR 270.41 which is incorporated in pertinent part by reference at OAR 340-100-0002, 340-105-0041 and Division 106 (see Attachment C). Causes for unilateral modification of a hazardous waste treatment facility permit (as opposed to modifications requested by the Permittee) include:

1. Material and substantial alterations or additions to the permitted facility or activity occurring after permit issuance. *See* 40 CFR 270.41(a)(1);
2. New information which was not available at the time of permit issuance and would have justified different permit conditions. *See* 40 CFR 270.41(a)(2);
3. New statutory, regulatory, or judicially mandated standards. *See* 40 CFR 270.41(a)(3);
4. "Acts of God" or uncontrollable circumstances warranting revised compliance schedules. *See* 40 CFR 270.41(a)(4).

Causes for termination of a permit are contained in 40 CFR 270.43, which states that "the following are causes for terminating a permit during its term, or for denying a permit renewal application":

1. Noncompliance by the permittee with any condition of the permit. *See* 40 CFR 270.43(a)(1);
2. The permittee's failure in the application or during the permit issuance process to disclose fully all relevant facts, or the permittee's misrepresentation of any relevant facts at any time. *See* 40 CFR 270.43(a)(2); or
3. A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination. *See* 40 CFR 270.43(a)(3).

### **Alternatives and Evaluation**

The Commission may decide that the information submitted by the Petitioners and by other Commenters does not meet the criteria for unilateral modification or revocation of the UMCDF HW Permit. Alternatively, the Commission may instruct the Department to open the UMCDF Hazardous Waste Storage and Treatment Permit (HW Permit) for modification with respect to specific items of concern. When a permit is modified under 40 CFR 270.41, only the conditions subject to modification are reopened. The Commission also has the option to revoke the UMCDF HW Permit.

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### **Summary of Public Input Opportunities**

A public comment period was held open from October 17 through December 18, 1999. On November 19, 1999, the Commission held a special worksession related to UMCDF which included oral testimony from the Petitioners in support of their Revocation Request.<sup>(Refs. 1, 2)</sup> There were a total of four written comments submitted during the public comment period. A full copy of all comments received during the public comment period was sent to the Commission on January 25, 2000.<sup>(Ref. 3)</sup> A written transcript of the testimony provided at the November 19, 1999 worksession was sent to the Commission on February 1, 2000.

Two comments were received in December, 1999 (listed in Attachment G) that are not specifically discussed in the sections below. The first was from the Oregon Water Resources Department (DEQ Item No. 99-2273<sup>1</sup>) offering the Department assistance in review of any water right issues related to UMCDF. The second was from Nathan and Allison Butz, and Andrew Butz (DEQ Item No. 99-2193) expressing their support for the revocation of the UMCDF permits.

In addition to the comments received during the public comment period, the Department has reviewed over 120 documents that were submitted during the legal proceedings for Case No. 9708-01659 ("exhibits"). A full copy of the exhibits, and selected motions and correspondence from the legal proceedings, were provided to the Commission on November 3, 1999.<sup>(Refs. 4, 5)</sup> This information was also sent to the Petitioners and to the UMCDF Information Repositories for reference and public review (see Attachment D).

A public comment period related to the UMCDF carbon filter system was held from July 19 through September 20, 1999. On August 18, 1999, the Commission held a special worksession that included comments and presentations concerning the UMCDF carbon filter system.<sup>(Ref. 6)</sup> On November 19, 1999, the Commission accepted the Department's recommendation that the carbon filter system be retained in the UMCDF design.

### **Review Methodology**

The Petitioners cite the exhibits that were submitted during legal proceedings (and subsequent oral and written comments) to support their arguments related to specific subject areas. The general approach the Department took in reviewing and responding to the exhibits was to examine the legal briefs and various correspondence (including the Petitioner's December 14, 1998 letter) to find instances where a particular exhibit was referenced, and in what context. The exhibits then were reviewed more closely,

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<sup>1</sup> The DEQ's Chemical Demilitarization Program maintains a database of documents related to the Umatilla Chemical Agent Disposal Facility. Most documents are assigned a record number for tracking purposes.

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and the Department assessed whether or not a given exhibit supported the Petitioner's argument. This assessment, and the Department's conclusions, were not based solely on the contents of any individual exhibit. The Department reviewed each exhibit in the context of the totality of information available from not only the Petitioners, but also from other public comments, and from any additional information in the Department's records related to a specific subject area.

The Department followed the same general approach when reviewing comments received from other members of the public during the public comment period, including oral testimony from November 19, 1999. The Department reviewed the comment and any supporting documentation, and assessed the merits of a Commenter's argument.

The review by the Department was made somewhat more difficult because many of the exhibits are only excerpts, sometimes very small excerpts, from much larger documents. The Department attempted to obtain a full copy of any excerpted document or referenced transcript (from various Utah court proceedings), especially since the citations in the legal briefs were often to pages that were not included in an exhibit excerpt. In other cases, a document citation was provided, but no specific page numbers were given. In addition, the Department found that many of the citations in the legal documents referenced incorrect exhibit numbers, although it was usually possible to determine which exhibit was intended. In some cases, referenced pages of transcripts (that had not been included in the exhibit as originally submitted) have been included here in attachments.

Exhibits 1-22 were the Affidavits of Legal Standing of the individual Petitioners in G.A.S.P., et al., v. EQC, et al. The Affidavits were not included in the review of exhibits for this Staff Report (A listing of the Affidavits can be found in Attachment R.). Some exhibits were reviewed previously during the proceedings related to the carbon filter system used in the pollution abatement system at UMCDF. Exhibits related to the carbon filter system were not reviewed again here, except in the context of new comments that were received during the public comment period opened for the Request for Revocation (see Section 1).

Throughout this Report the term "Petitioner" will be used to refer to comments received from persons or organizations that were Plaintiffs in the legal proceeding, or from their Counsels. The term "Commenter" will be used when referring to comments received from members of the public (individuals or organizations) that were not parties in G.A.S.P., et al., v. EQC, et al.<sup>2</sup>

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<sup>2</sup> The OCPR authors were offended when the Department's 1999 PFS Staff Report referred to them as "Petitioners." Although the use of the term "Petitioners" was inaccurate, since the OCPR was not actually one of the parties in the legal proceedings, the Department does not in any way consider the term pejorative or "belittling," and apologizes for any unintentional offense.

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### **Organization of Staff Report**

Due to the voluminous amount of written material reviewed for preparation of this Staff Report, the Department's review presented below does not always respond specifically to each and every exhibit and/or Comment. A complete listing of exhibits submitted during legal proceedings (in numerical order) can be found in Attachment D, beginning on page D-12. A table listing all of the comments and their attachments is included as Attachment G. For ease of reference, the comments of G.A.S.P., et al. (without attachments) are contained in Attachment E and the comments received from the Oregon Clearinghouse for Pollution Reduction (also without attachments) are contained in Attachment F.

For the purposes of this review, the material was grouped together (usually by subject area) into a series of summary tables which are included as Attachments G through R. Each attachment begins with a table that includes descriptions of the various documents. In some cases, additional material related to a particular subject was added to an attachment. The Department reviewed the material and prepared a list of general subject areas for review and comment. Each subject area is discussed in Sections 1 through 9 below.

Generally, each of the sections begins with a listing of related exhibits/comments, a description of the exhibit or comment, and where the particular document was cited. A more detailed discussion of the exhibit/comment is then presented, followed by the Department's conclusions for each subject area. Some documents are referenced in more than one section because the document was related to more than one subject area. Table 1 on the following page lists each section number, its subject area, and the related attachments. Table 2 lists each attachment, its subject area and/or contents, and the exhibits and/or comments that are listed in the attachment, if applicable.

**Table 1. Summary of Sections with Subject Areas and Related Attachments.**

<b>SECTION</b>	<b>PAGE</b>	<b>SUBJECT AREA</b>	<b>RELATED ATTACHMENTS</b>
1	9	Pollution Abatement System Carbon Filter System (PFS)	A, E, F, G, H, I
2	12	Dioxin Issues: Toxicity, Non-Cancer Effects, And The Use Of A "Reference Dose" For Dioxin Non-Cancer Effects	A, E, G, J, N, S, U
3	18	The Acute Toxicity And The Chronic Health Effects Of Low Level Exposures To Chemical Warfare Agents	A, E, G, K
4	24	Human Health Risk Assessments	A, E, G, L, N, P
5	28	Incineration Vs. "Alternative Technologies"	A, E, G, M, O, P, S, T
6	33	The Risk Of Storage Vs. The Risk Of Incineration	A, M, N, P
7	37	Performance Of The Tooele Chemical Agent Disposal Facility (TOCDF)	A, E, G, N, O, S, U
8	49	Treatment of Secondary Wastes	A, E, G, N, P, Q, U, V
9	54	Emergency Preparedness and the September, 1999 Industrial Exposure Incident At UMCDF	E, F, W

**Table 2. List of Attachments, by Subject Area**

Attachment #	Subject Area	Related Exhibit/Comments
A	"Request for Contested Case Hearing and Other Relief," DEQ Item No. 98-1247, Letter from Stuart A. Sugarman and Richard E. Condit (on behalf of G.A.S.P., et al.) dated December 14, 1998	Exhibit 69
B	Denial of "Request for Contested Case Hearing," DEQ Item No. 99-0264, Letter from Langdon Marsh, Director, Department of Environmental Quality, dated February 4, 1999	Exhibit 70
C	"Authority to Modify Hazardous Waste Facility Permits," DEQ Item No. 99-1344, Memorandum from Larry H. Edelman, Oregon Department of Justice, dated August 4, 1999	Not applicable
D	Transmittal Memoranda and Table of Contents only from "Documentation Related to Case No. 9708-06159, G.A.S.P., et al., v. Environmental Quality Commission, et al.," Volumes 1 and 2, August, 1997 to June, 1999	Not applicable
E	"Comments of G.A.S.P., Sierra Club, Oregon Wildlife Federation, et al., In Support Of Their Request To Suspend And Revoke Permits For The Umatilla Chemical Demilitarization Facility"	Comment C-5 (without attachments)
F	"Comments on the Request for Revocation of Permits" Submitted by Oregon Clearinghouse for Pollution Reduction	Comments C-3, C-3A, and C-3B (without other attachments)
G	Comments received during the "request for revocation" comment period. (October 18-December 17, 1999)	Comments C-1, C-2, C-3, C-4, C-5 and Exhibits C-75, C-76, C-77, C-78, C-79, C-80
H	"Exhibit 74" documents reviewed during the comment period for the carbon filter system	74 (lists 28 documents)
I	Documents related to the carbon filter system. See also Attachment H.	57, 58, 66, 67, 68, 71, 72, 73
J	Documents related to dioxin issues, including toxicity, noncancer effects, and EPA's use of a "reference dose" for dioxin noncancer effects	35, 38, 39, 40.1, 40.3, 40.6, 45, 54, 55, 56

<b>Table 2. List of Attachments, by Subject Area (Continued)</b>		
<b>Attach- Ment #</b>	<b>Subject Area</b>	<b>Related Exhibit/Comments</b>
K*	Documents related to the acute toxicity and/or the chronic health effects of nerve and blister agents	40, 40.2, 40.4, 40.5, 41, 50, 51, 52, 53
L*	Documents related to health risk assessments in general, and the UMCDF Pre-Trial Burn Health and Ecological Risk Assessment.	27, 28, 37.1, 37.2
M*	Documents related to the use of alternative treatment technologies and the risk of storage	48, 63, 65
N	Transcripts from various Utah proceedings (Court and USHW Board)	23, 24, 25, 26, 30, 33, 34, 36, 42, 43, 44.1, 44.2, 47, 49, 59, 64
O*	Miscellaneous Documents related to the Tooele Chemical Agent Disposal Facility	31, 32, 46
P	Documents Related to the Confederated Tribes of the Umatilla Indian Reservation	29
Q*	Documents related to the treatment and/or off-site disposal of secondary wastes	60, 61, 62
R	Affidavits of Legal Standing from Petitioners	1 through 22
S	Legal rulings related to the Tooele Chemical Agent Disposal Facility (Tooele, Utah)	Not Applicable
T	"Evaluation of Demonstration Test Results of Alternative Technologies for Demilitarization of Assembled Chemical Weapons: A Supplemental Review," National Research Council, 2000	Not Applicable
U	Additional Transcript Excerpts and Expert Witness Declaration from various Utah-related proceedings (State and Federal Courts and USHW Board)	25, 30, 33, 34, 47
V	Listing of documents related to the Dunnage incinerator	Not Applicable
W	A Report on the September 15, 1999 Industrial Accident at the Umatilla Chemical Agent Disposal Facility	Not Applicable
X	Facility Startup Checklist	Not Applicable

\* Attachments with an \* contain documents related to the subject of the Attachment, in addition to the "Table of Comments and Exhibits."

## **Review of Comments and Exhibits**

### **1. POLLUTION ABATEMENT SYSTEM CARBON FILTER SYSTEM (PFS)**

#### **1.A. Applicable Attachments and Exhibits/Comments**

- Attachment A, Exhibit 69 (December, 1998 "Revocation Request")
- Attachment E, Comment C-5 (Comments of G.A.S.P., et al.)
- Attachment F, Comment C-3 (Comments of Oregon Clearinghouse for Pollution Reduction)
- Attachment G, Comments C-3, C-3B, C-3C, C-3D, C-4, C-5, C-75
- Attachment H, Exhibits 74, 74.1, 74.2, 74.3, 74.301, 74.302, 74.303, 74.304, 74.305, 74.306, 74.307, 74.308, 74.309, 74.31, 74.311, 74.312, 74.313, 74.314, 74.315, 74.316, 74.317, 74.318, 74.319, 74.32, 74.321, 74.322, 74.323, 74.324, 74.325
- Attachment I, Exhibits 57, 58, 66, 67, 68, 71, 71.1, 72, 72.1, 73

#### **1.B. Description and Summary of Documents**

The "Petitioners' Request for Hearing and Other Relief on Remand" (December 14, 1998; DEQ Item No. 98-1247, Exhibit 69, included as Attachment A) requested that the Commission and the Department "Acknowledge that the Army's proposed incineration technology is inadequate without additional protection from a PAS carbon filter system ("PFS"), and that such a system is unproven, untested, and cannot be utilized at UMCDF." The Petitioners' December, 1999 comments reiterate their concerns about the PFS, and incorporate the comments of the Oregon Clearinghouse for Pollution Reduction (OCPR) by reference.

A copy of the comments of G.A.S.P., et al. (without attached exhibits) is included in Attachment E, and the comments of the OCPR (without attachments) are located in Attachment F. A table that includes a description of the exhibits and attachments to each set of comments can be found in Attachment G.

"Exhibit 74" (see document listing in Attachment H) was received as part of Case No. 9708-06159 (Multnomah County Circuit Court of the State of Oregon) and is titled "*An Analysis of Kriistina Iisa's Report Concerning the Emission of Dioxin and the Use of PAS Carbon Filters for the Oregon Environmental Quality Commission.*" Exhibit 74 was reviewed as part of the Department's Staff Report in November, 1999.<sup>(Ref. 7)</sup> Attachment I lists an additional 10 documents that were previously reviewed by the Department and considered by the Commission during proceedings related to the PFS.

The comments submitted by the OCPR focused primarily on responding to the Department's review of Exhibit 74 that was presented to the Commission in November, 1999. OCPR questions the Department's and the Commission's reliance on a contractor's review of Exhibit 74 [because] "The large majority of E&E's business comes from DOD and EPA. Reasonable persons would not hire them as an independent source to review Army submissions." OCPR also questions the qualifications of the Ecology and Environment (E&E) authors, does not believe that the E&E review was a "a fair examination of our points," and that the Department (and the Department's contractors) purposefully "characterize[d] [OCPR] in unflattering terms" when responding to Exhibit 74 in November, 1999.

OCPR provides a critique of the report prepared by E&E, and responds to the Department's Staff Report from November, 1999. OCPR also cites the affidavit (Exhibit C-75) of the former Permits Coordinator for the Tooele Chemical Agent Disposal Facility (TOCDF) and the testimony of an Army representative (Comment C-3D) during a legal proceeding related to the Pine Bluff (Arkansas) Chemical Agent Disposal Facility. OCPR states that "We know what DEQ could have learned about carbon filter and dioxin emissions from those depositions and could have, but did not include them in their report."

[The OCPR comments (Comments C-3 and C3-A) also included an abstract of a document titled "Air-Quality Dispersion Modeling in Complex Terrain Near the Umatilla Chemical Agent Disposal Facility." This document is discussed in Section 9.]

### **1.C. Discussion**

The issues covered by the PFS-related documents in Attachments E, F, G, H, and I were already discussed and reviewed by the Department and the Commission during the proceedings conducted in 1999. On November 19, 1999, the Commission accepted the Department's recommendation that the PFS be retained in the UMCDF design. The following discussion is limited to those documents and/or comments that were not addressed in previous Department reviews, primarily the comments of the OCPR.

The OCPR comments related to the E&E review of Exhibit 74 pointed out instances where OCPR believes that E&E was in error concerning E&E's review of the dioxin-related documents that were referenced by Dr. Iisa in responding to EQC questions regarding dioxin formation and control during the 1996 draft permit review process. (see Section 2 for further discussion of documents related to issues about dioxin.)

OCPR also cites the allegations of Mr. Gary Harris (Attachment G, Exhibit C-75), and the sworn deposition of Mr. Harris that was recently taken in Utah, as documentation of "known problems with the use of carbon bed filters." Mr. Harris' allegations, and their applicability to UMCDF, are discussed in Section 7. The testimony of Mr. Martin Hopkins (Attachment G, Comment C3-D) is related to the decision by the Army not to install the PFS at the Tooele facility. OCPR cites this testimony and asks why "Utah regulators found the courage to ask the Army hard questions about carbon filter technology and our DEQ does not?"

#### **1.D. Department Conclusions**

The Department is fully aware that E&E has contracts with the U.S. Department of Defense but believes that there is not an inherent conflict of interest, in part because of the separation between different organizational segments of E&E. Prior to commencement of the work associated with UMCDF, E&E performed a conflict of interest review and did not identify any conflicts related to the facility or their work assignments with DEQ.

Although the specific documents were not available at the time of the November 1999 decision concerning the carbon filters at UMCDF, the information about the PFS contained in the allegations of Mr. Gary Harris and the testimony of Mr. Hopkins was already known to the Department and to the Commission.

The Department reviewed the OCPR "rebuttal" of the E&E critique of Exhibit 74. The Department does not agree with OCPR concerning the interpretation of the content and conclusions of the various references found in the Iisa report of 1996.

The Petitioners (Comment C-5, pp. 21-24) state that the EQC has failed "to consider the human health and environmental risks associated with operation of pollution abatement system carbon filter units." The Petitioners cite several documents to support their contention that the PFS presents "significant risks" to both workers and the public. The documents cited by the Petitioners in Comment C-5 were all documents previously reviewed by the Department and the Commission, and subjects of oral testimony given before the Commission in August, 1999.

The Department stands by the content and conclusions of the November 1999 Staff Report, including the review of Exhibit 74 that was prepared by E&E, and the subsequent Commission decision related to the use of the carbon filters at UMCDF. The comments provided by OCPR and the Petitioners in December, 1999 do not provide a basis for changing the Department's conclusion and recommendation that the PFS should be retained in the UMCDF design.

## **2. DIOXIN ISSUES: TOXICITY, NON-CANCER EFFECTS, AND THE USE OF A “REFERENCE DOSE” FOR DIOXIN NON-CANCER EFFECTS**

### **2.A. Applicable Attachments and Exhibits/Comments**

- Attachment A, Exhibit 69 (December, 1998 “Revocation Request”)
- Attachment E, Comment C-5 (Comments of G.A.S.P., et al.)
- Attachment G, Comment C-5
- Attachment J, Exhibits 35, 38, 39, 40.1, 40.3, 40.6, 45, 54, 55, 56
- Attachment N, Exhibit 47
- Attachment S, Legal rulings related to the Tooele Chemical Agent Disposal Facility
- Attachment U, Additional transcript excerpts from Utah proceedings

### **2.B. Description and Summary of Documents**

**Exhibit 35** is a nine-page excerpt from the EPA’s three volume “Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin(TCDD) and Related Compounds (External Review Draft),” dated August, 1994. [Cited in Item No. **98-1275** (p. 41)]<sup>3</sup>

**Exhibit 38** is a one-page excerpt from the “Final Screening Risk Assessment” for the Pine Bluff Chemical Agent Disposal Facility, by the United States Army Center for Health Promotion and Preventive Medicine, dated October, 1997. The excerpted page contains a discussion of how the infant breast milk pathway was calculated in the Pine Bluff Health Risk Assessment (using a dioxin non-cancer reference dose). [Cited in Item No. **98-1275** (p. 43)]

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<sup>3</sup> The DEQ’s Chemical Demilitarization Program maintains a database of documents related to the Umatilla Chemical Agent Disposal Facility. Most documents are assigned a record number for tracking purposes. The following Item Numbers are cited in this section (reference to “Case No. 9708-06159” means G.A.S.P., et al., v. EQC, et al., Multnomah Circuit Court, decided in June, 1999):

- No. **98-1247**: “Request for Contested Case Hearing and Other Relief,” letter dated December 14, 1998 (See Attachment A)
- No. **98-1275**: “Petitioners’ Memorandum Supporting Cross Motion for Summary Judgment,” August 20, 1998 (Case No. 9708-06159)
- No. **98-1285**: “Petitioners’ Additional Documentary Evidence,” November 10, 1998 (Case No. 9708-06159)
- No. **99-0704**: “Petitioners’ Opposition to Respondents’ Supplemental Motion for Summary Judgment,” April 12, 1999 (Case No. 9708-06159)
- No. **99-2201**: “Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF],” December 17, 1999 (See Attachment E)

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**Exhibit 39** is an Affidavit from Dr. Peter deFur, dated July, 1998, about the cancer and non-cancer effects of dioxins. Dr. deFur reviewed the TOCDF Health Risk Assessment and states his belief that the TOCDF Health Risk Assessment is "not complete without adding the non-cancer risks from dioxin exposure to all target groups or individuals, and especially to fetuses, infants and young children..." [Cited in Item No. **98-1275** (p. 44-45, p. 55) and in Item No. **99-2201** (p. 32)]

**Exhibit 40.1** is part of a collection of papers from Exhibit 40. This paper is titled "Public Health Effects of Chemical Weapons Incineration" Richard Clapp, Ph.D., dated March, 1998. Dr. Clapp discusses the toxicity and health effects of dioxins and dioxin-like compounds and states his belief that the Health Risk Assessments undertaken for the chemical agent incineration facilities are "inadequate and incomplete" because the failure to account for dioxin and dioxin-like compounds. [Cited in Item No. **99-2201** (p. 32)]

**Exhibit 40.3** is part of a collection of papers from Exhibit 40. This paper is titled "Critique of Chemical Weapons Incineration Risk Assessment," by Peter deFur, Ph.D., dated March, 1998. Dr. deFur discusses the issues surrounding the cancer and non-cancer effects of dioxins and states his belief that the TOCDF Health Risk Assessment is "not complete without adding the non-cancer risks from dioxin exposure to all target groups or individuals, and especially to fetuses, infants and young children..." [Cited in Item No. **99-2201** (p. 32)]

**Exhibit 40.6** is part of a collection of papers from Exhibit 40. This paper is titled "Synthetic Chemicals as Endocrine Disruptors," by Peter deFur, Ph.D., and Carolyn Raffensperger, M.A., J.D., dated March, 1998. Dr. deFur and Ms. Raffensperger describe the endocrine system and the effects of chemicals known as endocrine disruptors, and the pathways through which human exposure occurs. The authors urge individuals to take action to reduce exposures, and also state that "to act responsibly and with precaution in light of the known effects of endocrine disruption in animals and humans and the uncertainty of the extent of human exposure, the Army must shut down the existing [chemical weapons] incinerators and choose alternative technologies with no toxic emissions." [Cited in Item No. **99-2201** (p. 32)]

**Exhibit 45** is a Fact Sheet titled "EPA Special Report on Endocrine Disruption," from the EPA dated February, 1997. The fact sheet discusses EPA's findings concerning the effects of endocrine disrupters on human health and the environment. [Cited in Item No. **98-1275** (p. 55)]

**Exhibit 47** is an excerpt from testimony during the Utah Solid and Hazardous Waste Control Board hearing held March 18-20, 1997. The Petitioners cite the testimony of Dr. Brent Finley (pp. 877-878 of the transcript) regarding the use of a dioxin reference dose, but the testimony of Dr. Finley was not actually included in the Exhibit submitted to the Department. Mr. Finley's testimony is included here in Attachment U, page U-1. [Cited in Item No. **98-1275** (p. 58)]

**Exhibit 54** is a two-page excerpt from a document titled "Toxicological Profile for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin," dated June, 1989 by the Syracuse Research Corporation for ATSDR (U.S. Public Health Service) and EPA. [Cited in Item No. **98-1285** (p. 5); Item No. **99-0704** (p. 11); and in Item No. **99-1247** (p. 7)]

**Exhibit 55** is two-page excerpt from a document titled "Drinking Water Criteria Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin," dated March, 1985 by the EPA Environmental Criteria and Assessment Office. [Cited in Item No. **98-1285** (p. 5); Item No. **99-0704** (p. 11); and in Item No. **99-1247** (p. 5)]

**Exhibit 56** is a one-page excerpt from the "Final Times Beach Site Multimedia Risk Assessment," dated March, 1995, by the EPA. The exhibit is a table that lists the "Toxicity Values for Chemicals of Potential Concern—Noncancer Effects." [Cited in Item No. **98-1285** (p. 6); Item No. **99-0704** (p. 11); and Item No. **99-1247** (p. 5)]

## **2.C. Discussion**

The Petitioners cite the exhibits in Section 2.B to document the effects of exposure to dioxin and dioxin-like compounds and to support the arguments that, contrary to the Department's assertions, there is a dioxin "non-cancer reference dose" in use by EPA and that "the Agencies erred in failing to consider the 1 pg/kg/day non-cancer standard."<sup>4</sup>

The Petitioners state that the EPA's 1994 "Dioxin Health Assessment" concluded that an appropriate reference dose for non-cancer effects from dioxin exposure would be 10 to 1000 times less than the current national background exposure levels for dioxin. This leads to the Petitioner's conclusion that since most adult persons in the U.S. are already exposed to background levels of dioxin higher than one pg/kg/day, then there should be absolutely no additional dioxin exposure allowed. Therefore, because dioxin can be formed in high temperature combustion sources, TOCDF and UMCDF should not be allowed to operate.

Similar arguments concerning the effects of dioxins, the use of a non-cancer reference dose for dioxin, and the potential for a chemical agent incineration facility to emit dioxins, were presented by the Petitioners during the UMCDF permitting process in 1996. Many of the same documents submitted to the State of Oregon were used by the Chemical Weapons Working Group, et al. during various legal proceedings in Utah. Dioxin issues were argued extensively before the Utah

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<sup>4</sup> "1 pg/kg/day" in this context refers to the exposure of a person to one picogram of dioxin per kilogram of body weight per day. This level of dioxin exposure is not expected to have an adverse health effect of any sort, including cancer. A picogram is one-trillionth of a gram.

Solid and Hazardous Waste Board (USHW) and the U.S. District Court. Attachment S contains various rulings by the USHW, the U.S. District Court in Utah, the Utah Court of Appeals, the U.S. Court of Appeals, and the U.S. District Court for the District of Columbia.

On August 13, 1996, the U.S. District Court in Utah (Chemical Weapons Working Group, Inc., et al., Plaintiffs, vs. United States Department of the Army, et al., Defendants, Civil No. 2:96-CV-425C) ruled in favor of the Defendants. Dioxin and the use of reference doses were just a few of the many issues argued before the District Court during this case. In the Court's "Findings of Fact" related to "Dioxin Hazards" (Attachment S, page S-5) the Court stated:

"The evidence indicates that the existence and amount of the health risks associated with exposure to background levels of dioxin, and the likely significance and effects of the incremental increases in the dioxin levels due to the operation of TOCDF, are largely uncertain. The conflicting opinions offered by the experts who presented testimony in this case emphasize the fact that the effects of dioxin at various levels of exposure are far from settled issues within the scientific community.

"Plaintiffs rely to a great extent on the draft document "Health Assessment Document for 2,3,7,8 Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds" (Dioxin Reassessment) issued by EPA in 1994, which by its terms is not to be cited or quoted. Certain of the findings in the Dioxin Reassessment were questioned in significant areas by EPA's Science Advisory Board in 1995. The document is still under review and does not currently represent a final position of the EPA.

"Plaintiffs also rely on a "reference dose" of 1 picogram/kg/day level noted by the Agency for Toxic Substances and Disease Control (ATSD) in 1989 to establish harm to humans. However, this reference dose is derived by dividing the lowest level at which adverse effects are shown in animals by 1,000 in order to conservatively account for unknown factors. Accordingly, although this "reference dose" may indicate a safe level for exposure, it does not follow that exceeding this level is likely to result in harm.

"The EPA Dioxin Reassessment itself states that the use of such a reference dose would be "inappropriate" and of "doubtful significance." [Dioxin Reassessment, p. 9-84] The evidence presented indicates that this level of exposure is already exceeded in most industrialized areas of the world. Although plaintiffs argue that any increase in the levels of dioxin exposure is unacceptable, the danger associated with relatively small increases is far from certain, and the evidence presented by plaintiffs is insufficient to support a finding that such danger is likely to be significant."

In a section titled "New information regarding dioxin harms" in its "Conclusions of Law" the Court (Attachment S, page S-10) goes on to say that:

"...the EPA 1994 dioxin reassessment's analysis is at best an indication that the debates regarding the effects of dioxin are still ongoing. The wide range of expert testimony presented to the court during the hearing on plaintiff's motion makes clear that the seriousness of the dioxin threat is far from settled."

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Exhibits 39, 40.3, and 40.6 are documents authored by Dr. Peter deFur that are dated after the August, 1996 ruling from the Utah District Court. Exhibit 40.1, by Dr. Richard Clapp, is also dated after August, 1996. However, Dr. deFur and Dr. Clapp both submitted declarations, and Dr. deFur testified, during a subsequent hearing before the Utah District Court. The declarations and testimony submitted during the March, 1997 hearing before the Utah District Court were essentially the same content as noted in the above exhibits.

On March 24, 1997, the U.S. District Court in Utah (Chemical Weapons Working Group, Inc., et al., Plaintiffs, vs. United States Department of the Army, et al., Defendants, Civil No. 2:96-CV-425C) once again ruled in favor of the Defendants, finding that "None of the new evidence presented by plaintiffs undermines the court's prior finding." In the Court's "Findings of Fact" related to "Screening Health Risk Assessment" (Attachment S, page S-25) the Court stated:

"As they did with their first motion, plaintiffs rely heavily on a draft chapter of the EPA's "Health Assessment Document for 2, 3, 7, 8, Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds" (Dioxin Reassessment). However, this document, which by its terms is not to be cited or quoted, remains subject to review by EPA's Science Advisory Board and possible public comment and does not represent the EPA's final position. The court finds that scientific knowledge regarding health risks associated with dioxin exposure and the methods to assess the health impacts of dioxin emissions at TOCDF remains unchanged since the previous hearing."

Further information about the EPA's 1994 "Dioxin Health Assessment" can be found in Attachment S (page S-67) in a ruling by the U.S. District Court of Appeals for the District of Columbia. The Chemical Weapons Working Group, et al., attempted to force EPA to produce documents related to the 1994 Dioxin Health Assessment. The Court denied the motion on January 19, 1999, stating (page S-69):

"...the Court finds highly creditable the agency's assertion that release of draft information could mislead the public. Decl. of William H. Farland at 12-13. "The public may misinterpret information in the drafts as the most up-to-date information on dioxin toxicity available from the Agency, even though the documents do not reflect official EPA views, but only the preliminary views of the primary authors." Id. at 13. In fact, it appears that Plaintiffs seek the documents [\*\*9] precisely because they believe it is the latest EPA information on the health effect of dioxins.

"The Court finds that the documents sought by the Plaintiffs are protected by the deliberative process privilege. Release of the documents would likely stifle candid communication within the agency, lead to public confusion, and violate the integrity of the decision-making process."

The testimony of Dr. Brent Finley (Exhibit 47) cited by the Petitioners was taken before the Utah Solid and Hazardous Waste Control Board (USHW Board) in March, 1997. (The USHW Board is

the State of Utah's equivalent of the Oregon Environmental Quality Commission.) The USHW Board heard much the same evidence that was presented to the Utah District Court, and in an Order dated July 22, 1997 (Attachment S, page S-39), the Board found that "The Petitioners failed to present evidence refuting the conclusions of the [TOCDF Screening Health Risk Assessment]" (page S-49). The Board cited Dr. Finley's testimony as part of the basis for their finding. (Exhibit 47 as originally submitted did not include Dr. Finley's testimony before the USHW Board. A transcript of his testimony is included here in Attachment U, beginning on page U-1.)

Exhibit 38 shows that the Health Risk Assessment conducted for the Pine Bluff Chemical Agent Disposal Facility used an "average daily dose" to calculate an infant's dioxin exposure from the breast milk pathway. This reflects current EPA guidance in how to calculate such an exposure pathway.

## **2.D. Department Conclusions**

The Petitioners argue that "The analysis of human health and environmental risks posed by dioxin and dioxin-like compounds relied upon by the EQC/DEQ is flawed and seriously underestimates the risks of these dangerous chemicals" (Attachment E, page E-32). The Department does not dispute the toxicity of dioxin and dioxin-like compounds. The issue is how to estimate the risks posed by these types of compounds. The Department has relied upon, and will continue to rely upon, the most current EPA Health Risk Assessment guidance available.

The Umatilla Chemical Agent Disposal Facility Pre-Trial Burn Human Health Risk Assessment (HRA) conducted in 1996<sup>(Ref. 8)</sup> used the most current EPA guidance available at the time. The Department expects to conduct the Umatilla "Post-Trial Burn" HRA with more recent EPA guidance. In October, 1998, the EPA published a Federal Register Notice and opened a public comment period for a "Peer Review Draft" of a "Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities."<sup>(Ref. 9)</sup> The EPA's 1998 Draft HRA Protocol includes discussion of how a risk assessment should account for the risks of non-cancer effects from dioxin. Regardless of the Petitioner's statements to the contrary, the Department notes that the EPA's 1998 Draft HRA Protocol clearly states that the "U.S. EPA has not developed reference doses for any of the [dioxin/furan] congeners" (p. 2-42 of the draft HRA Protocol).<sup>5</sup>

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<sup>5</sup> The Department encourages the Petitioners to direct their comments related to calculating the risk of dioxin exposure to the EPA. The EPA has already published one "Errata" document (August 2, 1999) for the 1998 Peer Review Draft of the HRA Protocol based on comments received from peer reviewers and members of the general public.

The Department concludes that the arguments presented by the Petitioners related to the use of a dioxin "non-cancer reference dose" are not sufficient reason to re-visit the UMCDF Pre-Trial Burn HRA conducted in 1996, nor to change the Commission's finding that the UMCDF will not have any adverse effects on public health or the environment. The Department will continue to rely on the most current EPA guidance available when conducting human health and ecological risk assessments related to UMCDF. The information reviewed does not provide a basis for unilateral modification or revocation of the UMCDF HW Permit.

### **3. THE ACUTE TOXICITY AND THE CHRONIC HEALTH EFFECTS OF LOW LEVEL EXPOSURES TO CHEMICAL WARFARE AGENTS**

#### **3.A. Applicable Attachments and Exhibits/Comments**

- Attachment A, Exhibit 69 (December, 1998 "Revocation Request")
- Attachment E, Comment C-5 (Comments of G.A.S.P., et al.)
- Attachment G, Comment C-5
- Attachment K, Exhibits 40, 40.2, 40.4, 40.5, 41, 50, 51, 52, 53; and additional Gulf War and toxicity-related documents

#### **3.B. Description and Summary of Documents**

**Exhibit 40** is a collection of papers titled "Public Health and Chemical Weapons Incineration" by the Kentucky Environmental Foundation, dated March, 1998. The mission of the Kentucky Environmental Foundation (as described in the website of the Chemical Weapons Working Group) is "to further the cause of safe disposal of chemical weapons and environmental democracy by improving public access to information, coalition building, fostering cooperation between government and citizens, and encouraging grassroots participation in the decision-making process." [Cited in Item No. 98-1275<sup>6</sup> (p. 46) and in Item No. 99-2201 (p. 32)]

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<sup>6</sup> The following Item Numbers are cited in this section:

- No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (Attachment A)
- No. 98-1275: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)
- No. 98-1285: "Petitioners' Additional Documentary Evidence," November 10, 1998 (Case No. 9708-06159)
- No. 99-0704: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)
- No. 99-1751: "First Supplemental Petition for Review," April 5, 1999 (Case No. 9708-06159)
- No. 99-1752: "Petitioners' Reply to Opposition to Motion for Relief," January 19, 1999 (Case No. 9708-06159)

**Exhibit 40.2** (one of the collection of papers in Exhibit 40) is titled "Toxic Exposures and Chronic Illnesses," by Howard Urnovitz, Ph.D. (Scientific Director, Chronic Illness Research Foundation, Berkeley, California). Dr. Urnovitz discusses the implications of various research projects related to chronic illnesses and Gulf War Syndrome that indicate exposures to a combination of chemical compounds can have synergistic and additive effects.

**Exhibit 40.4** (one of the collection of papers in Exhibit 40) is titled "Toxicology of Chemical Agents," by Robert Ginsburg, Ph.D. (Research Director, Midwest Center for Labor Research, Chicago). Dr. Ginsburg reviewed the literature on the toxicity of the agents GB and VX. He found that "evaluation of the potential effects from exposure to low levels of these chemicals is difficult because of complications arising from the chemicals' extremely high acute toxicity." Dr. Ginsburg recommends further testing of sub-acute exposure effects because "despite the limitations in testing, long-term consequences from low-level exposure to nerve agents as well as commercial organophosphate pesticides have been demonstrated."

**Exhibit 40.5** (one of the collection of papers in Exhibit 40) is titled "Health Effects of Low-level Exposure to Nerve Agent," by Jerry Buccafusco, Ph.D. (Professor of Pharmacology and Toxicology, Medical College of Georgia and Director, Neuropharmacology Laboratory, Department of Veterans Affairs Medical Center, Augusta, Georgia). Dr. Buccafusco discusses the research conducted by the Medical College that found that chronic low-level exposure to an organophosphorus agent "produced a subtle but reproducible memory impairment."

**Exhibit 41** is a copy of a news article from The Oregonian newspaper dated July 29, 1998 by James Long. The article is titled "Nerve gas danger underestimated." The article was reporting the results of a study conducted by the National Research Council. (see Exhibit 50)

**Exhibit 50** is an excerpt from a report by the National Research Council (NRC) in 1997 that is titled "Review of Acute Human-Toxicity Estimates for Selected Chemical Warfare Agents." The NRC recommended that some changes be made to the toxicity values used by the Army to assess the effects of chemical agents on soldiers. [Cited in Item No. 98-1247 (pp. 5-6); Item No. 98-1275 (p. 47); Item No. 98-1285 (pp. 2-3); Item No. 99-0704 (p. 8); Item No. 99-1751 (p. 4); and in Item No. 99-2201 (pp. 24-27)]

**Exhibit 51** is an excerpt of a review conducted by the "Environment Committee" of the "Armed Forces Epidemiological Board" in July, 1996, titled "Long-term Health Effects Associated with Sub-Clinical Exposure to GB and Mustard." The document states that it was prepared at the request of the Assistant Secretary of Defense (Health Affairs) to conduct a literature review and to

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- No. 99-2201: "Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF]," December 17, 1999 (Attachment E)

critique and comment on the question "Are there observable long-term health effects associated with exposure to Sarin (GB) and mustard at concentrations below that needed to cause acute signs, symptoms, or injury?" The review states that "The long-term effects of limited exposures to sub-clinical doses of GB and HD are unclear, but the data included in this review suggest that health effects would not be detectable." The review concludes, however, that much further research work needs to be done. [Cited in Item No. 98-1247 (p. 6); Item No. 98-1275 (p. 54); Item No. 98-1285 (pp. 3-4); Item No. 99-0704 (p. 9); and in Item No. 99-2201 (pp. 27-28)]

**Exhibit 52** is titled "105th Congress Report - Gulf War Veteran's Illnesses: VA, DOD Continue to Resist Strong Evidence Linking Toxic Causes to Chronic Health Effects," dated November, 1997 by the Committee on Government Reform and Oversight (House of Representatives). This exhibit is a copy of a report prepared in response to requests by Gulf War veterans. [Cited in Item No. 98-1247 (p. 6); Item No. 98-1275 (p. 54, lines 3-5); Item No. 98-1285 (pp. 4-5); Item No. 99-0704 (p. 10); and in Item No. 99-2201 (pp. 28)]

**Exhibit 53** is a September, 1998 report by the U.S. General Accounting Office titled "Chemical Weapons: DOD Does Not Have a Strategy to Address Low-Level Exposures. [Cited in Item No. 98-1247 (p. 7); Item No. 98-1285 (p. 5); Item No. 99-0704 (p. 10); and in Item No. 99-2201 (pp. 28-31)]

### **3.C. Discussion**

The Petitioners cite Exhibit 40 (with 40.2, 40.4, and 40.5) to support the statement that "studies of non-lethal agent exposures and chemicals containing ingredients similar to agent demonstrate that impacts to brain function and behavior may be likely." Exhibits 51, 52, and 53 are related to the ongoing research effort in identifying the cause of what has become known as the "Gulf War Syndrome." The Petitioners cite these Exhibits in stating that "low level agent exposure alone or in combination with other chemicals can generate a range of disturbing health effects." The Petitioners cite these documents to counter the Department's statement that there was insufficient information available concerning the Gulf War Syndrome to incorporate into the UMCDF Pre-Trial Burn Health Risk Assessment at the time it was conducted in 1996.

The Department was not able to incorporate Gulf War information into the 1996 UMCDF Health Risk Assessment because so much of the research being conducted was still in the early stages, and it was apparent, even at that time, that Gulf War veterans had been exposed to an incredible myriad of potentially health-damaging situations. The possibility of low-level nerve agent exposure was only one of the types of exposures under consideration as a possible cause of the health problems being exhibited by Gulf War veterans.<sup>(Refs. 10, 11)</sup>



The list of possible Gulf War veterans' exposures now include:

- chemical warfare agents;
- Pyridostigmine Bromide (an inoculation given to Gulf War soldiers as protection against nerve agents);
- biological warfare agents (anthrax, botulism toxins);
- infectious diseases (leishmaniasis, sandfly fever, malaria, dengue fever, etc.);
- immunizations (hepatitis A and B, yellow fever, rabies, cholera, etc.);
- depleted uranium;
- pesticide use (malathion, chlorpyrifos, lindane, DEET, and the flea collars that some veterans wore to combat the insects);
- smoke from the oil well fires in Kuwait;
- petroleum products [used for dust suppression, fuel (for vehicles and for heaters, stoves, and generators), to burn human waste, and as an ingredient in "Chemical Agent Resistant Coating" paint];
- the desert environment (high temperatures in the daytime reaching 130 degrees Fahrenheit, sand particulate);
- psychological and physical stressors (sudden mobilization, combat, accidents, etc.); and
- general exposures inherent to military service (propellants from ammunition, solvents, noise, vibration, blast impacts, etc.).

The Centers for Disease Control (CDC) sponsored a "Research Planning Conference" in February, 1999 with the purpose of obtaining "broad public input into the development of a multi-year research plan investigating relationships of chemical exposures to illnesses among Gulf War veterans." A copy of the "Background Document on Gulf War-Related Research" prepared for the conference is included in Attachment K, page K-7. A more recent report (January, 2000) by the Government Accounting Office (GAO) titled "Management Actions Needed to Answer Basic Research Questions" is also included in Attachment K (page K-41). The GAO concludes that "basic questions about the causes, course of development, and treatments of Gulf War veterans' illnesses remain unanswered" ("Results in Brief," page K-44). The GAO report states that there are 151 research projects being monitored by the "Research Working Group of the Persian Gulf Veterans' Coordinating Board," and most of those are still ongoing.

The Utah Citizens Advisory Commission was interested in whether the Gulf War Syndrome was a cause for concern about the Tooele Chemical Agent Disposal Facility (TOCDF) and requested that the CDC assess the public health risk associated with the emissions from TOCDF. In a letter to the Utah Advisory Commission (Attachment K, page K-73), the CDC replied:

"In your letter to CDC, you also asked us to address the current concern of some people that the stack emissions from the incinerator could lead to health effects similar to those associated with "Gulf War Syndrome." We, too, have seen this concern raised in the popular media. However, on the basis of the information available, we do not feel that this concern is well founded. Our reasons follow:

1. The symptoms described by the Gulf War veterans are diverse and often vague. They are not specific for symptoms associated with acute exposure to the chemical agents contained at the stockpile sites.
2. The Johnston Atoll incinerator (which is similar to the Tooele incinerator) has been operating for approximately seven years. WE are unaware of any information that shows any similarities between health problems reported on the island and the symptoms associated with Gulf War Syndrome.
3. The cause of Gulf War Syndrome is still subject to considerable debate and many hypotheses. Research is underway to investigate these issues and CDC will monitor the developments in this research.

If new information is produced to better support the hypothesis that Gulf War Syndrome is caused by exposure to chemical agent, we will examine it closely and let the Utah CAC, and others, know of our findings. However, in the absence of such information, we feel that it is prudent to reduce the existing stockpile storage risk by continuing to pursue the baseline recommended destruction technology, incineration, in a safe and deliberate manner."

The National Research Council's (NRC) "Review of Acute Human-Toxicity Estimates for Selected Chemical Warfare Agents" referenced in Exhibits 41 and 50 was made available in 1998. The Petitioners contend that the NRC report proves that "chemical warfare agents are even more dangerous than originally thought," and that "the EQC was misled concerning a critical aspect of the permitting process (i.e., the likely toxicity of CW Agents)."

Numerous agencies involved with the oversight of the Army's chemical demilitarization program were interested in the potential impact of the NRC "Acute Toxicity" report. Shortly after the NRC report was released, the Department requested that Ecology and Environment review the report to determine if the toxicity estimates of the NRC would have any impact on the UMCDF Health Risk Assessment. E&E concluded that "the toxicity values presented in the NRC document are not applicable for use in a risk assessment for the general population." A copy of the E&E review memorandum to the Department can be found in Attachment K (page K-77).

The Army Program Manager for Chemical Demilitarization was also concerned, and requested that the CDC review the report and "assess the adequacy of protection to the workforce and local community" (see Attachment K, page K-79). The Centers for Disease Control came to the same conclusion as E&E, and stated in a letter to the Army in October, 1998 (page K-81), that "the occupational and General Population Limit exposure levels were developed to protect the workers and civilians around the chemical stockpile and demilitarization sites and CDC continues to believe that these limits are still valid and protective of human health and safety." The Army

responded to an inquiry from the Alabama Department of Environmental Management (page K-83) and prepared a media release and "question and answer" sheet (page K-87).

### **3.D. Department Conclusions**

The Department does not concur with the Petitioners that either the Commission or the Department has been "misled" concerning the toxicity of chemical warfare agents. The Department monitors new information as it is available, and assesses its applicability, if appropriate, to the demilitarization activities being conducted at UMCDF (such was the case with the NRC "Acute Toxicity" Report). The Department concurs that research being conducted by agencies studying the Gulf War Syndrome (and new review of old research) indicates that there may be adverse health effects from low-level exposures to organophosphorus agents, including the nerve agent GB. However, researchers have not concluded that low-level nerve agent exposure is a "cause" of Gulf War Syndrome, and in fact some studies have ruled out nerve agent exposure as a cause.

The Department notes, however, that the definition of "low-level exposure" is not clear.<sup>(Ref 11)</sup> The Petitioners believe that incineration will result in emissions of chemical agents either through routine operations or through upset conditions and/or accidents. That leads to the assertion that UMCDF will be a source of chronic "low-level" nerve agent exposure for local communities, which will therefore result in health effects similar to those seen in Gulf War veterans. The Department does not believe that it is reasonable to equate barely detectable (if detectable at all) emissions from a highly engineered and controlled combustion unit (which includes a pollution abatement system followed by carbon filtration) with the "emissions" resulting from the open detonation of a large chemical agent ammunition dump.

The Centers for Disease Control agrees that the stack emissions from a chemical agent disposal facility are unlikely to lead to health effects similar to those associated with "Gulf War Syndrome." There is a risk of catastrophic accident (and subsequent population exposure to chemical warfare agent) as long as the chemical weapons stockpile remains stored at the Umatilla Chemical Depot. The Department believes, like the CDC, that the best way to reduce the risk is to remove the hazard, which will be accomplished through the safe operation of the UMCDF.

The Department has determined that the operation of UMCDF will not pose chronic health risks to the population. That determination is based on the use of exposure limits published by the CDC, site-specific information, and conservative exposure scenarios, all analyzed with health risk assessment guidance from the EPA that has been accepted by the greater scientific community. The Department will continue to use the most recent toxicity data and guidance available to assess

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the risks of UMCDF to public health and the environment. The Department will also continue to monitor the progress of Gulf War research studies and the applicability of results to health risk assessment-related activities being undertaken at UMCDF.

The Department concludes that the arguments presented by the Petitioners related to the toxicity of chemical warfare agents and the health effects of low-level exposures do not provide a basis for the unilateral modification or revocation of the UMCDF Hazardous Waste Permit.

#### **4. HUMAN HEALTH RISK ASSESSMENTS**

##### **4.A. Applicable Attachments and Exhibits/Comments**

- Attachment A, Exhibit 69 (December, 1998 "Revocation Request")
- Attachment E, Comment C-5 (Comments of G.A.S.P., et al.)
- Attachment G, Comments C-4, C-5
- Attachment L, Exhibits 27, 27.1, 27.2, 27.3, 27.4, 27.5, 27.6, 28, 28.1, 28.2, 37.1, 37.2  
(Also includes an excerpt from EPA's 1998 Health Risk Assessment Protocol, beginning on page L-5)
- Attachment N, Exhibit 26
- Attachment P, Exhibit 29, 29.1, 29.2

##### **4.B. Description and Summary of Documents<sup>7</sup>**

**Exhibit 26** is the "Affidavit of John Houston Miller" dated June 3, 1996. The origin of this affidavit is not clear, but it is assumed to be a document generated in *CWWG v. U.S. Army* (Case No. 96-CV-0425C). Dr. Miller is a "Professor of Chemistry at George Washington University in Washington, D.C." His Affidavit states that the TOCDF health risk assessment did not adequately account for upset emissions; that the calculated destruction removal efficiency will not be valid

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<sup>7</sup> The following Item Numbers are cited in this section:

- No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (See Attachment A)
- No. 98-1275: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)
- No. 98-1285: "Petitioners' Additional Documentary Evidence," November 10, 1998 (Case No. 9708-06159)
- No. 99-0704: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)
- No. 99-2201: "Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF]," December 17, 1999 (See Attachment E)

when chemicals are in low concentrations (below 1000 ppm); and that TOCDF relied on inadequate JACADS data. Dr. Miller provides a list of various chemicals that were not included in the JACADS data that TOCDF relied on. [Cited in Item No. 98-1275 (p. 35)]

**Exhibit 27** is an Affidavit from Thomas Bodley Stibolt Jr. (Senior Physician with Norwest Permanente and a Clinical Associate Professor of Medicine at Oregon Health Sciences University) and Lisa P. Brenner (Staff Scientist and President of Oregon Clearinghouse for Pollution Reduction), dated August 19, 1998. Drs. Stibolt and Brenner reviewed the Pre-Trial Burn Health Risk Assessment for UMCDF and state that DEQ did not follow "appropriate scientific steps" in the Health Risk Assessment and that there were "important unanswered questions." [Cited in Item No. 98-1275 (p. 39 and p. 61); Item No. 98-1247 (p. 4); Item No. 99-0704 (p. 7); and Item No. 99-2201 (p. 33)]

**Exhibit 27.1** (an attachment to Exhibit 27) is titled "Review of the inhalation modeling compounds and standards used in the RA for human health effects," dated August 17, 1998, by Lisa Brenner & Tom Stibolt. Issues of concern to the authors include the restriction of the UMCDF HRA's analysis to only those compounds included in the EPA guidance; the level of "acceptable" risk; the lack of consideration of "non-cancer" effects and the failure of the Department to perform an "acute risk assessment."

**Exhibit 27.2** (an attachment to Exhibit 27) is titled "A Listing of the Compounds that PRC claims should be included in the modeling analysis," dated August 16, 1998, by Lisa Brenner and Tom Stibolt. Includes three tables titled (1) "Carcinogenic Effects Via Inhalation: Presentation and Additions"; (2) "Non-Carcinogenic Effects: Additions and Qualitative Comparisons" and (3) "A Listing of the Compounds that PRC claims should be included in the modeling analysis."

**Exhibit 27.3** (an attachment to Exhibit 27) is titled "Table 1 - Comparison of Potential PICS, Recommended PICS, and Proposed Emission Rates, November 5, 1996, by PRC Environmental Management. Exhibit 27.3 is a table from a report prepared by PRC Environmental Management ("Air Quality Dispersion and Deposition Review and Evaluation of the Draft Pre-Trial Burn Risk Assessment of Combustion By-Products for the Proposed Umatilla Chemical Demilitarization Facility").

**Exhibit 27.4** (an attachment to Exhibit 27) is an excerpt from a document titled "Fundamentals of Risk Analysis and Risk Management," 1997, Vlasta Molak, editor. The portion of the two-page excerpt highlighted here is a sentence that states "The U.S. EPA defines negligible risk of cancer as that smaller than 1:1,000,000."

**Exhibit 27.5** (an attachment to Exhibit 27) is an excerpt from the "Umatilla Chemical Agent Disposal Facility Phase 1 Quantitative Risk Assessment, dated September, 1996, by Science Applications International Corporation (SAIC). The excerpt discusses which exposure pathways are modeled in the QRA, and the dose-response equations that are used.

**Exhibit 27.6** (an attachment to Exhibit 27) is titled "Technical Aspects of the Model and the Air Quality Impact Analysis," dated August, 1998, by Thomas Stibolt and Lisa Brenner. The Authors do not believe that the Department followed correct guidance in the selection and formatting of meteorological data used in the 1996 UMCDF HRA.

**Exhibit 28** is an Affidavit from Trygve P. Steen, dated August 20, 1998, affirming his support for the work of Lisa Brenner and Tom Stibolt contained in Exhibit 27. **Exhibit 28.1** is an article titled "Thinking of Biology - Science, environmental risk assessment, and the frame problem, dated September, 1994, by Kristin S. Shrader-Frechette. The article discusses the use of a "two-value frame" vs. a "three-value frame" when making risk assessment decisions. **Exhibit 28.2** is the Curriculum Vitae of Trygve P. Steen, dated June, 1998. [Cited in Item No. 98-1275 (p. 40 and p. 61; Item No. 98-1247 (p. 4); Item No. 99-0704 (p. 7); and Item No. 99-2201 (p. 33)]

**Exhibit 29** is an Affidavit by Mr. James R. Wilkinson (Program Manager for Special Sciences and Resources Program, Department of Natural Resources, Confederated Tribes of the Umatilla Indian Reservation), dated August 19, 1998. The Affidavit states that it is the "personal view of the author, and does not represent the views of the tribal government." Mr. Wilkinson's Affidavit outlines many of the Tribes' concerns, which include the State of Oregon's failure to "adequately consider the impacts of hazardous waste from the incineration of chemical weapons on the Tribe's treaty reserved resources." Mr. Wilkinson also states that the "risk assessment methods used by the DEQ and EQC are not reflective of the Tribe's cultural habits and practices" and that the state "neglected to consider important local meteorological data." Mr. Wilkinson also cites the report prepared by PRC Environmental Management (see Exhibit 27) and states that the "Tribe is concerned about the effects of the Products of Incomplete Combustion and other emissions from the proposed incinerator that were not adequately studied by the DEQ or EQC." [Cited in Item No. 98-1247 (p.4); Item No. 98-1275 (p. 40 and p. 61, line 2); Item No. 98-1275 (pp. 64-65); Item No. 99-0704 (p. 7); and Item No. 99-2201 (p. 33)]

**Exhibit 29.1** is an attachment to Exhibit 29 titled "Resolution of the CTUIR Board of Trustees. This document is a Resolution of the Board of Trustees of the Confederated Tribes of the Umatilla Indian Reservation, dated January, 1996. The Resolution requests that there be a "one year moratorium on consideration of the Army's incinerator request, pending the completion, in cooperation with the CTUIR, of an analysis of the relative capabilities presented by alternate chemical disposition technologies and the relative risks those technologies pose to the members and residents of the CTUIR as compared to incineration and to continued storage of these weapons."

**Exhibit 29.2** is an attachment to Exhibit 29. It is the text of a presentation given to the EQC in November, 1996, titled "Lines Drawn in the Sand: A Review of Challenges, Opportunities, and Options for Chemical Weapons Disposal, by Donald Sampson, Armand Minthorn, and J.R. Wilkinson. Mr. Sampson outlined CTUIR concerns with UMCDF, including the inadequacies of health risk assessments to account for unique Tribal lifestyles. Mr. Sampson proposed that the chemical weapons stockpile be reconfigured to reduce risks and that a Governor's Task Force be established to review alternatives to incineration.

**Exhibit 37.1** is a document titled "1997 Declaration of the Environmental Leaders of the Eight on Children's Environmental Health, dated July 27, 1998, from the Office of Children's Protection. [Cited in Item No. 98-1275 (p. 42)]

**Exhibit 37.2** is an Executive Order from the White House titled "Protection of Children From Environmental Health Risks and Safety Risks," dated April 21, 1997. This is President Clinton's Executive Order governing the establishment of a Task Force on "Environmental Health Risks and Safety Risks to Children" and directing federal agencies to ensure that they have addressed environmental health risks and safety risks that might disproportionately affect children. [Cited in Item No. 98-1275 (p. 42)]

#### 4.C. Discussion

The Petitioners believe that the 1996 UMCDF Pre-Trial Burn Health Risk Assessment <sup>(Ref. 8)</sup> ("1996 UMCDF HRA") failed to "thoroughly and properly assess the impacts of the Army's proposed incineration facility" and to "consider impacts of incineration on sensitive populations (i.e., children, elderly, persons with illness)." The Comments submitted to the Department in December, 1999 (and the exhibits submitted as support for those Comments), reflect comments previously received by the Department. The Department understands that the Petitioners and Commenters do not believe that previous Department responses were adequate, and that the Department failed to consider and incorporate their concerns in the 1996 UMCDF HRA.

The 1996 UMCDF HRA was conducted using the most recent guidance available at the time from the EPA, modified to incorporate Umatilla site-specific information as much as possible. Health Risk Assessment guidance is an ever-evolving science, and by its very nature it requires permittees, regulatory agencies, and policy-makers to make assumptions, calculations, and decisions every step of the way on what to include, and (sometimes more importantly) what not to include. Ultimately, risk management decisions must be made, and sometimes those decisions must be made in the face of incomplete, conflicting, and/or uncertain information.

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The EPA guidance used for the 1996 UMCDF HRA has been superseded by the updated 1998 HRA guidance.<sup>(Ref. 9)</sup> The new guidance specifically assesses risks to children of farmers and fishers; recommends a hierarchy of existing acute toxicity values and modeling specifics for evaluating acute risks; contains a process for quantifying fugitive emissions; and includes algorithms for new and updated exposure pathways.

The EPA included these items in the new guidance partially in response to public concerns, but also to reflect the latest in risk assessment science and to incorporate the experience gained from conducting and reviewing risk assessments that used the 1994 guidance. A copy of the Table of Contents and the introduction chapter of the new protocol is included in Attachment L. A flow chart of the "Human Health Risk Assessment Process" can be found on page L-22.

The Department will be conducting another UMCDF HRA when data become available from UMCDF Trial Burns. As part of the preparation for that process, all Surrogate and Agent Trial Burn Plans will be reviewed to insure that Trial Burns will include sampling of compounds of potential concern identified in the latest HRA guidance, or compounds that have become a concern through analysis of waste feeds and/or operations of other chemical demilitarization facilities. The Permittee is required to submit updated Trial Burn Plans no less than 180 days prior to the scheduled Trial Burn.

Submittal of an updated Trial Burn Plan is a Class 2 Permit Modification Request, which will allow for a public comment period. In addition, the Department has retained Ecology and Environment, Inc. to prepare the UMCDF "Post-Trial Burn" HRA Workplan, and will be inviting Tribal and public participation in the development of the HRA Workplan.

#### **4.D. Department Conclusions**

The information submitted by the Petitioners and Commenters related to Health Risk Assessment has already been considered by the Department and the Commission. There will be additional opportunities for public participation in the Health Risk Assessment process, to include the development of Trial Burn Plans and the Post-Trial Burn HRA Workplan to incorporate new guidance and Umatilla site-specific information. The Department concludes that the findings of the UMCDF Pre-Trial Burn Human Health Risk Assessment conducted in 1996 are still valid. The information submitted by the Petitioners and Commenters does not provide a basis for unilateral modification or revocation of the UMCDF HW Permit.

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## 5. INCINERATION VS. ALTERNATIVE TREATMENT TECHNOLOGIES

### 5.A. Applicable Attachments and Exhibits/Comments

- Attachment A, Exhibit 69 (December, 1998 "Revocation Request")
- Attachment E, Comment C-5 (Comments of G.A.S.P., et al.)
- Attachment G, Comments/Exhibits C-5, C-79, C-80
- Attachment M, Exhibits 48, 63, and "Perspectives on the Umatilla Quantitative Risk Assessment Results," SAIC, September, 1996
- Attachment O, Exhibit 46
- Attachment P, Exhibit 29, 29.1, 29.2
- Attachment S, Legal rulings related to the Tooele Chemical Agent Disposal Facility
- Attachment T, "Evaluation of Demonstration Test Results of Alternative Technologies for Demilitarization of Assembled Chemical Weapons—A Supplemental Review," National Research Council, 2000.

### 5.B. Description and Summary of Documents

**Exhibit 29** is an Affidavit by Mr. James R. Wilkinson (Program Manager for Special Sciences and Resources Program, Department of Natural Resources, Confederated Tribes of the Umatilla Indian Reservation), dated August 19, 1998. The Affidavit states that it is the "personal view of the author, and does not represent the views of the tribal government." Mr. Wilkinson's Affidavit outlines many of the Tribes' concerns about the permitting of UMCDF, including that the DEQ and EQC did not adequately consider the use of alternatives to incineration, nor was their sufficient consideration given to reconfiguration of the chemical weapons stockpile to reduce storage risks. [Cited in Item No. **98-1247**<sup>8</sup> (p.4); Item No. **98-1275** (p. 40, p. 61, and pp. 64-65); Item No. **99-0704** (p. 7); and Item No. **99-2201** (p. 33)]

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<sup>8</sup> The following Item Numbers are cited in this section:

- No. **98-1247**: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (See Attachment A)
- No. **98-1275**: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)
- No. **98-1285**: "Petitioners' Additional Documentary Evidence," November 10, 1998 (Case No. 9708-06159)
- No. **99-0704**: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)
- No. **99-2201**: "Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF]," December 17, 1999 (See Attachment E)

**Exhibit 29.1** is an attachment to Exhibit 29 titled "Resolution of the CTUIR Board of Trustees. This document is a Resolution of the Board of Trustees of the Confederated Tribes of the Umatilla Indian Reservation, dated January, 1996. The Resolution requests that there be a "one year moratorium on consideration of the Army's incinerator request, pending the completion, in cooperation with the CTUIR, of an analysis of the relative capabilities presented by alternate chemical disposition technologies and the relative risks those technologies pose to the members and residents of the CTUIR as compared to incineration and to continued storage of these weapons."

**Exhibit 29.2** is an attachment to Exhibit 29. It is the text of a presentation given to the EQC in November, 1996, titled "Lines Drawn in the Sand: A Review of Challenges, Opportunities, and Options for Chemical Weapons Disposal," by Donald Sampson, Armand Minthorn, and J.R. Wilkinson. Mr. Sampson outlined CTUIR concerns with UMCDF and the permitting process and proposed that the chemical weapons stockpile be reconfigured to reduce risks and that a Governor's Task Force be established to review alternatives.

**Exhibit 46** is a document titled "From the Journals of Gary Millar" dated September 9, 1996. The Petitioners contend that Exhibit 46 shows that the "project managers at TOCDF expressed significant concerns about various aspects of operations" and that the "problems reflected in these documents are not indicative of a mature technology that is capable of protecting human health or the environment consistent with state and federal standards." [Cited in Item No. 98-1275 (page 56)]

**Exhibit 48** is an excerpt of the "Annual Status Report on the Disposal of Chemical Weapons and Materiel for Fiscal Year 1997, dated September, 1997, by the Department of Defense. The excerpt includes a project schedule and discussion of the current status of each stockpile site. [Cited in Item No. 98-1275 (p. 63)]

**Exhibit 63** is an excerpt of the Final Environmental Impact Statement for "Pilot testing of Neutralization/Biotreatment of Mustard Agent at Aberdeen Proving Ground, Maryland," dated July, 1998, by the U.S. Army Program Manager for Chemical Demilitarization. The Aberdeen Chemical Agent Disposal Facility will use neutralization followed by biotreatment to destroy the stockpile of mustard agent stored at the Aberdeen Proving Ground. [Cited in Item No. 98-1247 (p. 8); Item No. 98-1285 (p. 8); and Item No. 99-0704 (p. 13); and Item No. 99-2201 (p. 35)]

**Exhibit/Comment C-79** is an excerpt of the "Assembled Chemical Weapons Assessment Program, Supplemental Report to Congress," dated September, 1999, by the Department of Defense. [Cited in Item No. 99-2201 (pp. 34-35)]

**Exhibit/Comment C-80** is a letter dated February 22, 1999 from the Director of the Waste Management Administration, Maryland Department of the Environment to the Installation Commander of Aberdeen Proving Ground, Maryland. The letter approves a modification to the Aberdeen Proving Ground's "Controlled Hazardous Substances Permit" to include the Aberdeen Chemical Agent Disposal Facility (which will use neutralization to destroy the mustard agent stockpile stored at Aberdeen Proving Ground). [Cited in Item No. 99-2201 (pp. 35-36)]

### 5.C. Discussion

The Petitioners state that "non-incineration alternatives must be considered by the EQC/DEQ and implemented at UMCDF in order to comply with the statutory mandate to ensure use of best available technology and that there will be no major adverse effect on public health and safety or the environment of adjacent lands" (Attachment E, page E-35). The Petitioners cite the Assembled Chemical Weapons Assessment (ACWA) Program mandated by Congress, and present the 1999 ACWA "Supplemental Report to Congress" (Exhibit 79) that "document[s] two technologies capable of fully treating all munitions and agents (General Atomics Neutralization/Super Critical Water Oxidation) and munitions containing mustard agent only (Parsons/Allied Signal Neutralization/Biotreatment). The Petitioners believe that "both ACWA demonstrated technologies would provide substantial benefits for the disposal of the Umatilla stockpile from both human health and environmental perspectives. Both technologies are superior to incineration."

Some of the demonstration testing conducted for alternative treatment technologies for the chemical weapon stockpiles have shown promising results. The Department notes, however, that the testing conducted to date has been limited in nature and scope and that none of the proposed treatment technologies has been tested as an integrated system. The National Research Council (NRC) prepared a report in 1999 titled "Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons." After the results of the ACWA demonstration testing program became available the NRC prepared a "Supplemental Review" titled "Evaluation of Demonstration Test Results of Alternative Technologies for Demilitarization of Assembled Chemical Weapons." A copy of the NRC's "Supplemental Review" is included in Attachment T.

The NRC Supplemental Review in Attachment T includes an update to the complete list of the original 1999 "General Findings and Recommendations" on page T-40. The document also contains descriptions of the alternative technologies that underwent the ACWA demonstration testing. In addition to the update to their original findings, the NRC added three "Supplemental General Findings" (Attachment T, page T-17):

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### **Supplemental General Findings**

The results of the demonstration tests did not significantly affect the committee's original general findings and recommendations and, in some cases, confirmed them. The committee's review of the results of the demonstration tests, however, led to the following new general findings.

**General Finding 1.** Based on the committee's assessment of the maturity of the various unit operations (as summarized in Table ES-1), none of the three technology packages is ready for *integrated* [emphasis in original] pilot programming, although certain unit operations are sufficiently mature to bypass pilot testing (e.g., hydrolysis of agent).

**General Finding 2.** The demonstration test were not operated long enough to demonstrate reliability and long-term operation.

**General Finding 3.** The committee reiterates that none of the unit operations has been integrated into a complete system. The lack of integration remains a major concern as a significant obstacle to full-scale implementation.

In the "Petitioners' Memorandum Supporting Motion for Summary Judgment" (DEQ Item No. 98-1275, dated August, 1998) the Petitioners cite the schedule shown in Exhibit 48 as evidence that the selection of an alternative technology for the Umatilla site would not have resulted in a delay of the destruction of the stockpile at Umatilla. In Comment C-5 the Petitioners cite exhibits 63 and C-80 as further evidence that alternatives to incineration are available and fully mature. The Department and the Commission were aware that the Army had selected neutralization technologies for the treatment of the stockpiles at Newport, Indiana, and Aberdeen, Maryland.

Although the schedule in Exhibit 48 is very out of date (September, 1997), the Department concurs with the Petitioners' statement that the schedule shows that the sites at Maryland and Indiana were (at the time) projected to complete operations before Umatilla. However, it should be noted that the construction and systemization times for each facility are almost identical. It is the processing time that extends the time bar to the end of 2005 at Umatilla, because the Umatilla stockpile is not only much larger than either Indiana or Maryland, but also much more diverse in agent munition types. Umatilla has about 220,000 individual items to process (three agent types), compared to a total of 3500 ton containers (no munitions involving explosives or propellants or munitions that require a disassembly process) at the other two sites. Aberdeen stores only mustard agent, Indiana only VX nerve agent.

The possibility of using the neutralization process for the mustard stored at the Umatilla Chemical Depot [which constitutes 63% (by weight) of the total agent stored at Umatilla] was discussed extensively during the UMCDF permitting process. There were several reasons that the mustard neutralization process did not appear feasible for Umatilla, including the delay in stockpile destruction and the fact that the neutralization process requires copious amounts of water (in short supply in eastern Oregon) that then must be treated before discharge.

Mr. Gary Millar (former EG&G General Manager of TOCDF) testified before the USHW Board in December, 1996. Mr. Millar's "journal" (see Exhibit 46), a letter he wrote in 1996, and his testimony before the USHW Board were reviewed by the Utah District Court in subsequent legal proceedings. The Petitioners contend that Exhibit 46 shows that the "project managers at TOCDF expressed significant concerns about various aspects of operations" and that the "problems reflected in these documents are not indicative of a mature technology that is capable of protecting human health or the environment consistent with state and federal standards." The Utah District Court, upon review of Mr. Millar's testimony in March, 1997 (Attachment S, page S-23) stated:

"Mr. Millar's testimony under oath belies many of the concerns raised in the November 9, 1996 letter. On December 12, 1996, Mr. Millar testified to the Utah Board that TOCDF was being operated safely and that state regulatory agencies charged with overseeing the facility were doing a "good job" keeping TOCDF operations and the public safe. Mr. Millar further testified that he never intended his letter to become public and that he considered the issues raised therein to concern EG&G's internal management, not plant safety."

#### **5.D. Department Conclusions**

In the 1997 "Findings and Conclusions of the Commission and Order"<sup>(Ref. 12)</sup> granting the HW Permit to UMCDF, the Commission (§ 75, pp. 20-21) found that:

- E. Alternative technologies reviewed, with the exception of neutralization, are years away from actual operational availability.
- F. Neutralization technology for HD, while currently undergoing laboratory bench-scale study, would entail lengthy delay at Umatilla due, among other constraints, to the need for staging of construction to allow energetics destruction by incineration prior to construction and operation of neutralization facilities.
- G. With the exception of neutralization, technologies reviewed appear to involve little impact on natural resource consumption. Neutralization of HD could, however, have significant implications for water consumption and disposal, and would need substantial ecological impact analyses.
- H. Alternative technologies reviewed face testing and operational hurdles which would add years of delay to the agent destruction program at Umatilla.
- I. Comparative costs of alternative technologies is considered a factor only with respect to neutralization of HD which would add significantly to costs of agent destruction at Umatilla by necessitating construction of a neutralization facility in addition to the proposed incinerators.

The Department has concluded that the Commission findings in 1997 have proven correct with respect to the length of time that will be needed to sufficiently develop alternative technologies to a point where they could be considered for the Umatilla stockpile. The information provided by

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the Petitioners and Commenters does not provide a basis for unilateral modification or revocation of the UMCDF HW Permit.

## **6. THE RISK OF STORAGE VS. THE RISK OF INCINERATION**

### **6.A. Applicable Attachments and Exhibits/Comments**

- Attachment A, Exhibit 69 (December, 1998 "Revocation Request")
- Attachment M, Exhibit 65 (also includes a summary of the Umatilla "Quantitative Risk Assessment," beginning on page M-3)
- Attachment N, Exhibit 64
- Attachment P, Exhibit 29, 29.1, 29.2

### **6.B. Description and Summary of Documents**

**Exhibits 29, 29.1 and 29.2:** Affidavit of J.R. Wilkinson. See Section 5.B for a description of these exhibits.

**Exhibit 64** is an excerpt from the testimony of Mr. Gary Boyd on July 29, 1996 during proceedings for the Utah District Court in CWWG, et al. v. U.S. Army, et al. (Case No. 96-CV-0425C). Mr. Boyd (of Science Applications International Corporation) was one of the authors of the TOCDF Quantitative Risk Assessment (QRA). Mr. Boyd's testimony was related to the methodology used to conduct the TOCDF QRA specifically, and QRAs in general. [Cited in Item No. 98-1247<sup>9</sup> (pp. 8-9); Item No. 98-1275 (p. 46); and in Item No. 98-1285 (p. 8)]

**Exhibit 65** is a report from the U.S. Department of Health and Human Services (DHHS) Public Health Service Agency for Toxic Substance and Disease Registry titled "Public Health Assessment for US Army Umatilla Depot Activity, dated September, 1997. The Assessment was prepared by the DHHS to "evaluate the possible pathways of exposure to contamination at the former Umatilla Depot Activity" as part of a review of the "Superfund" sites at the Umatilla Depot. [Cited in 98-1285 (p. 9)]

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<sup>9</sup> The following Item Numbers are cited in this section:

- No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (See Attachment A)
- No. 98-1275: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)
- No. 98-1285: "Petitioners' Additional Documentary Evidence," November 10, 1998 (Case No. 9708-06159)

[Note: Exhibit 65 is cited by the Petitioners as "shatter[ing] the myth, still perpetuated by the Army, that the risk of storage is greater than the risk of incineration." Review of Exhibit 65 showed that it was a document prepared solely to address the risks of the various "Operable Units" identified during "Superfund" clean-up work that is ongoing at the Umatilla Chemical Depot. None of the Operable Units involve the chemical weapons storage area, and the document does not address the chemical weapons storage risk at all. No further discussion of Exhibit 65 is provided here.]

### 6.C. Discussion

The Petitioners argue that the Department and the Commission "improperly relied on the [UMCDF Phase 1] QRA to provide substantial evidence regarding the determination that the risk of continued storage was more significant than incineration [because] the QRA cannot provide support for such a conclusion." They cite the testimony of Mr. Boyd and point out that that "QRA provides very limited information which is unsuited for the analyzes [sic] the DEQ/EQC were mandated to perform" [and that] the QRA "fails to consider the following issues: impacts of routine emissions from the stack, chronic exposure risks from emissions, the risks from products of incomplete combustion, the risks from exposure to the by-products of agent degradation, the risks and impacts to wildlife, the risks associated with the use of alternative technologies."

The Petitioners state that "it does not appear from the record that the EQC/DEQ considered the limitations of the QRA." On the contrary, the Phase 1 UMCDF Quantitative Risk Assessment<sup>(Ref. 13)</sup> was considered by both the Department and the Commission to be a significant document in the determination that the risks of storage of the chemical weapons stockpile at the Umatilla Chemical Depot far outweighed the risks posed by the operation of the UMCDF. The Commission heard directly from Mr. Boyd about the QRA on November, 15, 1996,<sup>(Ref. 14)</sup> and understood that the QRA was not intended to assess the public health and environmental risks posed by emissions from UMCDF. Attachment M contains a summary document prepared by SAIC titled "Perspectives on the Umatilla Quantitative Risk Assessment Results."

These same arguments about the QRA were submitted during various proceedings in Utah related to the TOCDF. The USHW Board found in July, 1997 (Attachment S, page S-44) that for "individuals living closest to TOCDF, the risks resulting from continued storage are one hundred times greater than the risks resulting from disposal operations." In March, 1997, the Utah District Court also made similar findings about the TOCDF QRA, stating that "on average, 34 days of continued storage of the stockpile incurs a public risk equal to that associated with the 7.1 years of TOCDF agent operations. If rare events such as earthquakes and aircraft accidents are removed from the assessment, the finding is stronger—the risk to the public from the entirety of TOCDF's operations is equaled by the risks of only 2.3 days of continued storage" (Attachment S, page S-24). The Phase 1 UMCDF QRA came to similar conclusions concerning the risk of storage at Umatilla, stating that "the annual risk to the individuals closest to the facility is about 90 times greater per year for continued storage versus disposal operations" (Attachment M, page M-7).

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The Affidavit of Mr. Wilkinson (Exhibit 29) states that the EQC and DEQ failed to adequately assess the risks of incineration vs. continued storage, and that the EQC and DEQ should have considered reconfiguration of the M-55 rockets to reduce the risks of storage (which would allow additional time to study alternative treatment technologies). In fact, the EQC heard direct testimony on November 22, 1996 about the possibility of "reconfiguration" of munitions, especially rockets.<sup>(Ref. 15)</sup>

An M-55 rocket is constructed as a one-piece unit (approximately six feet long) that contains chemical agent, explosives, and propellants. Unlike some of the other munitions, it is not possible to "separate" the energetic components (i.e., remove a fuze, or some other part containing an explosive), except by shearing the rocket apart.

"Reconfiguration" of the M-55 rockets to reduce storage risks has been considered by the Army only in terms of an action that would be taken in an extreme emergency, such as evidence that there is an imminent danger of auto-ignition. M-55 rockets, especially those filled with the nerve agent GB (sarin), are considered one of the highest risk munitions at Umatilla for several reasons. An M-55 rocket is constructed of aluminum (approximately twice the thickness of a soda can), and after extended storage GB nerve agent begins to corrode the aluminum. GB-filled munitions are the most common source of vapor leaks detected in the Umatilla storage igloos, and GB-filled rockets make up more than half of the total "leaker munitions."

There is considerable concern, and ongoing study, about the effects of GB nerve agent inside a rocket. GB is known to increase the rate of depletion of the stabilizer chemical contained in the rocket propellant. The liquid nerve agent, in time, corrodes the seals between the rocket segments, allowing the chemical agent (in vapor or liquid form) to come into contact with the propellant, which can accelerate the depletion of the stabilizer (hence the concern about "auto-ignition").

Reconfiguration of M-55 rockets would involve removal of the rockets from the igloos, transport of the pallets into an engineering-controlled facility, drainage of the chemical agent, and "disassembly" (by shearing) of the rocket segments. Each movement of any munition, let alone an M-55 rocket, presents inherent risks. Reconfiguration of rockets would involve (1) forklift movement from an igloo stack; (2) forklift movement into a transport container; (3) truck movement of the transport container into a controlled facility; (4) forklift movement out of the transport container; (5) manual movement of each rocket from the pallet to a conveyor; (6) automated movement of the rocket into an explosives containment room; (7) punching the rocket to drain the liquid chemical agent; and (8) shearing the rocket into segments.

Each of the eight transport and disassembly steps just described will also take place during the disposal operations of UMCDF. But during disposal operations, the movement of the rockets is followed immediately by high temperature incineration of both the liquid agent and the rocket segments (including the explosives and propellants), whereas a reconfiguration operation would return the liquid agent and the component parts to storage.

#### **6.D. Department Conclusions**

The Department did not misunderstand, and does not believe that the Commission misunderstood, the purpose, scope, and results of the UMCDF Phase 1 Quantitative Risk Assessment. The risk of catastrophic releases from the chemical weapons stored at the Umatilla Chemical Depot remains far and above the risk of UMCDF operations. The Department believes that the movement of M-55 rockets, most of which have been in storage for at least 40 years, should be kept to an absolute minimum prior to final disposal. The reconfiguration of M-55 rockets should remain an option only for the most dire of emergencies. The information provided by the Petitioners does not provide a basis for unilateral modification or revocation of the UMCDF Hazardous Waste Permit.

### **7. HISTORY AND ISSUES RELATED TO THE TOOELE CHEMICAL AGENT DISPOSAL FACILITY (TOCDF)**

#### **7.A. Applicable Attachments and Exhibits/Comments**

- Attachment A, Exhibit 69 (December, 1998 "Revocation Request")
- Attachment E, Comment C-5 (Comments of G.A.S.P., et al.)
- Attachment G, Comments/Exhibits C-5, C-75, C-76, C-77, C-78
- Attachment N, Exhibits 25, 26, 30, 33, 34, 42, 43, 44.1, 44.2, 47
- Attachment O, Exhibits 31, 32
- Attachment S, Legal rulings related to the Tooele Chemical Agent Disposal Facility
- Attachment U, Additional transcript excerpts from Utah proceedings

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**7.B. Description and Summary of Documents**

**7.B.1 Documents related to chemical agent releases and potential worker exposures at TOCDF**

**Exhibit 25** is an excerpt from the deposition of Mr. Timothy Thomas (TOCDF Project Manager for the U.S. Army Program Manager for Chemical Demilitarization) given on February 5, 1998 during proceedings for the Utah District Court in CWWG, et al. v. U.S. Army, et al. (Case No. 2:96-CV-0425C). Petitioners cite p. 30 of this exhibit as showing that Mr. Thomas "recanted" his testimony about agent releases that was given during the USHW Board hearing in March, 1997 (see also Exhibit 43). [Cited in Item No. **98-1275**<sup>10</sup> (p. 41 and p. 54)] {NOTE: Exhibit 25 did not, in several cases, contain the actual pages cited. Missing transcript excerpts from Exhibit 25 have been included in Attachment U.}

**Exhibit 30** is a one-page excerpt of the deposition of James Cudahy (President of Focus Environmental, Inc., an environmental engineering firm that specializes in the design, permitting and technical evaluation of hazardous waste incineration and other thermal treatment systems) given on February 16, 1998 during proceedings for the Utah District Court in CWWG, et al. v. U.S. Army, et al. (Case No. 2:96-CV-0425C). Mr. Cudahy testified on behalf of the U.S. Department of Justice as an expert witness. [Cited in Item No. **98-1275** (p. 40 and p. 54); Item No. **99-0704** (p. 7)] {NOTE: Mr. Cudahy provided extensive testimony for the Defendants as an expert witness in the field of incinerator design and engineering. During the course of the Utah proceedings he submitted numerous declarations, some of which are included in Attachment U, beginning on page U-47.}

**Exhibit 31** is an Affidavit of Pat Costner (Senior Scientist, Science Unit of Greenpeace International) dated July 27, 1998 stating that Ms. Costner reviewed information concerning the MC-1 bomb incident at TOCDF (see Exhibit 32) and that she believes the incident resulted in a "significant" release of agent out the stack at TOCDF on March 30, 1998. [Cited in Item No. **98-1275** (p. 40 and p. 44); Item No. **98-1247** (p. 5); Item No. **99-0704** (p. 7); and in Item No. **99-2201** (p. 12)]

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<sup>10</sup> The following Item Numbers are cited in this section:

- No. **98-1247**: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (See Attachment A)
- No. **98-1275**: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)
- No. **99-0704**: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)
- No. **99-2201**: "Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF]," December 17, 1999 (See Attachment E)

**Exhibit 32** is a copy of "TOCDF Unusual Occurrence Report: Metal Parts Furnace Feed Rate Exceedance" (dated April 2, 1998) that describes the event that occurred on March 30, 1998, related to insufficient draining of an MC-1 bomb that was subsequently processed through the MPF. [Cited in Item No. **98-1275** (p. 40 and pp. 43-44); Item No. **98-1247** (p. 4); Item No. **99-2201** (p. 12); and in Item No. **99-0704** (p. 7)]

**Exhibits 33 and 34** are excerpts of the deposition of Mr. Richard Holmes given on April 14, 1998 during proceedings for the Utah District Court in CWWG, et al. v. U.S. Army, et al. (Case No. 2:96-CV-0425C). Mr. Holmes was an employee of the Army "Program Manager for Chemical Stockpile Disposal based in Edgewood, Maryland. [Cited in Item No. **98-1275** (pp. 40 and 44); Item No. **98-1275** (p. 44), Item No. **98-1247** (p. 5); and Item No. **99-2201** (p. 12)] {NOTE: Exhibits 33 and 34 did not, in some cases, contain the actual pages cited. Missing transcript excerpts from Exhibits 33 and 34 have been included in Attachment U.}

**Exhibit 42** is an excerpt of the testimony of Deborah Ng (Chemical Engineer with the Utah DEQ's Division of Solid and Hazardous Waste, Chemical Demilitarization Section) during a hearing before the Utah DEQ Solid and Hazardous Waste Control Board on March 19, 1997. The exhibit excerpt focuses on the testimony of Ms. Ng related to agent analysis, although it is testimony given later by Ms. Ng that is cited to support the statement that "ACAMS placed in the TOCDF stack have not been tested to determine their actual effectiveness in drawing in and testing stack gases." [Cited in Item No. **98-1275**, p. 51, line 3.]

**Exhibit 43** is an excerpt of the testimony of Mr. Timothy Thomas (TOCDF Project Manager for the U.S. Army Program Manager for Chemical Demilitarization) given on March 3, 1997 during proceedings for the Utah District Court in CWWG, et al. v. U.S. Army, et al. (Case No. 2:96-CV-0425C). The excerpt focuses on Mr. Thomas' testimony related to the inability of TOCDF to identify the cause of numerous ACAMS alarms at the common stack and the analysis of the waste feed. [Cited in Item No. **98-1275** (p. 56) and in Item No. **99-2201** (p. 12)]

**Exhibit 44.1** includes excerpts from proceedings of the Utah Solid and Hazardous Waste Board hearing held March 18-20, 1997. The excerpts include portions of the examination of Dennis Downs (Manager of the Utah DEQ Division of Solid and Hazardous Waste) related to concrete cracking and leaks into the HVAC carbon filter vestibules); the examination of Scott Anderson (Manager of the Hazardous Waste Branch of the Utah Division of Solid and Hazardous Waste) regarding concrete cracks and professional conduct by HW staff; and the examination of Martin Gray (Manager of the Chemical Demilitarization Section of the Hazardous Waste Branch of the Utah Division of Solid and Hazardous Waste) regarding the HVAC carbon filter vestibule leaks). [Cited in Item No. **98-1275** (pp. 54 and 56)]

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**Exhibit 44.2** includes excerpts from proceedings of the Utah Solid and Hazardous Waste Board hearing held March 18-20, 1997. The excerpts include portions of the examination of Deborah Ng (Chemical Engineer, Utah DEQ) related to risk assessments and the examination of Mr. Donald Smith (Quality Assurance Program Development Coordinator, EG&G) regarding vestibule and concrete leaks. [Cited in Item No. **98-1275** (pp. 38, 54, and 56-57)]

**Exhibit 47** is an excerpt from the testimony of Mr. Timothy Thomas during the Utah Solid and Hazardous Waste Control Board hearing held March 18-20, 1997 that focuses on agent releases and concrete cracks at TOCDF. [Cited in Item No. **98-1275** (p. 54)] {NOTE: Exhibit 47 did not contain all of the actual pages cited. Missing transcript excerpts from Exhibit 47 have been included in Attachment U.}

**Exhibit C-75** is an Affidavit dated December 16, 1999, from Mr. Gary E. Harris, a former employer of EG&G who worked at TOCDF until 1996. Mr. Harris states that he “supervised Environmental Engineers, Permitting Technicians and other technical and non-technical staff” and that he “was involved in preparation of emergency and contingency plans as well as permitting, compliance, and trial burn testing. Mr. Harris’ Affidavit contains 128 separate allegations related to the operation of TOCDF. [Cited in Item No. **99-2201** (pp. 10, 14, and 15)]

The Affidavit submitted as Exhibit C-75 was arranged numerically, but later publication of the Affidavit by the Chemical Weapons Working Group provided the following subject area breakdown:

- Agent Monitoring;
- Emissions/Releases;
- Lessons Learned Program;
- Munitions Storage, Handling & Tracking;
- Permit Modifications;
- Permit Violations;
- Questionable Procedures;
- Risk Assessments;
- System Inadequacies/Failures;
- Trial Burns;
- Waste Characterization, Handling & Tracking; and
- Worker Exposures

**Exhibit C-76** is an internal EG&G (the Army's contractor at the Tooele facility) memorandum dated October 15, 1999, related to the use of the Depot Area Agent Monitoring System (DAAMS). The memorandum was prepared by Messrs. Guello and Burton in response to a request to "explain...the differences in methods used for DAAMS tube analysis" and "how these different methods may have lead to misinterpretation by investigators." The Memorandum concluded that there was a misinterpretation of a DAAMS analytical result that led to an ACAMS result being incorrectly identified as "unconfirmed" during an incident that occurred on June 4, 1999 due to a power outage at TOCDF. The authors of the Memorandum recommend that the report in question be revised, and that "it is advisable to review all reports that used DAAMS data in the decision making process." [Cited in Item No. 99-2201 (pp. 12-13)]

**Exhibit C-77** is a letter dated August 6, 1999 from EG&G's "Deputy General Manager—Risk Management" to the "Administrative Contracting Officer" of the Department of the Army's Industrial Operations Command. The letter transmits a report ("Occurrence Report No. 99-05-26-A1") related to a confirmed agent reading in the Toxic Maintenance Area at the Tooele facility and the exposure of workers to agent. [Cited in Item No. 99-2201 (p. 14)]

#### **7.B.2 Documents related to the analysis of waste feed to the furnaces at TOCDF**

**Exhibit 25** is an excerpt of the deposition of Mr. Timothy Thomas (TOCDF Project Manager for the U.S. Army Program Manager for Chemical Demilitarization) given on February 5, 1998 (see description in Section 8.B.1). The excerpt focuses on testimony related to analysis of chemical agent, especially from ton containers. [Cited in Item No. 98-1275 (p. 47)]

**Exhibit 42** is an excerpt of the testimony of Deborah Ng (Chemical Engineer with the Utah DEQ's Division of Solid and Hazardous Waste, Chemical Demilitarization Section during the course of Hearing before the Utah DEQ Solid and Hazardous Waste Control Board on March 19, 1997. The excerpt focuses on the testimony of Ms. Ng related to agent analysis. [Cited in Item No. 98-1275 (p. 51)]

**Exhibit 43** is an excerpt of the testimony of Mr. Timothy Thomas (TOCDF Project Manager for the U.S. Army Program Manager for Chemical Demilitarization) given on March 3, 1997 during proceedings for the Utah District Court in CWWG, et al. v. U.S. Army, et al. (Case No. 2:96-CV-0425C). The excerpt focuses on Mr. Thomas' testimony related to the inability of TOCDF to identify the cause of numerous ACAMS alarms at the common stack and the analysis of the waste feed. [Cited in Item No. 98-1275 (p. 56) and in Item No. 99-2201 (p. 12)]

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**Exhibit C-78** is a document titled "Issue and Directed Actions with Fact Sheet" related to the "Agent Quantification System Tank Problems Requiring Repeat Draining of Rockets." The Issue paper describes the problems encountered with M-55 rocket lots that contain thickened/gelled agents, and proposed/actual solutions for limiting processing delays due to insufficient rocket drains. [Cited in Item No. 99-2201 (p. 14)]

### **7.B.3 Documents related to TOCDF Trial Burns and Destruction Removal Efficiency**

**Exhibit 26** is the "Affidavit of John Houston Miller" dated June 3, 1996. The origin of this affidavit is not clear, but it is assumed to be a document generated in CWWG v. U.S. Army (Case No. 96-CV-0425C). At the time of this Affidavit, Dr. Miller was a Professor of Chemistry at George Washington University in Washington, D.C. His Affidavit states that the calculated TOCDF destruction removal efficiency will not be valid when chemicals are in low concentrations (below 1000 ppm). [Cited in Item No. 98-1275 (p. 35)]

**Exhibits 33 and 34** are excerpts of the deposition of Mr. Richard Holmes ("group leader for site support" within PMCS D's Operations Team at Edgewood, Maryland) given on April 14-15, 1998 as part of Case No. 2:96-CV-0425C. The excerpt in Exhibit 33 is primarily related to the M-55 rocket processing and the failure of the DFS at TOCDF to pass a TSCA trial burn. [Cited in Item No. 98-1275 (p. 44), Item No. 98-1247 (p. 5); and Item No. 99-2201 (p. 12)] {NOTE: Exhibits 33 and 34 did not, in some cases, contain the actual pages cited. Missing transcript excerpts from Exhibits 33 and 34 have been included in Attachment U.}

**Exhibit C-75** is an Affidavit dated December 16, 1999, from Mr. Gary E. Harris, a former employer of EG&G who worked at TOCDF until 1996. (see description in Section 7.B.1) [Cited in Item No. 99-2201 (pp. 10, 14, and 15)]

**Exhibit C-78** is a document titled "Issue and Directed Actions with Fact Sheet" related to the "Agent Quantification System Tank Problems Requiring Repeat Draining of Rockets." The Issue paper describes the problems encountered with M-55 rocket lots that contain thickened/gelled agents, and proposed/actual solutions for limiting processing delays due to insufficient rocket drains. [Cited in Item No. 99-2201 (p. 14)]

**7.C. Discussion**

**7.C.1 Discussion of Chemical Agent Releases and Potential Worker Exposures at TOCDF**

The "Petitioner's Memorandum Supporting Cross Motion for Summary Judgment and Opposing Respondent's Motion for Summary Judgment" (August 20, 1998; DEQ Item No. 98-1275) contends that the Army's Automatic Chemical Agent Monitoring System (ACAMS) has "not been validated as a stack monitoring device and it is unclear at best whether ACAMS can detect certain agents or agent by-products at sufficient levels of sensitivity." The Petitioners also contend that "TOCDF's stack ACAMS are unreliable and cannot determine in an accurate and timely fashion when chemical warfare agents are being released through the stack," and that it is an "Army myth" that there have been "no confirmed releases of nerve agents from the stack at TOCDF."

The Petitioners also state that because "TOCDF has experienced agent migration or leaks into areas where agent is not supposed to be present," then it is "...clear that the Army is unable to fully control and contain nerve and blister agents." Many of the exhibits cited are related to testimony in various Utah proceedings about concrete cracking (that resulted in a liquid leak of decontamination solution from an upper to a lower area), agent migration into observation corridors (which are not usually expected to experience agent vapor incursions), and incidents of worker exposures (and the Army's definition of "exposure").

Exhibits 42, 43, 44 and 47 are all excerpts of testimony taken before the Utah Solid and Hazardous Waste Control Board (USHW Board) in March, 1997. In their Order dated July 22, 1997 (see Attachment S) the USHW Board reviewed the "Operational Incidents" (see page S-45), which included the liquid leaks through concrete cracks, agent migration into observation corridors and into the Heating, Ventilation, and Air Conditioning (HVAC) vestibules, worker exposures, and agent emissions in the stack gases. The USHW Board stated that they "[found] no evidence sufficient to justify revocation or termination of the Army and EG&G's permit on these grounds." The USHW Board went on to state (page S-46) that:

"21. During the shakedown period three events occurred that caused Respondents to immediately shut down operations: detection of low levels of agent in two filter unit containment vestibules, leakage of a small quantity of decontamination fluid passing through hairline cracks in a second level cement floor to a first floor electrical room, and minor agent migration into an observation corridor. Two of the incidents involved trace amounts of chemical agent migrating to unintended areas. None resulted in harm to TOCDF personnel, the public or the environment. Descriptions of the events and corrective actions taken in response to each event have been adequately explained to the Board and Executive Secretary, and were adequately addressed by the Army and EG&G.



"22. With regard to the other incidents described in paragraph 19 above, the Board finds that: adequate backup generators are in place at TOCDF, and there has never been an occasion when the backup power system failed to operate upon loss of power; the fire suppression system test and temporary HVAC imbalance was properly responded to and TOCDF personnel have received corrective training; the agent quantification system anomaly has been corrected; hot cut out procedures are a normal part of facility operations, and appropriate workers are equipped with protective equipment; and stack effluent gases are appropriately monitored by ACAMS and DAAMS system and the agent readings in the ACAMS TREND reports were challenges to the monitoring equipment and not releases of agent."

The ruling of the U.S. District Court of Utah in March, 1997 also contains extensive discussion of many of these issues (Attachment S, beginning on page S-17). The Court concluded that:

"The overall record of operations at TOCDF does not support plaintiffs' claim. Although there have been problems at the facility, some of which required the suspension of operations, none of the events caused harm to TOCDF personnel, the public, or the environment. There is no evidence that human injury or environmental harm is inevitable or likely. In fact, the record suggests that TOCDF's safety equipment and procedures are effective in preventing such harms." (see page S-26, paragraph 3)

Exhibits 25, 30, 33, and 34 are all excerpts of depositions taken during more recent proceedings of the Utah District Court, most related in one form or another to the possibility that there have been agent releases from the TOCDF. The incident related to the processing of an undrained bomb (the subject of Exhibits 31 and 32) is discussed extensively in the April 14, 2000 ruling of the Utah District Court (see pp. S-72 through S-76). The Department believes that the incident described in Exhibit C-77 (related to a "hot cut-out" of workers) was also reviewed as part of the recent Utah District Court proceedings. The Utah District Court issued its "Findings of Fact and Conclusions of Law" on April 14, 2000 (Attachment S) and concluded that (pp. S-89 and S-90):

"...the evidence presented at trial was not sufficient to establish the following:

- i. that chemical agent has been released into the environment outside TOCDF;
- ii. that any TOCDF personnel or visitors have been injured through exposure to chemical agent;
- iii. that the safety practices of TOCDF violate the terms of the TOCDF permits;
- iv. that the gelling of agent in rockets and defendants' proposal to the State of Utah to incinerate rockets containing more than a 5% heel is in violation of defendants' permits or poses a threat to health and the environment;
- v. that the low pH factor of some of the chemical agents and defendants' means of incinerating it violates defendants' permits or poses a threat to health and the environment;
- vi. that defendants have failed to properly categorize agent waste; and
- vii. that defendants have failed to comply with the terms and requirements of their permits from the State of Utah.

Exhibits C-75, the Affidavit from Mr. Gary Harris, contains numerous allegations about questionable procedures and operations occurring at TOCDF, and at the Chemical Agent Munitions Disposal System (CAMDS). Mr. Harris was deposed during proceedings currently underway before the USHW Board (Sierra Club, Chemical Weapons Working Group, and Vietnam Veterans of America Foundation's "Third Request for Agency Action"). Mr. Harris was withdrawn as a witness in the USHW Board proceedings (due to health reasons), before the completion of the deposition. The Department has received and reviewed copies of the transcripts of from Mr. Harris' depositions taken on November 22 and 23, 1999 and February 2-5, 2000.<sup>(Ref. 16, 17)</sup> The vast majority of Mr. Harris' allegations are specific to the CAMDS and/or the TOCDF facility. The Utah DEQ and the USHW Board are investigating the allegations.

Exhibit C-76, an internal EG&G (the Army's contractor that operates TOCDF) memorandum contains a description of the procedures used to "confirm" an agent detection reading by the Automatic Continuous Agent Monitoring System (ACAMS). The memorandum states that there was at least one incident where there should have been a confirmation of an agent detection, but because of a "misinterpretation" of the data from the Depot Area Agent Monitoring System (DAAMS), the agent reading of the ACAMS was not confirmed. The memorandum recommends that all previous incidents involving confirmation of an ACAMS reading with a DAAMS analysis be reviewed to assess whether the correct confirmation procedure was used. It is the Department's understanding that this review is taking place and that the results will be made available in May.

### **7.C.2. Discussion of the analysis of waste feed to the furnaces at TOCDF**

The "Petitioner's Memorandum Supporting Cross Motion for Summary Judgment and Opposing Respondent's Motion for Summary Judgment" (August 20, 1998; DEQ Item No. 98-1275) contends that the Department has not "...address[ed] significant problems assessing what is in the munitions that will be incinerated" and that "chemical warfare agents contained in the stockpiled munitions may have a substantial amount of degradation by-products." The comments submitted by the Petitioners (Attachment E, page E-15) cite Exhibit C-78 as an indication that "the Army has been aware of the gelling/solidification problem for some time and recognizes that the condition of the agents in the munitions effects [sic] the waste analysis."

Exhibits 42 and 43 contain excerpts of testimony taken before the Utah Solid and Hazardous Waste Control Board (USHW Board) in March, 1997. Exhibit 25 is an excerpt of testimony taken during the recent proceedings of the Utah District Court. Exhibit C-78 ("Issue and Directed Actions with Fact Sheet" related to the "Agent Quantification System Tank Problems Requiring Repeat Draining of Rockets") describes the problems encountered with M-55 rocket lots that contain thickened/gelled agents.

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Neither the USHW Board (see excerpt of the Board Order in Section 7.B.1) nor the Utah District Court found the evidence compelling enough to merit modification or revocation of the TOCDF permit. The Utah District Court's "Findings of Fact and Conclusions of Law" issued on April 14, 2000 discusses waste characterization (paragraph 6, pp. S-78 and S-79), and the issue with agent gelling (paragraph 7.e. on page S-81) and concluded that the evidence was not sufficient to establish that the process used to incinerate rockets containing gelled agent and chemical agent with a low pH factor poses a threat to health and the environment, or that the TOCDF has failed to properly categorize agent waste (see items iv., v., and vi., listed in Section 7.B.1 above.)

### **7.C.3 Discussion of TOCDF Trial Burns and Destruction Removal Efficiency**

The "Petitioner's Memorandum Supporting Cross Motion for Summary Judgment and Opposing Respondent's Motion for Summary Judgment" (August 20, 1998; DEQ Item No. **98-1275**) contends that the Deactivation Furnace System (DFS) is incapable of meeting the Destruction Removal Efficiency (DRE) requirements, especially for the emissions of Polychlorinated Biphenols (PCBs). The Petitioners cite the failure of the DFS to meet the requirements of the Toxic Substances and Control Act (TSCA) during a trial burn in 1997.

The Department was aware that the DFS TSCA trial burn in 1997 was unsuccessful in demonstrating the required DRE for PCBs during one of the three test runs conducted. Subsequent investigations (by the EPA, the Utah DEQ, and the Permittees) revealed that a particular type of gasket being used in the furnace system was contributing to PCB contamination. The gaskets were replaced, and the subsequent TSCA trial burn was completed successfully. The TOCDF DFS is now permitted to process rockets (which contain PCBs in the packing material). The same type of testing will be required for the DFS at UMCDF prior to full operations.

Exhibit 26 is an affidavit that states that the required "six nines" DRE (that is, 99.9999% destruction of the chemical agent) cannot be demonstrated when the waste being fed contains very low levels (below 1000 ppm) of chemical agent. This information was considered by the Utah District Court in 1996, including the review of Dr. Miller's affidavit by Mr. James Cudahy disputing the allegation that a 99.9999% DRE cannot be achieved at low organic concentrations (see the declaration of James Cudahy in Attachment U, page U-57). The Utah District Court found in August, 1996, that "plaintiffs have not shown a likelihood of success on the merits of their claim that there is an existing or threatened future violation of TSCA." (see Attachment S, p. S-11, paragraph 16.) The Utah District Court affirmed that opinion in the April, 2000 ruling, concluding that "the DFS will meet the 6-9s DRE" (see page S-84).

Exhibit C-78 discusses the Agent Quantification System (AQS) and the problems encountered with draining munitions that contain thickened or gelled agent. The Issue Paper states that rocket lots known to be susceptible to problems with gelled agent were purposely not used during agent trial burns to avoid any delays during actual testing. The Petitioners cite Exhibit C-78 (Attachment E, page E-15) to support the Petitioners' contention that the "the Army was able to manipulate the trial burn process at TOCDF in order to avoid being tested in ways that might result in failure." This included "avoid[ing] testing actual conditions that are repeatedly experienced during operations" such as rejecting containers with solidified agent and sawing ton containers in half before processing.

The trial burn plans, and the subsequent trial burn results at TOCDF have been extensively reviewed by incineration experts (see the declarations of James Cudahy contained in Attachment U, beginning on page U-47), regulatory agencies (including the Utah DEQ and the U.S. EPA), federal courts, and oversight agencies, including the Centers for Disease Control (see Attachment K, page K-73) and the National Research Council (NRC). The NRC recently prepared an "Update on National Research Council Recommendations" related to TOCDF (included as Attachment O). The report contains extensive review of the trial burns conducted at TOCDF (see "Trial Burns," beginning on page O-33).

#### **7.D. Department Conclusions**

Most of the evidence submitted in support of the revocation request currently under consideration by the Oregon Environmental Quality Commission (including the material submitted to the Multnomah County Circuit Court during *G.A.S.P., et al., v. EQC, et al.*) has already been extensively reviewed by similar bodies in Utah (subject to discovery, depositions, testimony, and cross examination). In the most recent "Findings of Fact and Conclusions of Law" issued on April 14, the Utah District Court concluded that (page S-90):

"Although there have been problems in the operation of TOCDF, there was no evidence that TOCDF personnel, the public, or the environment have been harmed by these operations. Further, the evidence at trial indicated that when an operational incident occurred, defendants took steps to improve procedures and implement additional safety measures to prevent similar incidents from occurring. There was no evidence at trial that chemical agent has ever been released from the common stack into the environment and the evidence demonstrated that the release of non-agent emissions from the common stack have been, and continue to be, well within regulatory guidelines."

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The Department concurs with the findings of the Utah District Court and the USHW Board that operations at TOCDF do not pose a threat to either public health or the environment. The Department does not believe that UMCDF poses such a threat either. This does not imply that the Department ignores the operational experience being acquired at TOCDF that is applicable to the operation of UMCDF. The Department receives an extensive amount of information about the operations of both TOCDF and JACADS from a variety of sources, and acts on that information when appropriate.

For example, the tendency of concrete to settle and eventually crack is a well-known phenomenon. However, the consequences of a crack in a sidewalk or a driveway are clearly not the same as a crack in a concrete floor at a hazardous waste processing facility, as highlighted by the liquid leak at TOCDF. The Department has taken a very aggressive stance with the Permittees at UMCDF to ensure that concrete cracking at UMCDF would not result in a hazardous waste migration or release to the environment.

The Department has required the Permittees to develop and institute a concrete crack mitigation program, and issued a Notice of Noncompliance when the Permittees failed to repair a crack promptly, as required by the program. The Department has also required extensive "flood-testing" of elevated slabs during construction to ensure that any cracks are identified and promptly repaired. Department inspectors were present at many of these flood tests to make sure they were conducted in accordance with the approved methods. There is also an ongoing inspection requirement to insure that the integrity of floor coatings is maintained throughout operations.

All UMCDF trial burn plans will be submitted as Class 2 Permit Modification Requests, which require a public comment period. Both the "Surrogate" and "Agent" Trial Burn Plans will be made available to the public for review and comment. One of the many items that the Department will be looking for in Trial Burn Plans is whether the proposed test plan reflects expected operational conditions. The Army is conducting a study on which agent lots processed so far have contained a high percentage of gelled or thickened agents, and is providing that information to the Department and to the Umatilla Chemical Depot. This will allow both the Department and the UMCDF to estimate how many munitions at Umatilla might contain gelled agents, and to plan accordingly.

The Department shares the Petitioners' concerns about whether the methodology used by the Army to "confirm" chemical agent readings has been correctly applied. However, the Department notes that although there have been numerous ACAMS alarms at TOCDF, the NRC believes that most, if not all, were "false positives" (of alarms that occurred between August 1996, and October, 1998). The NRC has recommended that the Army work to improve the reliability and accuracy of agent detection systems, and notes in their 1999 report (see pp. O-44 through O-47) that the Army is investigating new technologies for the real-time detection of chemical agent.

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The Department concludes that the information provided by the Petitioners related to the history of operations at TOCDF does not provide a basis for unilateral modification or revocation of the UMCDF Hazardous Waste Permit.

## 8. TREATMENT OF SECONDARY WASTES

### 8.A. Applicable Attachments and Exhibits/Comments

- Attachment A, Exhibit 69 (December, 1998 "Revocation Request")
- Attachment E, Comment C-5
- Attachment G, Exhibit/Comments C-5, C-75
- Attachment N, Exhibits 23, 24, 25, 26, 33, 49, 59
- Attachment P, Exhibit 29
- Attachment Q, Exhibits 60, 61, 62
- Attachment U, Additional transcript excerpts from Utah proceedings
- Attachment V, Documents related to the Dunnage incinerator

### 8.B. Description and Summary of Documents<sup>11</sup>

**Exhibits 23 and 24** are excerpts from the testimony of Mr. John Cluff on July 17-18, 1996 during proceedings for the Utah District Court in CWWG, et al. v. U.S. Army, et al. (Case No. 96-CV-0425C). Petitioners use John Cluff's testimony (pp. 45-49 of this transcript) to support the contention that the BRA is not being operated at TOCDF due to "mechanical problems" and that the Army decided not to burn the Demilitarization Protective Ensemble (DPE) suits in the Dunnage incinerator (DUN) because of concern over the incineration by-products from the suit material. At the time of this deposition, John Cluff was the "Assistant Project Manager for

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<sup>11</sup> The following Item Numbers are cited in this section:

- No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (See Attachment A)
- No. 98-1275: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)
- No. 98-1285: "Petitioners' Additional Documentary Evidence," November 10, 1998 (Case No. 9708-06159)
- No. 99-0704: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)
- No. 99-2201: "Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF]," December 17, 1999 (See Attachment E)

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Systemization and Operations” working for the U.S. Army’s Program Manager for Chemical Demilitarization (PMCD) field office at TOCDF. [Cited in Item No. 98-1275 (pp. 32 and 34)]

**Exhibit 25** is an excerpt from the deposition of Mr. Timothy Thomas (TOCDF Project Manager for the U.S. Army Program Manager for Chemical Demilitarization) given on February 5, 1998 during proceedings for the Utah District Court in CWWG, et al. v. U.S. Army, et al. (Case No. 2:96-CV-0425C). [Cited in Item No. 98-1275 (p. 33)] {NOTE: Exhibit 25 did not, in several cases, contain the actual pages cited. Missing transcript excerpts from Exhibit 25 have been included in Attachment U. See page U-39 for the transcript excerpt related to the use of the DUN.}

**Exhibits 29, 29.1 and 29.2:** Affidavit of J.R. Wilkinson. See Section 5.B for a description of these exhibits.

**Exhibits 33 and 34** are excerpts of the deposition of Mr. Richard Holmes given on April 14, 1998 during proceedings for the Utah District Court in CWWG, et al. v. U.S. Army, et al. (Case No. 2:96-CV-0425C). At the time of this deposition Mr. Holmes was an employee of the Army’s “Program Manager for Chemical Stockpile Disposal” based in Edgewood, Maryland. The Petitioners cite Mr. Holmes’ deposition related to the Army’s intention to use the DUN and what types of wastes were to be fed to the DUN. [Cited in Item No. 98-1275 (p. 33)]

**Exhibits 49 and 59** include an excerpt from the deposition of Robert Bruce Perry dated July 16, 1996 taken during proceedings for the Utah District Court in CWWG, et al. v. U.S. Army, et al. (Case No. 96-CV-0425C). (Exhibits 49 and 59 are duplicates.) The excerpt is primarily related to the use of the DUN at TOCDF. Mr. Perry identifies himself as the Chief of the Risk Management Quality Assurance Office with PMCD. [Cited in Item No. 98-1247 (p. 8); Item No. 98-1285 (p. 7); Item No. 99-2201 (p. 10)]

**Exhibit 60** is an “Information Paper” regarding dioxin emissions from the DUN prepared by LTC John Ontiveros dated May 21, 1996. The Information Paper discusses the causes of dioxin formation and test results from the DUN operation at JACADS that indicate the DUN will be the greatest source of dioxin emissions at the demilitarization facilities. [Cited in Item No. 98-1247 (p. 8); Item No. 98-1285 (p. 7), and Item No. 99-0704 (p. 13)]

**Exhibit 61** is an EG&G memorandum dated July 28, 1998 discussing the discontinuing of BRA operations at the at the Tooele Facility and inviting affected employees to apply for other available positions at TOCDF. [Cited in Item No. 98-1247 (p. 8); Item No. 98-1285 (p. 7), and Item No. 99-0704 (p. 13)]

**Exhibit 62** is a table titled "TOCDF Hazardous Waste Off-Site Disposal Activities"(undated, but appears to have been faxed by the Utah DEQ in June, 1998.). The Petitioners have described this as a Table prepared by the Utah Division of Solid and Hazardous Waste that is a compilation of data (from 8/96 through 3/98) that shows the enormous off-site waste disposal needs of the Tooele Facility. [Cited in DEQ Item No. **98-1247** (p. 8); Item No. **98-1275** (p. 35); Item No. **98-1285** (p. 7), and Item No. **99-0704** (p. 13)]

**Exhibit C-75** is an Affidavit from Mr. Gary E. Harris, a former employer of EG&G who worked at TOCDF until 1996. See Section 7.B.1 for a description of this exhibit (The Affidavit submitted as Exhibit C-75 was arranged numerically. [Cited in Item No. **99-2201** (pp. 10, 14, and 15)]

### **8.C. Discussion**

The processing of the chemical weapons stockpile at the Umatilla Chemical Depot will produce a wide variety of what is referred to as "secondary wastes." The Waste Analysis Plan in the UMCDF Hazardous Waste Storage and Treatment Permit (HW Permit)<sup>(Ref. 18)</sup> lists the wastes expected to be generated during operations of UMCDF, and describes the analysis required for each waste prior to final disposal. The Waste Analysis Plan (WAP) describes the physical and chemical analyses the UMCDF will perform before hazardous wastes are stored, treated, or transported off-site. The current WAP retains the DUN as a treatment unit, and lists the wastes that were intended for the DUN.

There are other wastes, such as DPE suits, for which there is no currently identified treatment technology. (The DPE suits were removed as a DUN waste stream prior to the issuance of the UMCDF draft HW Permit in 1996.) Some of the wastes without approved treatment technologies were wastes that were identified through operations at JACADS and TOCDF and were subsequently added to the UMCDF waste streams. The Department expects that the Permittees will submit a Permit Modification Request seeking approval to modify the HW Permit to allow many of those wastes to be treated in existing (permitted) units, such as the Deactivation Furnace System (DFS) or the Metal Parts Furnace (MPF).

The Petitioners contend that the Brine Reduction Area (used to de-water the brines produced from the Pollution Abatement Systems) is not "viable," and will not be operated at UMCDF. The Department does not dispute that the Brine Reduction Area (BRA) is not currently being used at TOCDF and that the Utah DEQ has approved the off-site shipment of liquid brines for treatment at a commercial facility. The Department believes that the BRA can function effectively as a treatment unit to de-water brines, and will require that brines be treated prior to shipment off-site. Many of the problems experienced at TOCDF with the BRA were related to the performance of



the BRA Pollution Abatement System, which are correctable through conditioning of the gases to remove moisture prior to the baghouse, and through the use of different filter media for the bags used in the baghouse.

The HW Permit contains extensive requirements for the operations of the BRA (Module V), to include certification by an independent engineer to attest to the structural integrity and the suitability of the BRA to handle hazardous wastes, and the successful completion of Performance Tests. Each batch of brine must be analyzed for the presence of chemical agent prior to processing, and only brines that are agent-free may be processed. Regardless, the Department is still requiring that the emissions from the BRA stack be monitored for chemical agent, the same as any of the other stacks at UMCDF.

The Department has always acknowledged, and planned for, the need to ship wastes such as ash, slag, brine salts, and scrap metal off-site after treatment at UMCDF. The Permittees are required to meet stringent requirements for analyzing and characterizing the wastes, and off-site shipments must be sent only to approved disposal facilities. The Department monitors the activities at TOCDF quite closely, and has been aware for some time that the DUN and the BRA are not in use at TOCDF, nor does it appear that the Army intends to put either into operation at TOCDF any time soon.

This does not necessarily mean that the Army will, or can, make those same decisions for UMCDF. The Department has been quite clear to the Army that the BRA must be operated to insure that no liquid wastes will be sent off-site. The table in Exhibit 63 that lists off-site waste shipments from TOCDF illustrates a concern that is shared by the Department, and we believe by the public at large. The Department notes that 91% of the approximately 45 million pounds of wastes listed on this table consists of spent decontamination solution and liquid brines. These liquid wastes will be treated on-site at UMCDF (spent decontamination solution will be injected into the secondary combustion chambers of the liquid incinerators and brines will be treated in the BRA).

The Army informed the Department in August, 1998 that the DUN for UMCDF was being put on "hold," pending evaluation of other treatment technologies for wastes originally destined for the DUN.<sup>(Ref. 19)</sup> The Army gave a presentation to the Commission in August, 1999<sup>(Ref. 6)</sup> and proposed that the Commission allow the Army to proceed with a Permit Modification Request to insert a "Compliance Schedule" into the UMCDF HW Permit that would require the Army to meet milestone dates in their development of alternate secondary waste treatment technologies. The main reason given by the Army was one of economics. The Army representatives stated that although the DUN could process secondary waste, the throughput capability was limited and it was very expensive to operate. The Army representatives stated their belief that with modifications to the design they could improve the throughput rate and the reliability of the DUN system, but because of cost and schedule issues they preferred to evaluate other possible technologies.

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The Commission responded to the August presentation with a letter <sup>(Ref.20)</sup> to the Assistant Secretary of the Army and the Program Manager for Chemical Demilitarization expressing the Commission's concern about the information presented in August (see Attachment Q, page Q-3). The Commission wrote:

"The UMCDF hazardous waste permit that the Commission approved in 1997 permitted five treatment units for all [*emphasis in original*] waste stored at the Umatilla Chemical Depot, to include the wastes generated by any activities (past, present, or future) related to the storage, treatment, or disposal of the chemical weapons stockpile. The Dunnage incinerator was the treatment unit designated for secondary wastes. The Army has now come before the Commission, almost three years later and with 60% of the facility constructed, and informed us that the Dunnage incinerator is 'too expensive' and has 'throughput' problems."

The Commission's letter went on to state that:

"The Commission learned from the Army that the existing permitted DUN must be modified to improve processing throughput and efficacy. We believe the Army should move forward immediately with implementing improvements to the design of the Dunnage incinerator and any permit modifications should be approved by the Department prior to the start of hazardous waste operations. This approach will provide a degree of assurance for the Commission that the Army is committed to implementing a technology at Umatilla that is capable of processing the agent contaminated secondary wastes."

The Army's response<sup>(Ref. 21)</sup> to the Commission's letter states that "we are beginning the effort to design the specific changes to the Dunnage Incinerator which are necessary to improve its performance" (page Q-5). The Department is expecting a Class 3 Permit Modification Request related to the Dunnage incinerator to be submitted in August, 2000.

At the August, 1999 meeting the Army also proposed that the Department participate in an "Integrated Product Team" (IPT) that the Army was forming to address the secondary waste issues at UMCDF. The IPT has met seven times since October, 1999. Through the IPT process, and in meetings held as follow-up to the August, 1999 presentation to the Commission, the Department has become aware of numerous documents prepared by the Army or its contractors related to secondary waste treatment. These documents include various studies that have been conducted during the research and development of alternate secondary waste treatment technologies (such as the "Carbon Micronization System" for spent charcoal and the "Thermal Destruction System" for DPE suits), and studies and reports related to possible design modifications to the Dunnage Incinerator to improve its capacity and its performance.

Most of these documents were received between October 1999 and April 1, 2000, and the Department has not yet completed review of the contents of all of the documents. Attachment V contains a list of documents currently under review that are specifically related to the design of the Dunnage Incinerator.

**8.D. Department Conclusions**

The Department and the Commission share the public's concern that secondary wastes generated from the operation of UMCDF, and wastes generated over the years at the Umatilla Chemical Depot, not become "legacy wastes" for Oregonians to deal with for years to come. The Department, the Commission, and the Governor's office have consistently held the position that all agent-related wastes at the Umatilla Chemical Depot must be treated at UMCDF and/or shown to be free of chemical agent before shipment to any permitted off-site disposal facility.

The Department is anticipating further Permit Modification Requests related to both the Brine Reduction Area and the Dunnage Incinerator, both of which will include opportunity for further public comment. Therefore, the Department has concluded that the information submitted by the Petitioners related to the treatment of secondary wastes at UMCDF does not provide a basis for unilateral modification or revocation of the UMCDF Hazardous Waste Permit.

**9. EMERGENCY PREPAREDNESS AND THE SEPTEMBER, 1999 INDUSTRIAL EXPOSURE INCIDENT AT UMCDF**

**9.A. Applicable Attachments and Exhibits/Comments**

- Attachment E, Comment C-5
- Attachment F, Comment C-3
- Attachment W, Report on the September 15, 1999 Industrial Accident at UMCDF

**9.B. Description and Summary of Documents**

(No specific exhibits related to this subject area were submitted. See discussion of Comments below in Section 9.C.)

**9.C. Discussion**

On September 15, 1999 numerous workers located in the Munitions Demilitarization Building (MDB) at UMCDF experienced sudden breathing difficulties and had to evacuate the building. Thirty-four workers were ultimately transported to the Good Shepherd Community Hospital in Hermiston for treatment of symptoms including breathing difficulty, throat irritations, and nausea. Five employees were admitted to the hospital for observation. The source and nature of the

*BE*

contamination that affected the workers on September 15 remains unknown, although there is no evidence that any chemical warfare agents were involved.<sup>(Ref. 22)</sup>

The emergency response activities of Raytheon Demilitarization Company and the Umatilla Chemical Depot to the incident on September 15 have been highly criticized by the public and by state and federal agencies. Oral comments at the November 19, 1999 meeting of the Environmental Quality Commission<sup>(Ref. 2)</sup> and written comments received during the public comment period (Attachment E) expressed the public's concern over the handling of the September 15 incident at UMCDF.

The Governor's office established an investigation team consisting of the Oregon Department of Environmental Quality, Oregon Emergency Management, Oregon Occupational Safety and Health Administration, and the Oregon Health Division ("Agency Team"). On April 20, 2000, the Agency Team released its report on the September 15 incident (Reference 22, included here as Attachment W).

The Agency Team Report states (p. W-3):

"The Agency Team concurs with the Army and Raytheon findings that there is sufficient evidence to indicate that this was not a chemical event (for reasons so stated in their reports). However, the Team has identified failures in the following areas:

- Site Evacuation and Medical Evacuation
- Communication between the On-Post and Off-Post Emergency Response Communities, medical facilities and the public
- Communication between the Army, Raytheon and the employees"

The Agency Team essentially concurred with the concerns of the Commenters, and states that (p. W-3, W-4):

"The Agency Team has determined that the response actions by RDC were inadequate and seriously jeopardized the health and welfare of employees. An area of particular concern is how and when the decision was reached and by whom, that this incident was not caused by a chemical agent release. The timing and accuracy of this decision was crucial for all subsequent response actions. We remain unclear how the decision was reached. It is problematic that the UMCD and RDC did not implement the Chemical Accident/Incident Response Action (CAIRA) Plan until such time that monitoring of the storage igloos confirmed that a release of chemical agent did not occur. The results of chemical agent monitoring were not available for three hours following the incident."

The Oregon Clearinghouse for Pollution Reduction (OCPR) included in its comments (Attachment F, p. F-2) a copy of an abstract from a report titled "Air Quality Dispersion Modeling in Complex Terrain Near the Umatilla Chemical Agent Disposal Facility, Hermiston, Oregon," by Dr. Halstead Harrison of the University of Washington. A full copy of Dr. Harrison's report was received on January 11, 2000.<sup>(Ref. 23)</sup> Dr. Harrison performed air dispersion modeling of emissions from UMCDF using a dispersion model of his own design ("WPUFF") and found that the model "suggest[ed] infrequent plume 'hits' in the neighboring communities...but at concentrations several hundred fold higher than annual averages."

The Department's Air Quality Division (Technical Services) conducted a review of his results (but not of the actual model) and concluded that "his conclusions do not reveal any new relationships between near and far-source impacts, nor between short and long-term averaging time impacts."<sup>(Ref. 24)</sup> Because the WPUFF model appeared to be more suited for assessing short-term impacts in real-time, such as that needed for guiding emergency response activities during release events, the Department requested a technical review of Dr. Harrison's report by Innovative Emergency Management, Inc. (IEM), a firm with extensive experience in the modeling of accidental releases.<sup>(Ref. 25)</sup>

IEM had significant concerns about the ability of the WPUFF model to produce valid results due to a variety of errors. A copy of both the Department's and IEM's review have been transmitted to Dr. Harrison.

#### **9.D. Department Conclusions**

The Department concurs with the Commenters that there were significant failures in responding to the incident on September 15, 1999. It is the Department's understanding that most of the recommendations in the Agency Team Report have already been acted upon by Raytheon and the Umatilla Chemical Depot. Although this incident did not involve any chemical agents, the response of the Permittees in caring for injured workers and informing the off-post communities was inadequate and unacceptable. However, the Department believes that the new procedures in place will insure a better response in the event of any similar incidents. The Department has concluded that the actions of the Permittees related to the September 15, 1999 incident do not provide a basis for unilateral modification or revocation of the UMCDF HW Permit.

Upon review of the dispersion modeling report submitted by the OCPR, the Department has concluded that, even if the errors identified by IEM are corrected, the WPUFF model is not applicable to the type of modeling conducted by the Department to assess chronic health risks. The report by Dr. Harrison does not provide a basis for unilateral modification or revocation of the UMCDF HW Permit.

### **Conclusions**

The Department has reviewed all of the Exhibits submitted during the legal proceedings for G.A.S.P., et al., v. Environmental Quality Commission, et al. (Case No. 9708-06159), the various arguments presented in the motions and oral arguments during the case, the written and oral comments of the Petitioners received during two public comment periods, and all other public comments received. The Department has concluded that the information reviewed does not meet the criteria established in either 40 CFR 270.41 or 40 CFR 270.43 for cause to unilaterally modify or terminate the UMCDF HW Permit.

### **Intended Future Actions**

The Department will complete its review of the documents related to the Dunnage incinerator (listed in Attachment V) prior to review of the Class 3 Permit Modification Request related to the Dunnage incinerator (expected to be received in August, 2000).

### **Department Recommendation**

The Department recommends that the Commission deny the Request for Revocation dated December 14, 1998 from G.A.S.P., et al..

**Attachments** *See Table 2 on pages 7 and 8 for a list of Attachments.*

### **Reference Documents (available upon request)**

1. *"Minutes of the Two Hundred and Eightieth Meeting of the Environmental Quality Commission, November 18-19, 1999,"* Environmental Quality Commission (DEQ Item No. 99-2276).
2. *"Transcript of Proceedings, Public Comment on a Request to Revoke the Umatilla Chemical Weapons Depot Permits,"* before the Environmental Quality Commission, November 19, 1999 (DEQ Item No. 00-0181).
3. *"Transmittal of comments received during the Umatilla Chemical Agent Disposal Facility (UMCDF) 'Request for Revocation' Comment Period,"* Memorandum from the Department of Environmental Quality (Hermiston office) to the Environmental Quality Commission, January 25, 2000 (DEQ Item No. 00-0129).

4. *"Transmittal of documentation related to the 'Request for Revocation' of the Umatilla permits,"* Memorandum from the Department of Environmental Quality (Hermiston office) to the Environmental Quality Commission, November 3, 1999 (DEQ Item No. 99-1882).
5. *"Documentation Related to Case No. 9708-06159," G.A.S.P., et al., v. Environmental Quality Commission, et al.,"* Volumes I and II, August, 1997 to June, 1999 (DEQ Item No. 99-1877).
6. *"Minutes of the Two Hundred and Seventy-Eighth Meeting of the Environmental Quality Commission, August 18, 1999,"* Environmental Quality Commission (DEQ Item No. 99-2145).
7. *"Carbon Filter System Pollution Abatement System (PFS) at the Umatilla Chemical Agent Disposal Facility (UMCDF),"* Staff Report dated November 1, 1999 related to Agenda Item G, EQC Meeting, November 18-19, 1999 (DEQ Item No. 99-1815).
8. *"Pre-Trial Burn Risk Assessment for the Proposed Umatilla Chemical Demilitarization Facility,"* prepared by Ecology and Environment, Inc., for the Oregon Department of Environmental Quality, February, 1997 (DEQ Item Nos. 2377 & 2388).
9. *"Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities,"* Peer Review Draft, U.S. Environmental Protection Agency, July, 1998 (EPA 530-D-98-001A, B & C).
10. *"Background Document on Gulf War-Related Research,"* by the Syracuse Research Corporation for U.S. Department of Health and Human Services Centers for Disease Control and Prevention, February, 1999 (See Attachment K to this Staff Report).
11. *"Management Actions Needed to Answer Basic Research Questions,"* Government Accounting Office, January, 2000 (See Attachment K to this Staff Report).
12. *"Findings and Conclusions of the Commission and Order,"* In the Matter of the Application of the United States Army for a Permit to Construct and Operate a Chemical Weapons Demilitarization Facility at the Umatilla Chemical Depot, February 10, 1997.
13. *"Umatilla Chemical Agent Disposal Facility Phase 1 Quantitative Risk Assessment,"* Science Applications International Corporation, 1996 (DEQ Item No. 1830).
14. *"Transcript of Proceedings,"* Meeting of the Environmental Quality Commission, November 15, 1996 (DEQ Item No. 2887)
15. *"Transcript of Proceedings,"* Meeting of the Environmental Quality Commission, November 22, 1996 (DEQ Item No. 2351)
16. *"Transcript of the Deposition of Gary Harris,"* In the Matter of the Tooele Chemical Agent Disposal Facility's Permit and Permit Modifications, before the State of Utah Solid and Hazardous Waste Control Board, Volumes 1-2, November 22-23, 1999 (DEQ Item Nos. 00-0376 and 00-0377).
17. *"Transcript of the Deposition of Gary Harris,"* In the Matter of the Tooele Chemical Agent Disposal Facility's Permit and Permit Modifications, before the State of Utah Solid and Hazardous Waste Control Board, Volumes 3-6, February 2-5, 2000 (DEQ Item Nos. 00-0378, 0379, 0380, 0381).

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18. *"Permit for the Storage and Treatment of Hazardous Waste,"* Umatilla Chemical Agent Disposal Facility, Permit No. ORQ 000 009 431, February, 1997 (as modified) (DEQ Item No. 98-1455).
19. *"Decision Being Pursued to Remove the Dunnage Incinerator (DUN) from the UMCDF Scope,"* Letter from the U.S. Army Program Manager for Chemical Demilitarization to the Oregon Department of Environmental Quality, August 18, 1998 (DEQ Item No. 98-0584).
20. *"Follow-up to August 18, 1999 Environmental Quality Commission Meeting,"* Letter from the Chair of the Environmental Quality Commission to the Assistant Secretary of the Army and the U.S. Army Program Manager for Chemical Demilitarization, September 24, 1999 (DEQ Item No. 99-1640). (See Attachment Q to this Staff Report.)
21. Letter from the U.S. Army Program Manager for Chemical Demilitarization to the Chair of the Environmental Quality Commission (response to EQC letter of September 24, 1999), December 17, 1999 (DEQ Item No. 99-2272) (See Attachment Q to this Staff Report.)
22. *"A Report on the September 15, 1999 Industrial Accident at the Umatilla Chemical Agent Disposal Facility,"* by Oregon Department of Environmental Quality, Oregon Emergency Management, Oregon Occupational Safety and Health Administration, and the Oregon Health Division, April 20, 2000. (DEQ Item No. 00-0582) (See Attachment W to this Staff Report)
23. *"Air Quality Dispersion Modeling in Complex Terrain near the Umatilla Chemical Agent Disposal Facility,"* Dr. Halstead Harrison, University of Washington, January, 2000. (DEQ Item No. 00-0119)
24. *"'WPUFF' modeling report submitted by Dr. Halstead Harrison,"* Memorandum from Wayne C. Thomas to Langdon Marsh, Department of Environmental Quality, January 24, 2000. (DEQ Item No. 00-0010)
25. *"Technical Review of 'Air Quality Dispersion Modeling in Complex Terrain near the Umatilla Chemical Agent Disposal Facility'"* Innovative Emergency Management, Inc., March 20, 2000. (DEQ Item No. 00-0391)

Approved:

Section: \_\_\_\_\_

Division: \_\_\_\_\_

Report Prepared By: Sue Oliver

Phone: (541) 567-8297, Ext. 26

Date Prepared: April 20, 2000

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## ATTACHMENT A

*"Request for Contested Case Hearing and Other Relief"*  
(DEQ Item No. 98-1247)

Letter from Stuart A. Sugarman and Richard E. Condit  
Attorneys at Law  
(on behalf of G.A.S.P., et al.)

*to*

Members of the Environmental Quality Commission  
and  
Director, Department of Environmental Quality

December 14, 1998

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98-1247

**STUART A. SUGARMAN**  
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14 December 1998

**HAND DELIVERED**

Carol Whipple, Chair  
Melinda Eden  
Linda McMahan  
Mark Reeve  
Tony Van Vliet  
EQC Commissioners

Langdon Marsh  
Director, DEQ  
6th Floor  
811 SW 6th  
Portland, OR 97204

Re: Request for Contested Case Hearing and Other Relief

Dear Commission members and Director Marsh:

We write on behalf of G.A.S.P., Sierra Club, Oregon Wildlife Federation, Karyn Jones, Susan Jones, Heather Billy, Deborah Burns, Janice H. Lohman, Leandra Phillips, Merle C. Jones, Cindy Beatty, Andrea E. Stine, Dorothy Irish, Mary Bloom, Robert J. Palzer, Janet Nagy, Ladonna King, John Spomer, Christine Clark, Stuart Dick, Gail Horning, David Burns, Pius A. Horning, Karla Stuck, and Melanie Beltane, regarding the proposed Umatilla Chemical Demilitarization Facility (UMCDF). As you know, the Multnomah County Circuit Court issued a decision on 6 December 1998 remanding this matter to the EQC/DEQ. Your task is now to have a hearing to evaluate the use of Pollution Abatement System (PAS) carbon filters and to decide whether they are a critical component (as most of the commission stated earlier) or merely an "extra safety precaution" as was claimed in circuit court. See Opinion and Order on Cross Motions for Summary Judgment (ORDER) at 17 - 18, 27. In the process, you obviously need to consider our clients' evidence regarding the fitness of incineration as a disposal technology and the character and competence of the Army to ensure proper operation of the facility.

Our clients (Petitioners before the Court) urge the EQC and/or DEQ to implement a contested case process in order to provide balance and fairness in a process that has been tilted

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heavily in favor of proponents of incineration. There can be little fairness in a process that has critically important factual and technical questions at issue when neither the Commission nor other interested parties have the opportunity to hear witnesses testify under oath. Moreover, it is essential that all parties be permitted, through a reasonably administered adversarial process, to test the credibility and reliability of the statements and documents offered in support of each parties' position. Meaningful public participation is mandated by federal law. See 42 U.S.C. §§ 6926, 6974. Our clients are not afraid to submit to such scrutiny, nor should those who are interested in finding the truth be afraid to present their material in such a format. Too much is at risk in this type of decision to do otherwise.

With this thought of fairness firmly in mind, our clients urge the Environmental Quality Commission (EQC) and Department of Environmental Quality (DEQ) to reveal the truth and have the courage to stand up to the Army (and its ever shifting rhetoric and claims) and reach a new decision concerning UMCDF. As you know, the truth is that the EQC relied on the installation and operation of PAS carbon filters to provide the public health and environmental protection necessary given the emissions expected from normal operations of the Army's incineration technology and the history of serious malfunctions.

EQC members know that they told the public in private as well as public meetings that they could not support the Army's incineration technology without PAS carbon filter protections in place. For example, former EQC Chairperson Lorenzen stated:

The combination of incinerators as designed with the carbon filters, in my opinion, clearly point to best available technology that can destroy these weapons in a timely manner and do it in a safe manner that will not harm the residents in this area, both me, my children and my children's children that hopefully will live on our family farm in generations to come. For that reason, I will also support the permit application by the Army . . . So with that lengthy discussion, I think we have, we now have a general consensus of where we're going to be coming out . . .

Statement of Henry Lorenzen at EQC meeting rendering permit decision, 22 November 1996. AR 2351 (CD 3B, Folder 12B, p.35). No Commission member expressed disagreement. Commission Chair Lorenzen continued to stress the vital importance of PAS carbon filters.

Well, I'll start, Lang, and I'll tell you the one thing I want to make certain is included in here in language as explicit as possible, that at least from my perspective, and I hope from the remainder of the Commission's perspective with regard to the discussion, **but from my perspective, the conclusion that this is best available technology is absolutely hinged upon the inclusion of activated carbon filters on the output of the incinerators**, and that if that, if for any reason in the future it appears that that is not feasible and practical, that then we need to, the Commission needs to start this process all over again, and to take a very hard look at the prospect of alternate technology. And included in that would not only be technology for destruction of the weapons systems itself, but also for the destruction of mustard agent. **That I would like to make certain that that**

**foundation is very explicitly built within the finding on best available technology.**

AR 2351 (CD 3B, Folder 12B, p.37) (emphasis added). Chairperson Lorenzen went a step further and spoke on behalf of all commission members when, at the EQC hearing on Motion for Reconsideration on 5 June 1997, when he responded to Petitioners' counsel's suggestion the Army would attempt to circumvent the PAS carbon filter requirement when seeking the EQC's permit to operate the facility:

I think this Commission could not be clearer in its requirement that those carbon filters be on there and that they function properly, that if they're not, this permit is not going to go forward and they're not going to operate this facility . . . [carbon filters are] the very foundation for the approval of this particular permit . . . [and if they're] not going to be able to put those things on there and make them operate, this facility is not going to operate.

CD4B, Folder DEQ1, AR 2889, p. 4. The Commission apparently agreed with its chair's statements. Counsel responded "I'm glad you're stating that and I saw some heads nodding on the Commission and I sincerely hope that's the Commission's policy when the time comes." Id. See also Chair Lorenzen's statements at the EQC's 7 February 1997 hearing concerning permit conditions,

the Commission did strengthen the language relating to carbon filters and . . . the conclusion of best available technology is specifically dependent upon the utilization of carbon filters on the exhaust of each of the incinerators. . . [M]y **conclusion that this is the best available technology is specifically dependent upon the additional protection that will be provided by these filters . . . they are an integral part of this permit and that if there is a substantial request for modification to these filter systems, in my mind, it would then open the permit again for a thorough reevaluation of best available technology.**

Id. at 14. Commissioner Tony Van Vliet also stated on the record that he found the PAS carbon filters crucial to his decision to grant the permit when he said ". . . it looked to me as if the safety factor that was built in on this with the carbon filters and everything . . . helped me make my decision." AR 2351 (CD 3B, Folder 12B, p.29).

No Commission member expressed disagreement with the Commissioner's statement. Judge Marcus, however, opined that the EQC's findings were not explicit enough to reflect the Commissioners' reliance on PAS carbon filters. ORDER at 27.

We, and the public, now call upon the EQC to demonstrate that its members keep their commitments to the public, by re-opening the record and considering again (in light of our clients extensive new evidence on the carbon filter issue) whether to choose the Army's proposed incineration system over other alternatives. The EQC was misled about the Army's ability to utilize a PAS carbon filter technology and the toxicity of the chemical warfare (CW) agents

currently stored at Umatilla and elsewhere. In addition, evidence now available demonstrates that the Commissioners were misinformed about several other important issues, including the fact that a reference dose (RfD) for the non-cancer impacts of dioxin does exist and is used by EPA. In support of the referenced issues and other matters our clients wish to raise, we offer the documents listed below for your initial consideration, or in the case of documents already in the administrative record, your re-consideration. In order to limit possible confusion, we will reference the documents being offered in the same manner as was done before the Circuit Court.

**Petitioners' Exhibits 27, 28, and 29.** Affidavits of Lisa Brenner and Tom Stibolt, Tryge Steen, and J.R. Wilkinson. These affidavits describe the failings of the previous EQC/DEQ process. In particular these affidavits support Petitioners' well founded concerns that the EQC/DEQ failed to: (i) thoroughly and properly assess the impacts of the Army's proposed incineration facility; (ii) fully evaluate alternative technologies; (iii) consider impacts of incineration on sensitive populations (i.e., children, elderly, persons with illness); (iv) assess the current environmental burdens of the area; and (v) compare the risks of storage, storage after reconfiguration, alternative technologies and incineration.

As a public entity, the EQC, its members, and the DEQ have an obligation to protect public health and the environment to the maximum extent possible by ensuring that the disposal process chosen would not have a major adverse effect. When this type of critical new information arises, it is critical that matters be reevaluated. Thus, the DEQ/EQC are obliged to determine if the Army's incineration system would cause a major adverse effect on public health or the environment. See Exhibit 27, Affidavit of Lisa Brenner and Tom Stibolt, Attachments A - C; Exhibit 28, Affidavit of Tryge Steen; Exhibit 29, Affidavit of J.R. Wilkinson at ¶¶ 8 - 16. The EQC/DEQ must ensure that new hearings address this central question.

Another of the many features of this new evidence are exhibits, which Petitioners intend to submit, concerning what has come to be known as the MC1 Bomb Incident at the Tooele, Utah facility. A summary of the specifics of that incident are described below. It is important to note that incidents like this one demonstrate why the current incineration technology is unsafe and not the best available technology (BAT).

On March 30, 1998, an Army contractor at TOCDF knowingly overfed nerve agent GB (sarin) into the metal parts furnace (MPF) in one or more MC-1 bombs that had not been adequately drained, causing the MPF to automatically shutdown due to extreme overheating resulting from the high BTU value of the overfed agent. U.S. Army, Unusual Occurrence Report, Metal parts Furnace Feed Rate Excellence, March 30, 1998.

Approximately 80 pounds of agent GB were fed into the MPF, approximately seven times the allowable limit under the Utah DEQ hazardous waste permit (the permit allows a 5% heel for MC-1s containing 220 pounds of agent before draining). *Id.*

With the burners off in the primary and secondary combustion chambers of the MPF, poor combustion conditions resulted, as indicated by very high carbon monoxide readings, with agent still in the furnace. *Id.* An agent monitor (ACAMS) in the duct alarmed at the maximum value

(higher than five hundred and eleven (511) times the allowable stack concentration (ASC) for agent GB). The stack monitors approximately 100 feet down stream did not alarm. \*\* Id. The Army admits these facts but claims no agent GB escaped the stack. However, the Army cannot identify the chemical that admittedly did escape the stack nor can the Army (or EG&G) identify the toxicity of this unknown compound that was released. Exhibit 34, page 12, Chemical Weapons Working Group v. U.S. Army, Case No. 2:96CV0425C, U.S. District Court District of Utah, Deposition testimony of Richard Holmes at 248, 258.

The Army denial that agent GB was released from the stack when GB was overfed to the furnace causing a shutdown resulting in an immediate agent alarm in the duct leading to the stack, and poor combustion conditions with agent in the furnace, is simply not credible, particularly given the inability to identify a non-agent chemical causing the alarm. There is a high probability that a large amount of agent GB was released into the environment during this incident and that the alarms failed to detect the release. Exhibit 31, Affidavit of Pat Costner dated July 27, 1998.

**Exhibit 50.** Excerpts from the National Research Council's "Review of Acute Human-Toxicity Estimates for Selected Chemical Warfare Agents" (NRC Toxicity Review). Petitioners offer this document to establish that the EQC was misled concerning a critical aspect of the permitting process (i.e., the likely toxicity of CW agents). Such information is critical to assessing the best available technology (BAT), and establishing emissions standards/limits, as well as determining appropriate emergency procedures. The EQC has not reviewed and considered this information. The NRC Toxicity Report states in part:

The U.S. Army's Chemical Defense Equipment Process Action Team (CDEPAT) recently conducted an extensive review of the scientific basis for toxicity estimates in use by the Army for several chemical-warfare (CW) agents: GA, GB, GD, GF, VX, and HD. Following a detailed analysis of the toxicity of these agents and using contemporary methods of analysis, **CDEPAT concluded that many of the human-toxicity estimates in use would not protect the soldier adequately (CDEPAT 1994). Recalculations of the potencies of several of the CW agents are greater than previously determined. As a result, lower exposure levels of CW are expected to elicit adverse effects.**

NRC Toxicity Review at 17 (emphasis added). Thus, the Army has known that the toxicity data concerning the referenced CW agents was incorrect since as early as 1994. Two years before this permit was issued. Yet, the NRC Toxicity Report was not issued until December 1997, and only became publicly known sometime after that date.

The report also makes the following statement regarding individual sensitivity to CW agents:

The U.S. Army's original purpose for developing human-toxicity estimates for CW agents was to enable it to predict the number of casualties that would occur during an offensive action in which the goal was to kill or incapacitate a certain fraction of

the enemy forces (for example, killing or incapacitating a minimum of 50% of the least-sensitive (most-resistant) individuals). Such an approach would actually result in more than half of the exposed individuals dying (the "bonus effect"), because **a certain percentage of those exposed would be expected to be more susceptible than the least-sensitive individual.**

NRC Toxicity Report at 1 (emphasis added). Thus, the sensitivity of individuals to nerve agent is a critically important factor when considering accidents and emissions involving CW agents. The EQC/DEQ did not complete such an analysis. Consequently, its actions approving the permit for the Umatilla Chemical Demilitarization Facility (UMCDF) must be rejected as inconsistent with the statute (ORS 466.010(1)(b)(A), 466.055(5)) and as not being supported by substantial evidence.

**Exhibit 51.** "Long-term Health Effects Associated with Sub-clinical Exposures to GB and Mustard - A Review Conducted by the Environment Committee Armed Forces Epidemiological Board (July 18, 1996)." This document responds in part to the EQC's/DEQ's position in court that the effects of low-level impacts from agents were addressed in an addendum to the risk assessment. See AR 2377 (CD1, Folder 10B, Addendum p. 5.) This statement is misleading as the term "addressed" suggests the issue was considered substantively. This is not the case. The Addendum states that "[a]t the time the PreRA [pre-trial burn risk assessment] was conducted, additional data on Gulf War veterans was not available." *Id.* This statement ignores information that was available through the Army.

**There are no "No Observable Effects Levels" (NOELS) established with any degree of confidence for any of the chemical agents.** These NOELS would be useful for answering questions related to DESERT STORM, but also for establishing workplace and general population exposure limits for demilitarization efforts. Exhibit 51 at 6 (emphasis added).

This means that exposure to low-levels of agent should be assumed to have some adverse effect. Yet, neither the EQC/DEQ nor their contractor took this into consideration when evaluating BAT, emissions, and accidents involving chemical warfare agents.

**Exhibit 52.** "Gulf War Veterans Illnesses: VA, DOD Continue to Resist Strong Evidence Linking Toxic Causes to Chronic Health Effects" by the Committee on Government Reform and Oversight. This report from a committee of the U.S. Congress provides further rebuttal to the EQC's/DEQ's arguments in court, and supports Petitioners' contention that low-levels (i.e., non-lethal concentrations) of agents must be fully evaluated for potential long term impacts. The report specifically states as part of its findings that "[e]xposures to low levels of chemical warfare agents and other toxins can cause delayed, chronic health effects." Exhibit 52, Findings in Brief # 11-(p. 6). The information and conclusions of the report establish that the Petitioners were correct to be concerned about low-level agent impacts and demonstrates that the Agencies and their contractor clearly erred when they refused to fully assess this issue.



**Exhibit 53.** "Chemical Weapons: DOD Does Not Have a Strategy to Address Low-Level Exposures" by the U.S. General Accounting Office (GAO) (September 1998). This report notes that "[p]ast research indicates that low-level exposures to some chemical warfare agents may result in adverse short-term performance and long-term health effects." Exhibit 53, GAO Report at 3. This confirms Petitioners' earlier analysis that the Army has information indicating that low-level impacts were critical to evaluate. It is uncertain whether the Army provided and the EQC/DEQ evaluated the "[p]ast research" referred to by the GAO.

**Exhibit 54.** Excerpts from the "Toxicological Profile for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin" (ATSDR June 1989). Much like the concerns regarding the toxicity and low-level impact of chemical warfare agents, in court, the EQC/DEQ also attempted to downplay the concerns raised by Petitioners and others about the dioxin that will be created at UMCDF and emitted into the environment. Specifically, the Agencies argued that Petitioners' claim that there is a reference dose (RfD) used to assess the non-cancer impacts of dioxin is incorrect. Both the U.S. Environmental Protection Agency (EPA) and the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) utilize a 1 pg/kg/day reference dose for dioxin. Exhibit 54 at 93 - 94.

**Exhibit 55.** Excerpts from "Drinking Water Criteria Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin" (EPA Preliminary Draft March 1985). This document provides further support that the Agencies erred in failing to consider the 1 pg/kg/day non-cancer standard in the absence of any "new" standard adopted by EPA or the Agencies.

**Exhibit 56.** Excerpts from "Final Times Beach Risk Assessment Volume I" (EPA March 28, 1995). This document provides yet additional support for the need to use, at a minimum, a 1 pg/kg/day reference dose when assessing non-cancer impacts from dioxin - an action not taken by the Agencies. Table 5-2 establishes that EPA currently uses a non-cancer reference dose for reproductive impacts of dioxin. The Table also notes that "[r]eproductive toxicity is one of several potential adverse human effects the chronic [sic] oral RfD is applicable." Exhibit 56, Table 5-2 n. c.

**Exhibit 57.** Excerpts from "Review of Systemization of the Tooele Chemical Agent Disposal Facility" (NRC March 1996). This report notes the NRC's recommendation for further study of carbon filters. Exhibit 57 at 26 - 27. This means that there was significant doubt about whether carbon filters could be utilized.

**Exhibit 58.** Excerpts from DOD's "Interim Status Assessment for the Chemical Demilitarization Program" (DOD April 15, 1996). In this report the DOD concludes that "the addition of the PFS [carbon filters] may not contribute to any measurable reduction in risk and may actually be the source of new risk to both workers and to the public." Exhibit 58 at 4-7. The DOD indicates that an evaluation (i.e., "screening risk evaluation") will be conducted as a first step in addressing the risks associated with carbon filters. This assessment has not been completed to date.

Note that Exhibit 57 and 58 were published before the EQC approved the permit. Moreover, Dr. Iisa did not refer to or discuss in her testimony or brief report the fact that the Army was undertaking a risk analysis regarding the possible use of carbon filters. Dr. Iisa's report does not cite these reports. Either Dr. Iisa ignored this information or it was withheld. In either case, the fact that the Army had not even completed its own assessment on the use of carbon filters means the EQC's decision to rely on carbon filters for a BAT analysis was not supported by substantial evidence.

**Exhibit 59.** Excerpts from the Deposition of Robert Bruce Perry dated July 16, 1996. At the time of the deposition, Mr. Perry was a high level official in the Army's chemical weapons disposal program. Regarding the use of the dunnage incinerator (DUN) at the Tooele facility Mr. Perry testified: "I did not review the DUN for readiness because we are not going to use it." Exhibit 59, Perry Deposition (Depo.) at 231. Mr. Perry confirmed that there were concerns about the DUN and that it would not be used "initially." Id.

**Exhibit 60.** "Information Paper" regarding dioxin emissions from the DUN, dated May 21, 1996. This document appears to have been prepared by LTC John Ontiveros. The paper reflects the Army's concern about dioxin emissions from the DUN and discusses eliminating the DUN. The reason it appears the Army did not inform the EQC/DEQ that it wanted to drop the DUN from the proposed incineration system was "in order to prevent another 3+ year permit application review and approval process." Exhibit 60 at 2.

**Exhibit 61.** EG&G Memo regarding discontinuing operation of the brine reduction area (BRA) at the Tooele facility, dated July 28, 1998. This memo confirms the decision to stop operating the BRA. It is highly unlikely the BRA will be operated at UMCDF.

**Exhibit 62.** Table prepared by the Utah Division of Solid and Hazardous Waste compiling data concerning the enormous off-site waste disposal needs of the Tooele facility. The data cover the period August 1996 through March 1998. During that period over 45 million pounds of hazardous waste was disposed of off-site. Such off-site waste disposal needs were not considered in the risk assessment or by the EQC/DEQ in its BAT determination.

**Exhibit 63.** Excerpts from "Pilot Testing of Neutralization/Biotreatment of Mustard Agent at Aberdeen Proving Ground, Maryland – Final Environmental Impact Statement" (Army/PMCD July 1998). This document confirms the Army's decision to implement the use of neutralization / biotreatment for bulk stored mustard agent (HD). Almost seventy percent of the HD stored at Umatilla is in bulk storage and could be disposed of using this technology. Note that the Army's discussion of potential impacts reveals "[n]o adverse human health impacts are expected from exposure to atmospheric emissions ..." Exhibit 63, Table 2.8 at 2-24.

**Exhibit 64.** Excerpts from the testimony of Army expert Gary Boyd, dated July 29, 1996. Mr. Boyd had a substantial role in the preparation of the quantitative risk assessment (QRA) for the Tooele facility. During cross examination Mr. Boyd described the limits of a QRA. The EQC/DEQ in the instant case improperly relied on the QRA to provide substantial evidence regarding the determination that the risk of continued storage was more significant than

incineration. The QRA cannot provide support for such a conclusion. Mr. Boyd's testimony reveals that the QRA fails to consider the following issues:

- Impacts of routine emissions from the stack
- Chronic exposure risks from emissions
- The risks from products of incomplete combustion (PICs)
- The risks from exposure to the by-products of agent degradation
- The risks and impacts to wildlife
- The risks associated with the use of alternative technologies

Exhibit 64 at 931 - 932, 937 - 938. It does not appear from the record that the EQC/DEQ considered the limitations of the QRA.

Petitioners will soon offer, for the first time, Steven W. Jones v. EG&G Defense Materials, Inc., ARB Case No. 97-129 (Final Decision and Order of the U.S. Department of Labor dated September 29, 1996). In this decision the Department of Labor determined that the Army's contractor at the Tooele facility illegally fired former Safety Manager Steven W. Jones. The Department concluded: "EG&G demonstrated indifference to the steps taken by Jones, as Safety Manager, to ensure compliance with environmental safety and regulations." Exhibit 65 at 25. Thus, the Army's contractor was found to have violated the federal Resource Conservation and Recovery Act and the Clean Air Act. For its part, the Army refused to provide witnesses during the adjudicatory process. Moreover, the Army has failed to dismiss or discipline EG&G for these serious violations of law. On November 24<sup>th</sup> the Department decided to reconsider the case. However, such reconsideration will not change the finding that Mr. Jones was illegally fired.

Our clients intend to offer additional evidence, including expert testimony, regarding the issues raised herein when the EQC/DEQ advises us of the process they will employ to fully and fairly evaluate this information. As noted previously, we anticipate the Commissioners and Department providing contested case hearings. Our clients urge that new hearings be commenced within forty-five (45) days of your receipt of this letter.

In order to be prudent and sensitive to the issues raised herein, the EQC/DEQ should order the Army and its contractors to cease construction of incinerator specific components only. Because the Army's incineration technology is in significant doubt, no further taxpayer dollars should be spent on an incineration system. Our clients want to encourage prompt action concerning the deadly chemicals stored in Umatilla, but not at the expense of human health and appropriate environmental protection.

Finally, to sum up, our clients request the following actions by the EQC/DEQ:

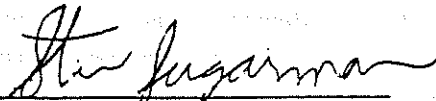
- (1) Provide a contested case hearing on the issues raised by the Court, our clients, and/or other parties or concerned citizens within forty-five (45) days of receipt of this letter;

(2) Acknowledge that the Army's proposed incineration technology is inadequate without additional protection from a PAS carbon filter system, and that such a system is unproven, untested, and cannot be utilized at UMCDF. Similarly acknowledge that the incineration system offered by the Army will not be deployed at Umatilla because the Army's dunnage incinerator and brine reduction area simply do not work. The failings of the PAS carbon filters, dunnage incinerator, and brine reduction area must be fully contemplated by the EQC/DEQ

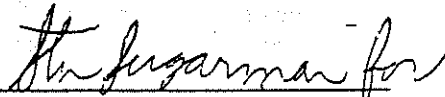
(3) Fully consider the information offered by our clients today in light of the EQC's and DEQ's obligations to ensure no "major adverse impact" and that UMCDF will employ the best available technology.

We appreciate the full and prompt attention of the EQC to the matters discussed herein. We look forward to resolving these issues in a full and fair public process.

Respectfully Submitted,



Stuart Sugarman, OSB #92137



Richard E. Condit, Attorney  
2525 Arapahoe Ave., Suite E4-309  
Boulder, CO. 80302  
303-444-1188 ext. 219

Counsel for G.A.S.P., Sierra Club, and OWF et al.

SAS:ss

Enclosures

cc: Henry Lorenzen, past EQC Chair (w/enclosures)  
Steve Bushong (w/enclosures)

## ATTACHMENT B

*"Request for Contested Case Hearing"*  
(DEQ Item No. 99-0264)

Letter from Langdon Marsh  
Director, Department of Environmental Quality  
*to*  
Stuart A. Sugarman and Richard E. Condit  
Attorneys at Law

February 4, 1999

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# Oregon

John A. Kitzhaber, M.D., Governor

Department of Environmental Quality

811 SW Sixth Avenue

Portland, OR 97204-1390

(503) 229-5696

TDD (503) 229-6993

February 4, 1999

Stuart A. Sugarman  
3430 S.E. Belmont St. Suite 101  
Portland OR 97214

Richard E. Condit  
2525 Arapahoe Avenue, Suite E4-309  
Boulder CO 80302

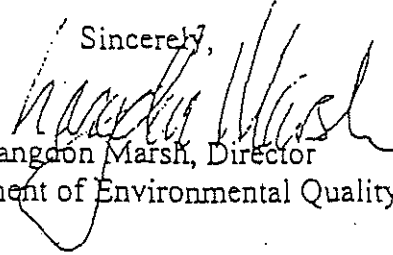
RE: Umatilla Army Depot  
Request for Contested Case Hearing

Dear Mr. Sugarman and Mr. Condit:

This letter is in response to your letter dated December 14, 1998 requesting the Environmental Quality Commission to schedule a contested case process evidence regarding the permit.

The Commission will be considering a revised order at its March 19, 1999 meeting. Prior to that time, the Commission will be accepting written comments on the revisions to the order. You should receive the public notice within the next few weeks. As such, we are denying your request for a contested case hearing on this matter.

Sincerely,

  
Langdon Marsh, Director  
Department of Environmental Quality

cc: Sue Oliver, Hermiston DEQ  
EQC Members

EQC Meeting May 18, 2000  
Attachment B, Page B-1

Oregon



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# ATTACHMENT C

(DEQ Item No. 99-1344)

*"Authority to Modify Hazardous Waste Facility Permits"*

Memorandum from Larry H. Edelman  
Oregon Department of Justice  
*to*  
Carol Whipple, Chair  
Environmental Quality Commission

August 4, 1999

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DEPARTMENT OF JUSTICE  
GENERAL COUNSEL DIVISION

**COPY**

MEMORANDUM

STATE OF OREGON  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
RECEIVED

AUG 09 1999

DATE: August 4, 1999

TO: Carol A. Whipple, Chair  
Environmental Quality Commission

HERMISTON OFFICE

FROM: Larry H. Edelman, Assistant Attorney General  
Natural Resources Section

SUBJECT: Authority to Modify Hazardous Waste Facility Permits

This memorandum is to provide guidance regarding the legal bases for modification, revocation, and/or termination of a hazardous waste treatment facility permit issued pursuant to applicable federal and state regulations. The issue is addressed in the context of the Umatilla Chemical Agent Disposal Facility permit and the Environmental Quality Commission's authority to modify that permit if it were to find new evidence or changed circumstances.

This memorandum addresses only bases for unilateral permit modification, not modifications at the request of the permittee.<sup>1</sup>

Criteria for Permit Modifications

The criteria for unilateral modification of a hazardous waste facility permit are set forth at 40 CFR 270.41 which is incorporated in pertinent part by reference at OAR 340-100-0002, 340-105-0041 and Division 106. Causes for unilateral modification of a hazardous waste treatment facility permit include:

1. Material and substantial alterations or additions to the permitted facility or activity occurring after permit issuance. *See* 40 CFR 270.41(a)(1);
2. New information which was not available at the time of permit issuance and would have justified different permit conditions. *See* 40 CFR 270.41(a)(2);
3. New statutory, regulatory, or judicially mandated standards. *See* 40 CFR 270.41(a)(3);

EQC Meeting May 18, 2000  
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<sup>1</sup> Modifications at the request of the permittee are governed by 40 CFR 270.42.

4. "Acts of God" or uncontrollable circumstances warranting revised compliance schedules. See 40 CFR 270.4(a)(4).

Causes for unilateral modification, revocation and reissuance include:

1. Cause exists for permit termination under 40 CFR 270.43 (grounds for termination in turn include noncompliance with any permit condition, failure by the permittee to disclose all relevant facts in the application or misrepresentation of relevant facts at any time, or a determination that the permitted activity endangers human health or the environment);
2. The permit issuing authority has received notification of a proposed permit transfer.

The hazardous waste facility permit issued to the Army and Raytheon references in paragraph I.C.1 the regulatory bases for modification, revocation or termination described above. Paragraph I.C.2 of the Umatilla permit additionally references applicable state law at ORS 466.170 regarding Commission authority to revoke the permit on a finding of violation of the statute, rules, or a material condition of the permit.

Paragraph I.C.3 references ORS 466.200 which provides authority to the Department to halt operations under the permit if there is reasonable cause to believe there is a clear and immediate danger to the public health, welfare or safety or to the environment from continued facility operation.

Finally, paragraph I.C.4 of the permit provides for reopening of the permit if Congress or the President makes substantial changes in the Chemical Weapons Demilitarization Program or in CSSEP.

#### Initiation of Permit Modification, Revocation, Termination

Hazardous waste facility permits may be modified, revoked, reissued, or terminated either at the request of any interested person (including the permittee) or upon the initiative of the permitting body. 40 CFR 124.5. All requests must be in writing and must contain facts or reasons supporting the request. In the case of the Umatilla permit, the Commission is the permit issuing body and would, therefore, be the entity authorized to make unilateral permit modifications. Revocation or termination proceedings would most likely be conducted as contested cases governed by the Administrative Procedures Act.

If the Commission denies a request for modification, revocation, or termination it must send the requester a brief, written response giving a reason for the decision. Denials are not subject to public notice, hearing, or comment. OAR 340-106-0005. Denials by the Commission are subject to judicial review under ORS 183.480 as orders in other than a contested case. OAR 340-106-0005(1)(c).

Procedure for Modification

The procedure for unilateral permit modifications by the Commission is not precisely specified in the statutes or rules. Preparation of a modified draft permit is required. 40 CFR 270.41. The procedures for public notice, comment and public hearing then become applicable. 40 CFR 124.10; 124.11; 124.12. The most logical procedure would appear to be for the Commission to direct the Department to prepare a modified draft permit which would be processed similarly to a new or reissued permit, i.e. noticed for public comment and hearing. 40 CFR 124.12(a)(3) incorporated by reference in OAR 340-100-002 as modified by Division 106. As with permit issuance, the Commission would then have the option of providing for contested case review of the modified permit by the permittee and/or interested persons.

LHE/GEN26561



# ATTACHMENT D

Transmittal Memoranda and Table of Contents  
From  
"Documentation Related to Case No. 9708-06159,  
G.A.S.P., et al., v. Environmental Quality Commission, et al."

August, 1997 to June, 1999

Volumes 1 and 2

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# Oregon

John A. Kitzhaber, M.D., Governor

Department of Environmental Quality  
Eastern Region  
Hermiston Office  
256 E Hurlburt  
Hermiston, OR 97838  
Phone: (541) 567-8297  
FAX: (541) 567-4741  
TTY: (503) 229-6993

State of Oregon

Department of Environmental Quality

Memorandum

DEQ Item No. 99-1882 (600.01)

DATE: November 3, 1999

TO: Melinda Eden  
Tony Van Vliet  
Linda McMahon  
Mark Reeve  
Harvey Bennett

Langdon Marsh  
Larry Edelman  
Stephen Bushong

FROM: Sue Oliver *SO*  
DEQ, Hermiston

SUBJECT: Transmittal of Documentation Related to the "Request for Revocation" of the Umatilla permits.

Enclosed for your information are Volumes I and II of "Documentation Related to Case No. 9708-06159." These two volumes include copies of various legal filings, and all 74 Exhibits that were submitted by the Petitioners during the proceedings related to Case No. 9708-06159. The public comment period on the revocation request was opened on October 18, 1999 and is scheduled to close on December 17, 1999. The Petitioners have been given one hour to present oral comments (on November 19) related to the Exhibits. The Department is reviewing each of the Exhibits and will present the review at a later meeting (we anticipate that this will be on the EQC's February meeting agenda).

For your information, I have also included a list of legal filings and significant events and correspondence during the course of the legal proceedings related to this case. Not every document on the list was included in the two-volume set of documentation.

If you have any questions please contact me at 541-567-8297, ext. 26.

Enclosures:

Volumes I and II of "Documentation Related to Case No. 9708-06159"  
"List of legal filings, hearings, and significant correspondence" (DEQ Item No. 99-1881)

EQC Meeting May 18, 2000  
Attachment D, Page D-1

Oregon



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LIST OF LEGAL FILINGS, HEARINGS, AND SIGNIFICANT CORRESPONDENCE  
 GASP, ET AL. v. EQC AND DEQ  
 UMATILLA PERMITS  
 MULTNOMAH COUNTY CIRCUIT COURT CASE NO. 9708-06159

Documents that are shaded were included in the 2-volume set labeled "Documentation Related to Case No. 9708-06159" that was assembled for the public comment period (October 18, 1999 through December 17, 1999)

DATE	TITLE OF DOCUMENT	DEQ ITEM NO.
8-22-97	Petition for Review	98-1264
9-25-97	Respondent's Motion for Designation as Complex Case	98-1263
9-29-97	Respondent's ORCP 21E Motions to Strike	98-1262
10-8-97	U.S. Army's Unopposed Motion to Intervene	98-1260
10-9-97	Petitioner's First Request for Admissions	98-1257
10-9-97	Petitioner's First Request for Production of Documents	98-1258
10-17-97	Petitioner's ORCP 23 Motion for Leave to Amend Petition and Response to Respondent's ORCP 21 Motions	98-1253
10-30-97	Answer of Intervenor	98-1249
11-6-97	Respondent's Answer to Petition for Review	98-1250
4-13-98	Respondent's Memorandum in Support of Motion for Summary Judgment	98-1423
8-20-98	Petitioner's Memorandum Supporting Cross Motion for Summary Judgment and Opposing Respondent's Motion for Summary Judgment (includes exhibits 1 through 49)	98-1275
8-20-98	Petitioner's Cross Motion for Summary Judgment	98-1276
9-30-98	Respondent's Reply Memorandum in support of Motion for Summary Judgment and in Opposition to Cross-Motion for Summary Judgment Includes Exhibits 1-3 (and copy of Utah Court of Appeals Decision)	98-1287
10-23-98	Oral Arguments before Judge Marcus	N/A
11-10-98	Petitioners' Additional Documentary Evidence In Support of Reversal and/or Remand of the EQC's/DEQ's Permit Decisions (includes exhibits 50 through 65, plus a revised version of exhibit 27 from 8-20-98 filing)	98-1285
11-23-98	Letter from Judge Marcus regarding new evidence and schedule for ruling.	98-01282
11-30-98	Respondents' Memorandum In Response to Petitioners' Additional Documentary Evidence.	98-1279
12-6-98	Opinion and Order on Cross Motions for Summary Judgment	98-1277

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DATE	TITLE OF DOCUMENT	DEQ ITEM NO.
12-14-98	Petitioners send a letter to the EQC and DEQ requesting a Contested Hearing and Other Relief	98-1247
12-28-98	Petitioners' Motion For Relief From An Order Of The Court, Or For Supplemental Relief (Includes Exhibits 66 and 67)	98-1419
1-13-99	Respondents' Memorandum In Opposition to Motion For Relief From Order	99-0087
1-19-99	Petitioners' Reply To Opposition to Motion For Relief (Includes Exhibit 68)	99-1752
1-22-99	Hearing before Judge Marcus (Petition for Motion for Relief is denied)	N/A
1-29-99	Order Regarding Motion For Relief (Denial)	99-0661
2-4-99	Letter from Langdon Marsh denying request for contested case hearing (reply to petitioners' December 14 1998 letter)	99-0624
3-25-99	Respondents' Supplemental Motion for Summary Judgment	99-0494
4-5-99	Petitioners' First Supplemental Petition for Review (Includes Exhibits 69 and 70)	99-1751
4-12-99	Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment (Includes Exhibits 71-74)	99-0704
4-22-99	Respondents' Memorandum in Opposition to Motion for Leave to File First Supplemental Petition for Review	99-1859
4-22-99	Respondents' Reply in Support of Supplemental Motion for Summary Judgment	99-1860
4-29-99	Respondents' Memorandum in Opposition to Motion for Leave to File Second Supplemental Petition for Review	99-0738
5-10-99	Petitioners' Reply Supporting Motions for Leave to File First and Second Supplemental Petitions for Review	99-0834
6-1-99	Hearing for Oral Arguments before Judge Marcus	N/A
6-1-99	Opinion and Order Denying Supplemental Petitions and For Final Judgment	99-0942
7-2-99	Notice of Appeal and Designation of Record	99-1259

EQC Meeting May 18, 2000  
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SUR

State of Oregon  
Department of Environmental Quality

Memorandum

DEQ Item No. 99-1876 (600.01)

To: Information Repositories for the Umatilla Chemical Agent Disposal Facility

From: Wayne C. Thomas *WCT* 11/3/99  
 Program Manager  
 Umatilla Chemical Agent Disposal Program

Date: November 3, 1999

Re: Invitation to Comment on Request for Revocation of Permits

Documentation related to Case No. 9708-06159  
 (G.A.S.P., et al. v. Environmental Quality Commission, et al.)

The records of the Department of Environmental Quality (DEQ) indicate that you are an Information Repository for information related to the Umatilla Chemical Depot and the Umatilla Chemical Agent Disposal Facility (Hazardous Waste Treatment and Storage Permit I.D. No. ORQ 000 009 431). The Department has recently opened a public comment period on a Request for Revocation" of the Umatilla Chemical Agent Disposal Facility permits. The enclosed binders contain information related to the Request for Revocation. Please place the binders (Volume I and Volume II) with your information related to the Umatilla facility.

EQC Meeting May 18, 2000  
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If you have any questions please contact Wayne C. Thomas of the Department of Environmental Quality at (541) 567-8297, ext. 22.

COPY

State of Oregon

Department of Environmental Quality

Memorandum

To: Karyn Jones  
G.A.S.P.

From: Wayne C. Thomas *WCT* 11/5/99  
Program Manager  
Umatilla Chemical Agent Disposal Program

Date: November 5, 1999

Re: Transmittal of Documentation Related to the "Request for Revocation" of  
the Umatilla Permits [DEQ Item No. 99-1915 (600.01)]

Enclosed for your information are Volumes I and II of "Documentation Related to Case No. 9708-06159." These two volumes include copies of various legal filings, and all 74 Exhibits that were submitted by the Petitioners during the proceedings related to Case No. 9708-06159. The public comment period on the revocation request was opened on October 18, 1999 and is scheduled to close on December 17, 1999.

COPY

State of Oregon

Department of Environmental Quality

Memorandum

---

To: Richard Condit  
Attorney at Law

From: Wayne C. Thomas  
Program Manager  
Umatilla Chemical Agent Disposal Program

*WCT* 11/5/99

Date: November 5, 1999

Re: Transmittal of Documentation Related to the "Request for Revocation" of  
the Umatilla Permits [DEQ Item No. 99-1916 (600.01)]

---

Enclosed for your information are Volumes I and II of "Documentation Related to Case No. 9708-06159." These two volumes include copies of various legal filings, and all 74 Exhibits that were submitted by the Petitioners during the proceedings related to Case No. 9708-06159. The public comment period on the revocation request was opened on October 18, 1999 and is scheduled to close on December 17, 1999.

COPY

State of Oregon  
Department of Environmental Quality

Memorandum

To: Lieutenant Colonel Thomas F. Woloszyn  
Commander  
Umatilla Chemical Depot

From: Wayne C. Thomas *WCT 11/5/99*  
Program Manager  
Umatilla Chemical Agent Disposal Program

Date: November 5, 1999

Re: Transmittal of Documentation Related to the "Request for Revocation" of  
the Umatilla Permits [DEQ Item No. 99-1914 (600.01)]

Enclosed for your information are Volumes I and II of "Documentation Related to Case No. 9708-06159." These two volumes include copies of various legal filings, and all 74 Exhibits that were submitted by the Petitioners during the proceedings related to Case No. 9708-06159. The public comment period on the revocation request was opened on October 18, 1999 and is scheduled to close on December 17, 1999.

Cf: Raj Malhotra, PMCSA  
Jay Bluestein, Raytheon

EQC Meeting May 18, 2000  
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List of Petitioners' Exhibits .....iv

Following Page xii:

Chance to Comment Form

Agenda for the November 18-19, 1999, meeting of the Environmental Quality Commission

"DOCUMENTATION RELATED TO CASE NO. 9708-06159"  
G.A.S.P., ET AL. V. ENVIRONMENTAL QUALITY COMMISSION, ET AL.  
RELATED TO THE  
UMATILLA CHEMICAL AGENT DISPOSAL FACILITY (UMCDF)

**BACKGROUND**

In August 1997 a legal challenge to the UMCDF permits was filed in Multnomah County Circuit Court (Case No. 9708-06159) by G.A.S.P. (a local Hermiston organization), the Sierra Club of Oregon, Oregon Wildlife Federation, and 22 individuals (collectively referred to as the "Petitioners"). The Petitioners challenged the validity of the hazardous waste and air permits issued by the Environmental Quality Commission (EQC) and the Department of Environmental Quality (DEQ) ("Agencies") in February, 1997. A final judgment affirming the Agencies' decisions to issue hazardous waste and air permits for UMCDF was entered in June, 1999. (The Petitioners have appealed that decision to the Oregon Court of Appeals. The appeal is currently pending.)

The Petitioners contend that there is new information since the issuance of the permits that provides a basis for revocation. The information submitted by the Petitioners consists of 74 "Exhibits" representing approximately 120 individual documents, plus various letters and comments submitted to the Agencies by the Petitioners.

In connection with the Circuit Court case, the EQC and DEQ made a commitment to the Court that a letter written by the Petitioners to the Agencies on December 14, 1998, (see Exhibit 69 in Volume II) would be treated as a request for revocation of the permits under applicable regulations. A public comment period was opened on October 18 and will close on December 17, 1999.

Volume I contains copies of various legal filings during the course of the lawsuit proceedings, some of which make specific references to one or more of the Exhibits (Volume I includes Exhibits 1-25, Volume II includes Exhibits 26-74). Volume I also contains (immediately following this Table of Contents) the "Chance to Comment" form and an Agenda for a meeting of the Environmental Quality Commission scheduled for November 18-19, 1999. The EQC will be accepting oral testimony on November 19 about this issue.

If you have any questions about this material please call the Hermiston office of the DEQ at 541-567-8297. Written comments should be received by the DEQ no later than 5:00 p.m., December 17, 1999. The mailing address is Wayne C. Thomas, DEQ - Hermiston Office, 256 E. Hurlburt, Suite 105, Hermiston, OR 97838. The facsimile number is (541) 567-4741.

EQC Meeting May 18, 2000  
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# VOLUME I

“DOCUMENTATION RELATED TO CASE NO. 9708-06159”  
 G.A.S.P., ET AL. v. ENVIRONMENTAL QUALITY COMMISSION, ET AL.  
 UMATILLA CHEMICAL AGENT DISPOSAL FACILITY

This list is organized chronologically by date.  
 The tabs in Volume I are arranged by “DEQ Item No.” for ease of reference.

DATE	TITLE OF DOCUMENT	DEQ ITEM NO.
8-22-97	Petition for Review	98-1264
4-13-98	Respondent's Memorandum in Support of Motion for Summary Judgment	98-1423
8-20-98	Petitioner's Memorandum Supporting Cross Motion for Summary Judgment and Opposing Respondent's Motion for Summary Judgment (References Exhibits 1 through 49) (Exhibits 1-25 are in Volume I, 26-49 are in Volume II)	98-1275
9-30-98	Respondent's Reply Memorandum in support of Motion for Summary Judgment and in Opposition to Cross-Motion for Summary Judgment	98-1287
11-10-98	Petitioners' Additional Documentary Evidence In Support of Reversal and/or Remand of the EQC's/DEQ's Permit Decisions (References Exhibits 50 through 65, see Volume II)	98-1285
11-30-98	Respondents' Memorandum In Response to Petitioners' Additional Documentary Evidence.	98-1279
12-6-98	Opinion and Order on Cross Motions for Summary Judgment	98-1277
12-14-98	Petitioners send a letter to the EQC and DEQ requesting a Contested Hearing and Other Relief	98-1247
12-28-98	Petitioners' Motion For Relief From An Order Of The Court, Or For Supplemental Relief (References Exhibits 66 and 67, see Volume II)	98-1419
1-13-99	Respondents' Memorandum In Opposition to Motion For Relief From Order	99-0087
1-19-99	Petitioners' Reply To Opposition to Motion For Relief (References Exhibit 68)	99-1752
1-29-99	Order Regarding Motion For Relief (Denial)	99-0661
3-25-99	Respondents' Supplemental Motion for Summary Judgment	99-0494
4-5-99	Petitioners' First Supplemental Petition for Review (References Exhibits 69 and 70, see Volume II)	99-1751
4-12-99	Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment (References Exhibits 71-74, see Volume II)	99-0704
6-1-99	Opinion and Order Denying Supplemental Petitions and For Final Judgment	99-0942

EQC Meeting May 18, 2000  
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*List of Petitioner's Exhibits (Case No. 9708-06159)*

<i>Exhibit Number</i>	<i>Title</i>	<i>Date of Document</i>	<i>Author</i>	<i>Volume No.</i>
1	Karyn Jones' (and GASP) Standing Affidavit	17-Aug-98	Karyn Jones	I
2	Dr. Robert J. Palzer's (and Sierra Club's) Standing Affidavit	07-Aug-98	Dr. Robert J. Palzer	I
3	Cindy Beatty's Standing Affidavit	17-Aug-98	Cindy Beatty	I
4	Christine Clark's Standing Affidavit	18-Aug-98	Christine Clark	I
5	David Burn's Standing Affidavit	12-Aug-98	David Burns	I
6	Debra Burn's Standing Affidavit	11-Aug-98	Debra Burns	I
7	Gail L. Horning's Standing Affidavit	17-Aug-98	Gail L. Horning	I
8	Heather Billy's Standing Affidavit	13-Aug-98	Heather Billy	I
9	Janet S. Nagy's Standing Affidavit	17-Aug-98	Janet S. Nagy	I
10	Karla Stuck's Standing Affidavit	13-Aug-98	Karla Stuck	I
11	LaDonna King's Standing Affidavit	17-Aug-98	LaDonna King	I
12	Pius Horning's Standing Affidavit	17-Aug-98	Pius Hornings	I
13	Stuart Dick's Standing Affidavit	14-Aug-98	Stuart Dick	I
14	Andrea E. Stine's Standing Affidavit	10-Aug-98	Andrea E. Stine	I
15	Merle Jones' Standing Affidavit	17-Aug-98	Merle Jones	I
16	Janice H. Lohman's Standing Affidavit	15-Aug-98	Janice Lohman	I
17	John Spomer's Standing Affidavit	17-Aug-98	John Spomer	I
18	Susan L. Jones' Standing Affidavit	17-Aug-98	Susan L. Jones	I
19	Leandra Phillips' Standing Affidavit	15-Aug-98	Leandra Phillips	I
20	Melanie Beltane's Standing Affidavit	18-Aug-98	Melanie Beltane	I
21	Dorothy Irish's Standing Affidavit	13-Aug-98	Dorothy Irish	I

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## List of Petitioner's Exhibits (Case No. 9708-06159)

<i>Exhibit Number</i>	<i>Title</i>	<i>Date of Document</i>	<i>Author</i>	<i>Volume No.</i>
22	Paul Loney's Standing Affidavit for Oregon Wildlife Federation	20-Aug-98	Paul Loney, Oregon Wildlife Federation	I
23	Deposition of John K. Cluff ( CWWG, et al. v. U.S. Army, et al.; Case No. 96-CV-0425C; TOCDF)	17-Jul-96	John Cluff	I
24	Deposition of John K. Cluff (CWWG, et al. v. U.S. Army, et al.; Case No. 96-CV-0425C; TOCDF)	18-Jul-96	John Cluff	I
25	Deposition of Timothy W. Thomas (CWWG, et al. v. U.S. Army, et al.; Case No. 2:96-CV-0425C; TOCDF)	05-Feb-98	Timothy Thomas	I
26	Affidavit of John Houston Miller	03-Jun-96	John Houston Miller	II
27	Affidavit of Thomas Bodley Stibolt Jr. and Lisa (Elizabeth) P. Brenner	19-Aug-98	Thomas Bodley Stibolt Jr. & Lisa P. Brenner	II
27.1	Review of the inhalation modeling compounds and standards used in the RA for human health effects	17-Aug-98	Lisa Brenner & Tom Stibolt	II
27.2	A Listing of the Compounds that PRC claims should be included in the modeling analysis	16-Aug-98	Lisa Brenner and Tom Stibolt	II
27.3	Table 1 - Comparison of Potential PICS, Recommended PICS, and Proposed Emission Rates	16-Aug-98	PRC Environmental Management	II
27.4	Fundamentals of Risk Analysis and Risk Management	01-Jan-97	Vlasta Molak, editor	II
27.5	Umatilla Chemical Agent Disposal Facility Phase 1 Quantitative Risk Assessment	01-Sep-96	Science Applications International Corporation	II
27.6	Technical Aspects of the Model and the Air Quality Impact Analysis	17-Aug-98	Thomas Stibolt and Lisa Brenner	II
28	Trygve P. Steen's Affidavit	20-Aug-98	Trygve P. Steen	II
28.1	Thinking of Biology - Science, environmental risk assessment, and the frame problem	01-Sep-94	Kristin S. Shrader-Frechette	II
28.2	Curriculum Vitae of Trygve P. Steen	01-Jun-98	Trygve P. Steen	II
29	James R. Wilkinson's Affidavit	19-Aug-98	James R. Wilkinson	II

## List of Petitioner's Exhibits (Case No. 9708-06159)

Exhibit Number	Title	Date of Document	Author	Volume No.
29.1	Resolution of the CTUIR Board of Trustees	17-Jan-96	Donald Sampson, Chairman	II
29.2	Lines Drawn in the Sand: A Review of Challenges, Opportunities, and Options for Chemical Weapons Disposal (presented to the Oregon EQC)	14-Nov-96	Donald Sampson, Armand Minthorn, J.R. Wilkinson	II
30	Deposition of James Cudahy (CWWG, et al. v. U.S. Army, et al.; Case No. 2:96-CV-0425C; TOCDF)	16-Feb-98	James Cudahy	II
31	Affidavit of Pat Costner	27-Jul-98	Pat Costner	II
32	TOCDF Unusual Occurrence Report: Metal Parts Furnace Feed Rate Exceedance	02-Apr-98	Michael J. Rowe, Timothy Thomas, Harold Oliver	II
33	Telephonic Deposition of Richard Holmes (CWWG, et al. v. U.S. Army, et al.; Case No. 2:96-CV-0425C; TOCDF)	14-Apr-98	Richard Holmes	II
34	Continuation of the Telephonic Deposition of Richard Holmes (CWWG, et al. v. U.S. Army, et al.; Case No. 2:96-CV-0425C; TOCDF)	15-Apr-98	Richard Holmes	II
35	Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds Volume III of III (External Review Draft)	01-Aug-94	U.S. Environmental Protection Agency	II
36	Cross-examination of John K. Cluff (CWWG, et al. v. U.S. Army, et al.; Case No. 2:96-CV-0425C; TOCDF)	25-Jul-96	John Cluff	II
37.1	1997 Declaration of the Environmental Leaders of the Eight on Children's Environmental Health	27-Jul-98	Office of Children's Protection	II
37.2	Executive Order: Protection of Children From Environmental Health Risks and Safety Risks	21-Apr-97	The White House	II
38	Final Screening Risk Assessment Resource Conservation and Recovery Act Part B Pine Bluff Chemical Agent Disposal Facility	08-Oct-97	United States Army Center for Health Promotion and Preventive Medicine	II
39	Affidavit of Dr. Peter deFur	31-Jul-98	Dr. Peter deFur	II

## *List of Petitioner's Exhibits (Case No. 9708-06159)*

<i>Exhibit Number</i>	<i>Title</i>	<i>Date of Document</i>	<i>Author</i>	<i>Volume No.</i>
40	Public Health and Chemical Weapons incineration	01-Mar-98	Kentucky Environmental Foundation	II
40.1	Public Health Effects of Chemical Weapons Incineration	01-Mar-98	Richard Clapp	II
40.2	Toxic Exposures and Chronic Illnesses	01-Mar-98	Howard Umovitz	II
40.3	Critique of Chemical Weapons Incineration Risk Assessment	01-Mar-98	Peter deFur	II
40.4	Toxicology of Chemical Agents	01-Mar-98	Robert Ginsburg	II
40.5	Health Effects of Low-level Exposure to Nerve Agent	01-Mar-98	Jerry Buccafusco	II
40.6	Synthetic Chemicals as Endocrine Disruptors	01-Mar-98	Peter deFur and Carolyn Raffensperger	II
41	Nerve gas danger underestimated, study says	29-Jul-98	James Long, The Oregonian	II
42	Examination of Deborah Ng; Utah DEQ Solid and Hazardous Waste Control Board; Hearing on TOCDF Permit Modification; Transcript of Proceedings	19-Mar-97	Deborah Ng	II
43	Examination of Timothy Thomas (CWWG, et al. v. U.S. Army, et al.; Case No. 2:96-CV-0425C; TOCDF), Transcript of Preliminary Injunction Hearing	03-Mar-97	Timothy Thomas	II
44.1	Examination of Dennis Downs, Scott Anderson, and Martin Grey; Utah DEQ Solid and Hazardous Waste Control Board; Hearing on TOCDF Permit Modification; Transcript of Proceedings	18-Mar-97	Downs; Grey; Anderson	II
44.2	Examination of Deborah Ng and Mr. Smith; Utah DEQ Solid and Hazardous Waste Control Board; Hearing on TOCDF Permit Modification; Transcript of Proceedings	19-Mar-97	Ng and Smith	II
45	Fact Sheet - EPA Special Report on Endocrine Disruption	01-Feb-97	U.S. Environmental Protection Agency	II
46	Excerpts from the Journals of Gary Millar	09-Sep-96	Gary Millar(???)	II

## *List of Petitioner's Exhibits (Case No. 9708-06159)*

<i>Exhibit Number</i>	<i>Title</i>	<i>Date of Document</i>	<i>Author</i>	<i>Volume No.</i>
47	Examination of Mr. Timothy Thomas;; Utah DEQ Solid and Hazardous Waste Control Board; Hearing on TOCDF Permit Modification; Transcript of Proceedings	20-Mar-97	Timothy Thomas	II
48	Annual Status Report on the Disposal of Chemical Weapons and Materiel for Fiscal Year 1997 .	30-Sep-97	Department of Defense	II
49	Deposition of Robert Bruce Perry (CWWG, et al. v. U.S. Army, et al.; Case No. 96-CV-0425C; TOCDF)	16-Jul-96	Robert Bruce Perry	II
50	Review of Acute Human-Toxicity Estimates for Selected Chemical Warfare Agents	01-Jan-97	National Research Council	II
51	Long-term Health Effects Associated with Sub-Clinical Exposure to GB and Mustard	18-Jul-96	Dennis M. Perrotta, PhD, CIC, Chair	II
52	105th Congress Report - Gulf War Veteran's Illnesses: VA, DOD Continue to Resist Strong Evidence Linking Toxic Causes to Chronic Health Effects	07-Nov-97	Committee on Government Reform and Oversight (House of Representatives)	II
53	Chemical Weapons DOD Does Not Have a Strategy to Address Low-Level Exposures	01-Sep-98	US General Accounting Office	II
54	Toxicological Profile for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin	01-Jun-89	Syracuse Research Corporation for ATSDR (U.S. Public Health Service) and EPA.	II
55	Drinking Water Criteria Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (Final Draft; EPA 600/X-84-194-1)	01-Mar-85	U.S. Environmental Protection Agency, Environmental Criteria and Assessment Office	II
56	"Remedial Activities at Uncontrolled Hazardous Wste Sites in the Zone of Regions VI, VII, VIII." Possibly from the "Final Times Beach Site Multimedia Risk Assessment - Volume I"	28-Mar-95	U.S. Environmental Protection Agency	II
57	Review of Systemization of Tooele Chemical Agent Disposal Facility	01-Mar-96	National Research Council	II
58	Interim Status Assessment for the Chemical Demilitarization Program	15-Apr-96	Department of Defense	II

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*List of Petitioner's Exhibits (Case No. 9708-06159)*

<i>Exhibit Number</i>	<i>Title</i>	<i>Date of Document</i>	<i>Author</i>	<i>Volume No.</i>
59	Deposition of Robert Bruce Perry	16-Jul-96	Robert Bruce Perry	II
60	"Information Paper" regarding dioxin emissions from the DUN	21-May-96	LTC John Ontiveros	II
61	EG&G Memo - Discontinuing op. Of BRA at the Tooele Facility	28-Jul-98	Tom Kurkky & Debbie Sweeting	II
62	Table prepared by the Utah Division of Solid and Hazardous Waste - compiling data concerning the enormous off-site waste disposal needs of the Tooele Facility - based on data from 8/96 through 3/98		Utah DEQ	II
63	Pilot testing of Neutralization/Biotreatment of Mustard Agent at Aberdeen Proving Ground, Maryland - Final Environmental Impact Statement	01-Jul-98	PMCD	II
64	Excerpts from the testimony of Army expert Gary Boyd	29-Jul-96	Gary Boyd	II
65	Public Health Assessment for US Army Umatilla Depot Activity - Public Health Service Agency for Toxic Substance and Disease Registry	30-Sep-97	HHS	II
66	Attachment A, Appendix 3 - PAS Carbon Filter Unit and Emission tot he Carbon filters Permit Conditions	28-Dec-98	Oregon Department of Environmental Quality	II
67	Appendix 3 - Commission Response - February 7, 1997	07-Feb-97	II	II
68	Agenda Environmental Quality Commission Meeting (EQC) January 29, 1999	01-Jan-99	Environmental Quality Commission	II
69	Request for Contested Case Hearing and Other Relief	14-Dec-98	Stuart Sugarman	II
70	Umatilla Army Depot Request for Contested Case Hearing	04-Feb-99	Langdon Marsh	II
71	Comments on EQC Order Clarifying Permit Decision	15-Mar-99	Stuart Sugarman, Richard Condit	II
71.1	Risk Assessment of the Pollution Abatement Filter System for the Umatilla Chemical Agent Disposal Facility	01-Sep-98	Mitretek Technical Report	II

## List of Petitioner's Exhibits (Case No. 9708-06159)

Exhibit Number	Title	Date of Document	Author	Volume No.
72	Supplement to March 15, 1999 Comments	18-Mar-99	Sugarman & Condit	II
72.1	Department of Defense's Status Assessment for the Chemical Demilitarization Program	01-Jan-97	II	
73	Petitioner's Attorney's Affidavit Supporting Memorandum Opposing Supplemental Motion for Summary Judgment	12-Apr-99	Stuart Sugarman	II
74	Affidavit of Dr. Lisa P. Brenner & Dr. Thomas Stibolt with "Analysis of Kristina Iisa's Report Concerning the Emission of Dioxin and the Use of PAS Carbon Filters"	12-Apr-99	Dr. Lisa P. Brenner & Dr. Thomas Stibolt	II
74.1	Appendix 1 - Iisa Report References With Quotes from the References (attached to Exhibit #74)	12-Apr-99	Dr. Lisa P. Brenner & Dr. Thomas Stibolt	II
74.2	Appendix II to Exhibit 74 - Summary of the events found in the record	12-Apr-99	Dr. Lisa P. Brenner & Dr. Thomas Stibolt	II
74.3	Appendix III to Exhibit 74 - Copies of the References from Kristina Iisa's Dioxin Report to the EQC	12-Apr-99	Dr. Lisa P. Brenner & Dr. Thomas Stibolt	II
74.301	A New Theory of Dioxin Formation in Municipal Solid Waste Combustion	01-Nov-86	Roger D. Griffin	II
74.302	Effect of Sulfur Dioxide on the Formation Mechanism of Polychlorinated Dibenzodioxin and Dibenzofuran in Municipal Waste Combustors	01-Jun-92	Brian K. Gullett	II
74.303	Combustion Dioxin Suppression in Municipal Solid Waste Incineration with Sulphur Additives	01-Oct-92	Ralf L. Lindbauer, Friedrich Wurst and Theodor Prey	II
74.304	Effect of Sulfur in Reducing PCDD/PCDF Formation	11-May-98	K. Raghunathan and Brian K. Gullett	II
74.305	Dioxin Reduction by Sulfur Component Addition	01-Jan-96	Hiroshi Ogawa, Norihiko Orita, Mitsuhiro Horaguchi, Takumi Suzuki, Mitsuhiro Okada and Shirzuo Yasuda	II

*List of Petitioner's Exhibits (Case No. 9708-06159)*

<i>Exhibit Number</i>	<i>Title</i>	<i>Date of Document</i>	<i>Author</i>	<i>Volume No.</i>
74.306	Dioxin Emissions from Full Scale Hazardous Waste Combustion Units Handling Variable Chlorine Feed Compositions	11-May-98	J.D. Wilson, C.N. Park and D.I. Townsend	II
74.307	Effects of Facility Contamination on Dioxin Emissions	01-May-96	K. Raghunathan	II
74.308	Dioxin Emissions from Full Scale Hazardous Waste Combustion Units Handling Variable Chlorine Feed Compositions	11-May-98	J.D. Wilson, C.N. Park and D.I. Townsend	II
74.309	The Relationship Between Chlorine in Waste Streams and Dioxin Emissions from Waste Combustor Stacks (CRTD 36)	20-Oct-95	H. Gregor Rigo, A.J. Chandler, and W.S. Lanier	II
74.31	Evaluation of Carbon Injection for Controlling PCDD/PCDF Emissions at WTI's Commercial Hazardous Waste Incineration Facility	11-May-98	Douglas R. Roeck, Alfred Sigg	II
74.311	Mechanisms for Formation and Options for Control of Emissions of PCDD'S/PCDF'S from Incineration	11-May-98	D.I. Townsend, J.D. Wilson and C.N. Park	II
74.312	Dioxin/Furan Formation and Control in Waste Combustors	01-May-96	K. Raghunathan and Brian K. Gullett	II
74.313	Formation of Polychlorinated Dibenzofurans by Chlorination and de Novo Reactions with FeCl <sub>3</sub> in Petroleum Refining Processes	03-Mar-93	Adrian Beard, K.P. Nalkwadi and F.W. Karasek	II
74.314	PCDD and PCDF Formation From Hydrocarbon Combustion in the Presence of Hydrogen Chloride	01-Jul-92	R. De Fre and T. Rymen	II
74.315	Mechanisms of Formation and Destruction of Polychlorinated Dibenzo-p-dioxins and Dibenzofurans in Heterogeneous Systems	01-Jun-95	Ruud Addink and K. Olie	II
74.316	Prevention of PCDD Formation in MSW Incinerator by Inhibition of Catalytic Activity of Fly Ash Produced	01-Jul-89	Naikadi K.P. and F.W. Karasek	II
74.317	Reduction of Dioxins by Combustion Control and Prevention of Reformation (Control of the Denovo Reaction)	01-May-96	William Prescott	II

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*List of Petitioner's Exhibits (Case No. 9708-06159)*

<i>Exhibit Number</i>	<i>Title</i>	<i>Date of Document</i>	<i>Author</i>	<i>Volume No.</i>
74.318	Effects of Copper Contamination on Dioxin Emissions from CFC Incineration	01-Jan-96	G.W. Lee, J.V. Ryan, R.E. Hall, et al.	II
74.319	Reduction of Dioxins by Combustion Control and Prevention of Reformation (Control of the Denovo Reaction)	01-May-96	William Prescott	II
74.32	Inhibition Effect of Calcium Compound Fed to Furnace on PCDDS/PCDFS from Incineration Plant	11-May-98	S. Matsui, T. Iwasaki and T. Noto	II
74.321	A Survey of Post-Combustion PCDD/PCDF Control Technologies	11-May-96	B. Siret, K. Gilman	II
74.322	Comparison of Dry Sorbent Injection of Sodium Bicarbonate Lime and Carbon and their Control of Dioxins/Furans, Mercury, Chlorides and Sulfur Dioxide	01-May-96	John Maziuk, Jr	II
74.323	Reduction of Dioxin/Furan Emissions from an Incineration Plant by Means of an Activated Carbon Filter	11-May-98	G. Steinhaus and F. Dirks	II
74.324	Catalyst Development for the Destruction of Volatile Organic Compounds in the Flue Gas of Municipal Waste Incinerators	01-May-96	H. Dropsch, J. Stohr and J. Furrer	II
74.325	Rotary Kiln Incinerator at Bayer AG in Germany Sets New Performance Standards for Air Emissions	01-May-96	Dr. Hans Piechura and Dr. Peter K. Zeeb	II

EQC Meeting May 18, 2000  
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# CHANCE TO COMMENT ON...

INVITATION TO COMMENT  
ON REQUEST FOR REVOCATION  
OF PERMITS

Public Notice Date: October 18, 1999  
Comments Due: December 17, 1999

UMATILLA CHEMICAL AGENT DISPOSAL FACILITY (UMCDF)  
UMATILLA CHEMICAL DEPOT  
HERMISTON, OREGON  
PERMIT NO. ORQ.000.009.431

For what facility?

This Invitation to Comment is related to the Umatilla Chemical Agent Disposal Facility (UMCDF) currently under construction at the U.S. Army's Umatilla Chemical Depot near Hermiston in Eastern Oregon. The UMCDF is an incineration facility that will be used to destroy the stockpile of chemical warfare agents that have been stored at the Depot since the mid-1960s. The chemical agents at the Umatilla Chemical Depot are stored in munitions and bulk containers and include the lethal nerve agents known as "GB" (Sarin) and "VX," and the blister agent "HD" (commonly known as "mustard").

Who has requested  
revocation of the  
UMCDF permits?

In August 1997 a legal challenge to the UMCDF permits was filed in Multnomah County Circuit Court (Case No. 9708-06159) by G.A.S.P. (a local Hermiston organization), the Sierra Club of Oregon, Oregon Wildlife Federation, and 22 individuals (collectively referred to as the "Petitioners"). The Petitioners challenged the validity of the hazardous waste and air permits issued by the Environmental Quality Commission (EQC) and the Department of Environmental Quality (DEQ) ("Agencies") in February, 1997. A final judgment affirming the Agencies' decisions to issue hazardous waste and air permits for UMCDF was entered in June, 1999. (The Petitioners have appealed that decision to the Oregon Court of Appeals. The appeal is currently pending.)

In connection with the Circuit Court case, the EQC and DEQ made a commitment to the Court that a letter written by the Petitioners to the Agencies on December 14, 1998, would be treated as a request for revocation of the permits under applicable regulations.

What is the basis  
for the revocation  
request?

The Petitioners contend that there is new information since the issuance of the permits that provides a basis for revocation. The information submitted by the Petitioners consists of 74 "Exhibits" representing approximately 120 individual documents, plus various letters and comments submitted to the Agencies by the Petitioners.

The documents submitted by the Petitioners include, but are not limited to, excerpts from Court proceedings related to the Army's Tooele, Utah chemical agent disposal facility; information related to the toxicity and health effects of chemical agents and emissions from incineration facilities; and information about conducting health risk assessments. The Department has placed copies of the Exhibits and other related documents in the information repositories listed below.

Is there going to be a public hearing?

A regular meeting of the EQC is scheduled for November 18-19, 1999 in Portland, Oregon. The Commission will take oral public testimony beginning at 2:00 p.m. on November 19, but is not expected to reach a decision on the request for revocation until a later meeting. The meeting will be held at the DEQ Headquarters building, Conference Room 3A, 811 S.W. Sixth Ave., Portland, Oregon, 97204. A separate agenda for the EQC meeting is attached.

Where can I find more information?

Please call the Hermiston office of the DEQ if you would like to be provided a list of all the available documents related to this matter. DEQ will place the documents in the following information repositories:

DEQ--Hermiston Office  
256 E. Hurlburt, Suite 105  
Hermiston, OR 97838  
(541) 567-8297

Hermiston Public Library  
235 E. Gladys Avenue  
Hermiston, OR 97838  
(541) 567-2882

Pendleton Public Library  
502 S.W. Dorion Avenue  
Pendleton, OR 97801  
(541) 966-0210

Mid Columbia Library  
(Kennewick Branch)  
1620 S. Union St.  
Kennewick, WA 99336  
(509) 586-3156  
or 1-800-572-6251

Portland State University Library  
951 SW Hall, Fifth Floor  
Portland, OR 97204  
(503) 725-4617

Umatilla Community Outreach Office  
245-B East Main Street  
Hermiston, OR 97838  
(541) 564-9339

Where do I send my comments?

Written comments should be received by the DEQ no later than 5:00 p.m., December 17, 1999. The mailing address is Wayne C. Thomas, DEQ - Hermiston Office, 256 E. Hurlburt, Suite 105, Hermiston, OR 97838. The facsimile number is (541) 567-4741.

What happens next?

The members of the EQC will review the documents submitted by the Petitioners and all comments received during the comment period. The EQC will accept oral testimony on the Petitioners' revocation request at the November meeting.

The Department is also reviewing the Petitioners' documents and all comments received during the public comment period. The Department will prepare a staff report with recommendations for the EQC's consideration at its February 2000 meeting. It is expected that the EQC may issue a decision on the request for revocation at or following the February 2000 meeting.

Accommodation of disabilities:

Please notify DEQ about any special physical or language accommodations you may need as far in advance of the meeting or hearing as possible. To make these arrangements, contact Sylvia Herrley at 1-800-452-4011 (toll free in Oregon), or at (503) 229-5317. People with hearing impairments may call DEQ's TDD number at (503) 229-6993.

# AGENDA

## ENVIRONMENTAL QUALITY COMMISSION MEETING

November 18-19, 1999  
DEQ Conference Room 3A  
811 S. W. Sixth Avenue  
Portland, Oregon

Notes: Because of the uncertain length of time needed for each agenda item, the Commission may deal with any item at any time in the meeting. If a specific time is indicated for an agenda item, an effort will be made to consider that item as close to that time as possible. However, scheduled times may be modified if agreeable with participants. Anyone wishing to listen to the discussion on any item should arrive at the beginning of the meeting to avoid missing the item of interest.

Public Forum: The Commission will break the meeting at approximately 11:30 a.m. for the General Public Forum if there are people signed up to speak. The Public Forum is an opportunity for citizens to speak to the Commission on environmental issues and concerns not a part of the agenda for this meeting. The public comment period has already closed for the Rule Adoption items and, in accordance with ORS 183.335(13), no comments can be presented to the Commission on those agenda items. Individual presentations will be limited to 5 minutes. The Commission may discontinue this forum after a reasonable time if an exceptionally large number of speakers wish to appear.

*Thursday, November 18  
Beginning at 1:30 p.m.*

Work Session: Tax Credit Application Number 5009

- A. Approval of Minutes
- B. Approval of Tax Credits

*Friday, November 19  
Beginning at 8:30 a.m.*

C. Informational Item: Update on the General Air Contaminant Discharge Permits (ACDP)

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D. Action Item: Appeal of Hearing Order Regarding Assessment of Civil Penalty in the Matter of Cascade General, Inc., Case No. HW-NWR-97-176

E. †Rule Adoption: On-site Sewage Disposal Fees

F. †Rule Adoption: Rules Establishing Review and Acceptance Criteria for New or Innovative Technologies and Materials for Application in the On-site Program

G. Action Item: Reopen the Permit at the Umatilla Chemical Agent Disposal Facility (UMCDF) for Modifications with Respect to the Inclusion of the Carbon Filter System as Part of the Pollution Abatement System

H. Commissioners' Reports

I. Director's Report

2:00 p.m. - Public Comment: UMCDF Permit Revocation Request Dated December 14, 1998 from GASP, et al only

†Hearings have already been held on the Rule Adoption items and the public comment period has closed. In accordance with ORS 183.335(13), no comments can be presented by any party to either the Commission or the Department on these items at any time during this meeting.

The Commission will honor outgoing Chair, Carol Whipple before the meeting on November 18.

The Commission will have lunch at 12:00 noon on November 19. No Commission business will be discussed.

The Commission has set aside February 10-11, 2000, for their next meeting. The location has not been established.

Copies of staff reports for individual agenda items are available by contacting the Director's Office of the Department of Environmental Quality, 811 S. W. Sixth Avenue, Portland, Oregon 97204, telephone 229-5301, or toll-free 1-800-452-4011. Please specify the agenda item letter when requesting.

If special physical, language or other accommodations are needed for this meeting, please advise the Director's Office, (503)229-5301 (voice)/(503)229-6993 (TTY) as soon as possible but at least 48 hours in advance of the meeting.

October 15, 1999

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## ATTACHMENT E

(DEQ Item No. 99-2201)

***“Comments of G.A.S.P., Sierra Club, Oregon Wildlife Federation, et al.,  
In Support Of Their Request To Suspend And Revoke Permits For The  
Umatilla Chemical Demilitarization Facility”***

(Comment C-5, without attachments)  
(See Attachment G for list of exhibits that were attached)

December 17, 1999

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*“Comments of G.A.S.P., Sierra Club, Oregon Wildlife Federation, et al.,  
In Support Of Their Request To Suspend And Revoke Permits For The  
Umatilla Chemical Demilitarization Facility”  
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99-2201

STATE OF OREGON  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
RECEIVED

DEC 20 1999

HERMISTON OFFICE

COMMENTS OF

G.A.S.P., SIERRA CLUB, OREGON WILDLIFE FEDERATION,  
KARYN JONES, SUSAN JONES, HEATHER BILLY, DEBORAH  
BURNS, JANICE H. LOHMAN, LEANDRA PHILLIPS, MERLE C.  
JONES, CINDY BEATTY, ANDREA E. STINE, DOROTHY IRISH,  
MARY BLOOM, ROBERT J. PALZER, JANET NAGY, LaDONNA  
KING, JOHN SPOMER, CHRISTINE CLARK, STUART DICK, GAIL  
HORNING, DAVID BURNS, PIUS A. HORNING, KARLA STUCK,  
and MELANIE BELTANE

IN SUPPORT OF THEIR REQUEST TO  
SUSPEND AND REVOKE PERMITS FOR  
THE UMATILLA CHEMICAL DEMILITARIZATION FACILITY

Submitted by

Richard E. Condit  
P.O. Box 77001  
Washington, D.C. 20013-8001  
202-955-6968 ext. 4

Stuart A. Sugarman  
3430 S.E. Belmont #101  
Portland, OR 97214  
503-234-2694

dated: December 17, 1999

EQC Meeting May 18, 2000  
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## I. INTRODUCTION

The Commentors have requested that the Oregon Department of Environmental Quality (DEQ) and Oregon Environmental Quality Commission (EQC) (jointly referred to as DEQ/EQC or Agencies) suspend and revoke the permits issued for the Umatilla Chemical Demilitarization Facility (UMCDF). These comments respond to a DEQ Chance to Comment Notice published on or about October 18, 1999. The Notice established an oral public comment session on November 19, 1999, and a written comment deadline of December 17, 1999. The Commentors participated in the November 19<sup>th</sup> meeting and provided prior written and oral comments regarding the pollution abatement system carbon filter units allegedly planned for UMCDF.

In support of their request for revocation of the UMCDF permits, Commentors will rely, in part, on the extensive record already before the Agencies. This record includes the following:

- (1) References to the administrative record (AR) created during the permitting process.
- (2) The oral and written comments provided to the Agencies regarding the pollution abatement system carbon filter units.
- (3) The record of new evidence that was presented initially to the Circuit Court. This material has been expertly organized and catalogued by DEQ staff in a two volume set identified as Documentation Related to Case No. 9708-06159 (Aug. 1997 - June 1999). This two volume set contains pleadings and briefs

filed with the Circuit Court, Circuit Court decisions, and a full set of exhibits number 1 through 74. The Commentors will rely on this documentation.

- (4) The Commentors letter to the EQC dated December 14, 1998 and the documents included in that submission will also be relied upon to support the Commentors request for revocation.
- (5) The Comments and supporting documentation provided by Oregon CPR and air-modeling summary provided by Dr. Halstead Harrison.

A. How did we get here?

The issues presented in these comments and comments presented throughout this year are a culmination of the new evidence and issues that the Commentors have been trying desperately to have a court or agency promptly address. During the first phase of litigation of the UMCDF permits before the Circuit Court, counsel for the EQC/DEQ sought to dismiss the evidence the Commentors sought to introduce because it had not been previously presented to the agencies. For example, counsel for the agencies argued on one issue that "[e]vidence of stack releases at Tooele . . . might be relevant to a future decision to modify or revoke the permits . . . EQC/DEQ Brief (98-1287) to Circuit Court at 22 (Sept. 30, 1998). This same brief made similar points on a variety of issues. *Id.* at 18-26. Overall, the effort by the agencies in court appeared to the Commentors to merely be a tactic designed to delay assessment of the issues being raised.

In an effort to obtain immediate review of these important issues by the EQC/DEQ the Commentors submitted a detailed letter on December 14, 1998 seeking to halt construction at

UMCDF and obtain a contested case hearing on the important issues being raised. At least eighteen exhibits were submitted with the letter along with a promise to provide additional evidence once the Agencies advised the Commentors of a process for consideration of their concerns. Further, the Commentors sought a hearing within forty-five days in order to quickly assess and make decisions on the issues and evidence being raised.

The Circuit Court was inclined to agree that arguably "new" facts should be considered by the agencies before receiving court review. On June 1, 1999, the Circuit Court issued a Final Judgment that concluded the first phase of the permit litigation. In its Opinion and Order Denying Supplemental Petitions and for Final Judgment (Final Order) the Court memorialized the agencies' agreement to evaluate the Commentors December 14, 1998 letter as presenting requests for revocation and/or reconsideration of the UMCDF permits based upon new evidence. Final Order (99-0942) at 4-5.

Over one year later, the Commentors are submitting their written comments on the issues meriting revocation of the UMCDF permits without the benefit of a contested case process. A contested case process would have benefited the agencies and all the parties as it could have helped put to rest many difficult issues. If the agencies had provided a contested case process, the record now being made on the critical issues discussed herein would overwhelmingly favor revocation of the UMCDF permits. Given the deadly serious nature of the chemical warfare agent disposal process and the risks of serious injury and death to workers and nearby residents, the Commentors strongly believe that the agencies' refusal to provide a contested case process is a gross denial of their right to due process.

B. Persons effected

Many members of Commentor organizations and individual Commentors live, work, and/or recreate in close proximity to UMCDF. See, Exhibits 1-22.<sup>1</sup> Many of the Commentors live or work in the area designated as the Immediate Response Zone (IRZ). Many also consume foods grown in or near the IRZ. See, e.g., Exhibits 1, 3-8, 13, 16, 18, 20, 21. There is little doubt the Commentors have reason to be gravely concerned about all aspects of UMCDF.

II. SUMMARY OF LEGAL STANDARDS

The Commentors are seeking revocation of the current permits that authorize the Army to construct, test, and operate incinerators at UMCDF. A permit shall be terminated if the permittees either: (1) fail in the application or during the permit issuance process to disclose fully all relevant facts or misrepresent any relevant facts; or (2) the permitted activity is determined to be a danger to human health or the environment that cannot be regulated to acceptable levels. 40 C.F.R. § 270.43. As these issues are presently before the EQC, the Commentors will consider their request for revocation to be denied if the EQC fails to provide a decision within sixty (60) days (by February 15, 2000). OAR 340-106-0005(1)(b).

In addition, as the information being offered by the Commentors implicates the very statutory requirements that were supposed to be satisfied in order to permit UMCDF in the first place. Federal standards, which must be adopted and followed by Oregon, provide the following standards regarding public health protection in the permitting process.

In order for the State of Oregon or EPA to approve permits authorizing construction of an incinerator facility for the purposes of treating, storing, and disposing of toxic and hazardous wastes and their byproducts, it must be sure that the facility can be operated so that it will adequately protect public health and the environment. 42 U.S.C. 6925(c); 40 C.F.R. § 270.32(b); In the Matter of Ecolotec, Inc., RCRA Appeal No. 87-14 (Remand Order 12/14/88). The EPA has made it clear that hazardous waste permitting decisions are solely focused on protection of public health and the environment.

Section 3005(c) [42 U.S.C. § 6925(c)] provides that each RCRA permit issued under section 3005 shall contain such terms as the Administrator [or the State] deems necessary to protect human health and the environment. The Congressional intent underlying this amendment is to authorize the Agency to impose permit conditions beyond those mandated by the regulations, such as new or better technologies or other requirements. S. Rep. No. 284, 98th Cong., 1st Sess. 31 (1983). The purpose is to upgrade facility requirements in order to protect human health and the environment. The Agency believes the authority to issue permits containing conditions deemed necessary to protect human health and the environment must encompass the authority to deny permits where necessary to afford such protection.

50 Fed. Reg. 28,723 (July 15, 1985) (emphasis in original). Thus, in Ecolotec the EPA Administrator reasoned that "[m]ere technical compliance with the existing location, design, and operational standards is not ... sufficient to justify permit issuance if human health and the environment cannot be adequately protected." Ecolotec, at 8.

Most significantly, what is referred to as EPA's omnibus authority is reflected in Part 270. As explained in Ecolotec, EPA's omnibus authority is used to ensure that public health is adequately protected when evaluating hazardous waste permits. The regulation states:

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<sup>1</sup> Commentors' Exhibits 1 - 74 are documents already in the possession of the Agencies. These are the documents previously referenced that have been cataloged by DEQ staff in a two-volume set. Any new exhibits submitted in support of these comments will begin with number 75.

GASP, OWF, Sierra Club, *et al.*

Comments in support of suspension and revocation of permit for UMCDF  
December 17, 1999 -- Page 5 of 36



270.32 Establishing permit conditions.

(a) In addition to conditions required in all permits (§ 270.30), the Director shall establish conditions, as required on a case-by-case basis, in permits under 270.50 (duration of permits), 270.33(a) (schedules of compliance), 270.31 (monitoring), and for EPA issued permits only, 270.33(b) (alternate schedules of compliance) and 270.3 (considerations under Federal law).

(b)(1) Each RCRA permit shall include permit conditions necessary to achieve compliance with the Act and regulations, including each of the applicable requirements specified in Parts 264 and 266 through 268 of this chapter. In satisfying this provision, the Administrator may incorporate applicable requirements of Parts 264 and 266 through 268 of this chapter directly into the permit or establish other permit conditions that are based on these parts.

(2) Each permit issued under section 3005 of this act shall contain terms and conditions as the Administrator or State Director determines necessary to protect human health and the environment:

(c) For a State issued permit, an applicable requirement is a State statutory or regulatory requirement which takes effect prior to final administrative disposition of a permit. For a permit issued by EPA, an applicable requirement is a statutory or regulatory requirement (including any interim final regulation) which takes effect prior to the issuance of the permit (except as provided in § 124.86(c) for RCRA permits being processed under Subparts E or F of Part 124). Section 124.14 (reopening of comment period) provides a means for reopening EPA permit proceedings at the discretion of the Director where new requirements become effective during the permitting process and are of sufficient magnitude to make additional proceedings desirable. For State and EPA administered programs, an applicable requirement is also any requirement which takes effect prior to the modification or revocation and reissuance of a permit, to the extent allowed in § 270.41.

(d) New or reissued permits, and to the extent allowed under § 270.41, modified or revoked and reissued permits, shall incorporate each of the applicable requirements referenced in this section and in 40 CFR 270.31.

(e) Incorporation. All permit conditions shall be incorporated either expressly or by reference. If incorporated by reference, a specific citation to the applicable regulations or requirements must be given in the permit.

40 C.F.R. § 270.32. Subsection 270.32(b)(2) is considered the omnibus provision because it provides broad authority for EPA or a state to do what is necessary to protect public health.

One recent EPA decision described Agency's omnibus authority as follows.

Under the omnibus clause, if the operation of a facility would have an adverse impact on the health or environment of the surrounding community, the Agency would be required to include permit terms or conditions that would ensure that such impacts do not occur. Moreover, if the nature of the facility and its proximity to neighboring populations would make it impossible to craft a set of permit terms that would protect the health and environment of such populations, the Agency would have the authority to deny the permit. See In re Marine Shale Processors, Inc., RCRA Appeal No. 94-12, at 48, n.64 (EAB, Mar. 17, 1995) ("[T]he Agency has traditionally read [section 3005(c)(3)] as authorizing denials of permits where the Agency can craft no set of permit conditions or terms that will ensure protection of human health and the environment."). In that event, the facility would have to shut down entirely.

In Re Chemical Waste Management of Indiana, Inc., RCRA Appeal Nos. 95-2 & 95-3, 1995 WL 395962, \*6 (EPA 1995).

The Oregon Legislature has explicitly mandated that protection of public health, safety, and the environment is the paramount purpose of the State's hazardous waste law.

(b) ... the Legislative Assembly declares that it is the purpose of [the hazardous waste law] to:

(A) Protect the public health and safety and environment of Oregon to the maximum extent possible.

ORS § 466.010(1)(a)(b)(A) (emphasis added). Both the DEQ and EQC are directed to enforce and carry out the provisions of the State's hazardous waste law. ORS §§ 466.015 and 466.025.

The Legislature has given some specific direction to the DEQ/EQC regarding the manner in which the Agencies implement the hazardous waste law. For example, Oregon law requires the following:

Before issuing a permit for a new facility designed to dispose of or treat hazardous waste or PCB, the commission must find, on the basis of information submitted by the applicant, the department or any other interested party, that the proposed facility meets the following criteria:

(1) The proposed facility location:

(a) Is suitable for the type and amount of hazardous waste or PCB intended for treatment or disposal at the facility;

(b) Provides the maximum protection possible to the public health and safety and environment of Oregon from release of the hazardous waste or PCB stored, treated or disposed of at the facility; and

(c) Is situated sufficient distance from urban growth boundaries, as defined in ORS 197.295, to protect the public health and safety, accessible by transportation routes that minimize the threat to the public health and safety and to the environment and sufficient distance from parks, wilderness and recreation areas to prevent adverse impacts on the public use and enjoyment of those areas.

(2) Subject to any applicable standards adopted under ORS 466.035, the design of the proposed facility:

(a) Allows for treatment or disposal of the range of hazardous waste or PCB as required by the commission; and

(b) Significantly adds to:

(A) The range of hazardous waste or PCB handled at a treatment or disposal facility currently permitted under ORS 466.005 to 466.385; or

(B) The type of technology employed at a treatment or disposal facility currently permitted under ORS 466.005 to 466.385.

(3) The proposed facility uses the best available technology for treating or disposing of hazardous waste or PCB as determined by the department or the United States Environmental Protection Agency.

(4) The need for the facility is demonstrated by:

(a) Lack of adequate current treatment or disposal capacity in Oregon, Washington, Idaho and Alaska to handle hazardous waste or PCB generated by Oregon companies;

(b) A finding that operation of the proposed facility would result in a higher level of protection of the public health and safety or environment; or

(c) Significantly lower treatment or disposal costs to Oregon companies.

(5) The proposed hazardous waste or PCB treatment or disposal facility has no major adverse effect on either:

- (a) Public health and safety; or
- (b) Environment of adjacent lands.

ORS 466.055. Many of these standards go beyond or supplement EPA requirements.

Oregon regulations provide additional guidance regarding the application of the best available technology standard to the proposed UMCDF incinerator.

The facility shall use the best technology as determined by the Department for treatment and disposal of hazardous waste and PCB. The facility shall use the highest and best practicable treatment and/or control as determined by the Department to protect public health and safety and the environment.

OAR 340-120-010(2)(c). See, also, OAR 340-120-001(1). If a permit applicant cannot demonstrate that these criteria will be met, then the permit must be denied.

In addition to the best technology requirements, the DEQ/EQC must also ensure that UMCDF meets the General Facility Standards established by state and federal law or regulations. 40 C.F.R. Part 264, Subparts A - H. Similarly, the Agencies must ensure that UMCDF meets specific requirements for hazardous waste incinerators. 40 C.F.R. Part 264, Subpart O.

One of the most critical EPA authored requirements mandates that the UMCDF incinerator "shall be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or nonsudden discharge of hazardous waste or hazardous waste constituents to air, soil, groundwater, or surface water which could threaten the environment or human health." 40 C.F.R. § 264.31. The most important words in this requirement are: "could threaten the environment or human health." This phrase means

that the DEQ/EQC have a duty to prevent injury to the environment or human health by denying authorization to operate or sufficiently limiting such operations to ensure protection.

With these standards firmly in mind the Commentors turn to the facts supporting revocation of the UMCDF permits.

### III. OVERVIEW OF FACTS THAT REQUIRE THE DEQ/EQC TO FINALLY REJECT THE TECHNICAL AND NON-TECHNICAL STATEMENTS OFFERED BY THE ARMY TO EXPLAIN THE LIMITATIONS AND FAILURES OF THE INCINERATION TECHNOLOGY

Commentors have seen throughout the permitting and construction process involving UMCDF how the Army has charmed, lobbied, bombarded with technical information, and cajoled state and local officials on a variety of issues. For example, consider the Army's recent discussion regarding the dunnage incinerator (DUN) for UMCDF. Although, the Commission and DEQ staff exhibited skepticism about the Army's decision to consider a different treatment method for dunnage, there were no hard questions asked. One important issue that should be addressed concerning the DUN is when did the Army first encounter serious design and/or operation problems with the DUN? This question is important because the Commentors have seen evidence indicating that the Army and its contractors have known for quite sometime that the DUN was not a viable piece of the baseline incineration system. See, e.g., Affidavit of Gary E. Harris (Harris Afft. or Exhibit 75) ¶¶ 53-54, 60, 115; Exhibits 23, 49. Further, Commentors believe the totality of facts and circumstances surrounding the baseline program will show that the DUN was not viable long before the UMCDF permits were approved. The Army's new found concern for cost is simply a ruse to justify its desire to — now officially eliminate the DUN.

Why couldn't the cost or other issues concerning the DUN have been raised prior to permit approval? Because such an admission would have raised further doubts about the baseline incineration system and delayed the acquisition of permits. Once the permits are in hand, the Army feels free to add modification after modification until the facility is nothing like the one permitted. The documentation for permit modifications at UMCDF now totals 18,000 pages.

The deception involving the DUN and the other issues described herein makes a mockery of the initial permitting process, including risk assessment, technology assessment, and public participation. It is important to investigate these issues because the change in the Army's baseline program may change the Agencies' assessment of the technology, human health impacts, and/or environmental impacts. The Commentors urge the Agencies to check all modification requests against when issues or problems were first known to the Army. Commentors believe there is a pattern emerging concerning important issues the Army was aware of during the permitting process, but failed to inform the Agencies of in order to ensure initial receipt of a permit. The important issues that come to mind and make the point raised here include: toxicity of the agents; viability of the DUN; viability of the brine reduction area (BRA); solidification or gelling of agents in stored munitions; agent stack releases; worker exposures to agent; and the viability of the pollution abatement system carbon filter units. Each of these issues has evolved with significant new<sup>2</sup> information since the permits were granted. This means that the EQC approved a significantly different facility on paper, than might be tested and operated in the future. Consequently, the Agencies have failed to meet their statutory and regulatory obligations to fully assess UMCDF as best available technology

and have failed to properly assess the risks posed by the facility. This problem is primarily a creation of the Army, but must be sternly addressed by the Agencies.

A. Despite repeated denials, the Army has released nerve agents from TOCDF into the environment.

Another Army myth is that there have been no confirmed releases of nerve agents from the stack at TOCDF. There have been many stack alarms, but according to Army officials these incidents do not result in the confirmation of agent release. See, e.g., Testimony of TOCDF Project Manager Tim Thomas, Exhibit 43 at 2-3. Even in the absence of a stack alarm agent may escape into the environment. See, Exhibits 31, 32, 34 (regarding the March 30, 1998 overfeed of agent GB into the Metal Parts Furnace at TOCDF). Interestingly, during the federal court trial regarding TOCDF in June 1999 the Army failed to produce evidence from stack DAAMS tubes to prove that agent had not been detected in the stack on March 30, 1998.

The Commentors have obtained a copy of an internal EG&G document that sheds further light on the Army's stack release charade. The memo, in part, evaluates the uses of DAAMS tubes to confirm the presence of agent during an ACAMS alarm. The authors of the memo specifically evaluated one incident where agent was not confirmed through the DAAMS analysis, but should have been confirmed had the proper analysis been confirmed. The memo provides the following analysis of one report involving an ACAMS alarm and a DAAMS analysis.

The conclusion is made that because there was not enough agent on the DAAMS tube to calculate an 8 hour TWA [time weighted average] above the LOQ [limit of quantification], that the ACAMS was a false positive. This is an improper conclusion

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<sup>2</sup> That is, new to regulators and the public.  
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... For confirmation of the ACAMS, the DAAMS tube needed only contain a mass of 0.060 ng [nanograms]. The mass of agent on the two tubes was 0.93 ng on one and 1.48 ng on the other. This is well over the needed mass to confirm the ACAMS.<sup>3</sup>

The memo concludes by recommending the review of all reports that used DAAMS data in the decision making process.<sup>4</sup> It remains to be seen if the recommendation will be followed and how many agent releases from the stack and elsewhere will be "newly" confirmed for TOCDF.

This information is important for risk calculations for workers and the public. It is also important for assessing the Army's agent monitoring, emergency preparedness, and contingency planning capabilities. At this stage of construction at UMCDF, the uncertainty that exists regarding these critical issues requires suspension of the permits followed by revocation. The Army has only itself to blame for any delay that such a prudent action would cause.

**B. Despite repeated denials, the Army has exposed TOCDF workers to nerve agent.**

Another Army word game that directly impacts public health involves the determination of worker "exposure" to chemical warfare agents. Instead of following a common sense approach which would indicate that a worker is exposed when s/he comes in contact with agents, the Army requires a blood test indicating a certain level of cholinesterase depression in order to confirm an exposure.

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<sup>3</sup> Exhibit 76: EG&G Interoffice Correspondence from Sam Guello and Fred Burton to Mike Rowe, Jack Maddox, and James Colburn dated October 15, 1999 at 2.

<sup>4</sup> *Id.* at 3.  
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A recent event at TOCDF indicates that workers have clearly been exposed to agents during operations. An internal EG&G memo describes an incident where readings on the skin of exposed workers exceeded four (4) TWA. See, letter with attachments from Jackson P. Maddox (EG&G) to Army Contracting Officer Janice Wards dated August 6, 1999 (Exhibit 77).

C. At TOCDF the Army rigged the trial burns to ensure permitting.

It appears that the Army was able to manipulate the trial burn process at TOCDF in order to avoid being tested in ways that might result in failure. The testing methods also appear to have avoided testing actual conditions that are repeatedly experienced during operations. For example, ton containers were sawed in half to ensure an efficient burn. Harris Afft. ¶¶ 8-9. Ton containers with solidified agents were rejected during the trial burn process. Harris Afft. ¶¶ 42-45.

Moreover, there was a pattern of rejecting the gelled or hard to burn munitions during trial and mini-burn activities at TOCDF. This is documented in a recently obtained internal Army document. See, Issues and Directed Actions with Fact Sheet, 6 December 1999 (Exhibit 78) at 2, 4, 8. This document also indicates that the Army has been aware of the gelling/solidification problem for some time and recognizes that the condition of the agents in the munitions affects the waste analysis. Exhibit 78 at 4-5.

The compromise of the TOCDF trial burns renders the data from those burns virtually useless for calculation of emissions and risks at UMCDF. The trial burn manipulation also demonstrates gross weaknesses in the incineration system, which should have been clearly identified during the permitting process.

- D. At TOCDF the Army manipulated the permit modification process in order to avoid public scrutiny and input.

As noted earlier, the Army has used the permit modification process to create the "real" permit for TOCDF and UMCDF. This manipulation violates the letter and spirit of the laws and regulations that govern the permit evaluation process. Gary Harris notes several instances of such manipulation in his affidavit. Harris Afft. ¶¶ 20, 35, 66-72, 111-112.

Similar abuses of the permitting process are evident in the carbon filter and DUN replacement issues being raised at UMCDF.

#### IV. FACTS REQUIRING A DECISION TO SUSPEND AND THEN REVOKE THE ARMY'S PERMIT TO CONSTRUCT, TEST, AND OPERATE A CHEMICAL WARFARE AGENT INCINERATION FACILITY

- A. Inadequate emergency preparedness and community protection

Worker Incident: September 15, 1999

Existing procedures for dealing with the type of incident which occurred on September 15, 1999 at the UMCDF were ignored by PMCD and Raytheon Demilitarization Corporation (RDC) in an attempt to mitigate any image or other problems which may have resulted in the information concerning this event getting into the public arena.

PMCD and Raytheon did not notify the Depot Commander of the incident until between 28 and 30 minutes after the occurrence, knowingly violating agreements surrounding such events.

PMCD and Raytheon made the unilateral determination that the incident was not a chemical event knowingly violating agreements surrounding such events.

PMCD and Raytheon failed to provide adequate medical attention to impacted workers for more than two hours after the incident occurred, knowingly violating procedures surrounding such events.

PMCD and Raytheon knowingly falsely represented their handling of the incident in a public hearing on November 1, 1999.

#### Basis of Comments

Appropriate procedures were not followed to determine the type of event which took place on September 15, 1999.

#### Standard Operating Procedure

The Memorandum of Agreement (MOU) signed January 4, 1999 between the Deputy Chief of Staff for Chemical and Biological Matters and the Program Manager for Chemical Demilitarization states, "[w]here the installation is a SBCCOM Chemical Depot the Commander will execute the Installation and Chemical Activity functions described below."

The Umatilla Chemical Depot is a SBCCOM Chemical Depot. The MOU states that the AMC Commander, in this instance, Lt. Col. Woloszyn shall,

1) "Determine if any abnormal situation warrants characterization as a chemical event."

2) "Program, budget and provide for coordinated security, emergency response, .... medical support, .....from installation assets." (emphasis added).

3) "Serve as the Initial Response Force Commander/Federal On-Scene Coordinator and direct all installation and tenant resources for response, recovery, and remediation during all simulated or actual chemical events."

#### Incident Facts

According to the UMCD/RDC document "Fact Finding Mission - UMCDF Industrial Release (September 15, 1999)", presented at the public meeting on November 1, 1999 they state:

a) RDC: "The (RDC) Deputy Project Manager, in discussion with Safety and Construction Management, concluded that the incident was not related to chemical agent from K-Block." (Violates MOU)

UMCD: "It was clear from the beginning that this was not a chemical event." (Violates MOU);

b) RDC: "The initial assessment of employee symptoms was made at the construction site infirmary by EMT/Paramedics." (emphasis added) (Violates MOU);

c) UMCD: "Initial notification confirmed this was a construction site vs. a chemical weapons incident. Therefore, normal CAIRA response plan actions were not taken." (Violates MOU). Note: The Depot Commander is required to determine if the incident is a chemical event, and if so, is required to provide the Initial Response Force. In this case the Commander was not

notified until after the determination was made by unauthorized personal

(PMCD/RDC). To date the cause of the worker illness has yet to be determined and thus, the root cause should still consider chemical agents in their investigation. Outcomes could determine chemical agent as the cause, in which case the PMCD/RDC determination to exclude the Commander from responding would violate MOU.

According to the RECORD transcribed at the November 1, 1999 public meeting:

a) Mr. Bluestein (RDC) stated, "It was deemed to be an industrial incident, and it was felt, again, lessons learned, it was felt that we could handle it ourselves and it wasn't to the point that we needed extra help." (Violates MOU);

b) Lt. Col. Woloszyn stated, "The initial immediate response was slow. Actually, it was two hours." ( Violates MOU);

c) Lt. Col. Woloszyn stated, "In this situation, there were 30 workers inside one room inside one building. The people in the EOC looked at that, analyzed that, and the leadership came to a decision that it could not have been chemical agents." ( Record Transcript from Nov. 1, 1999 public meeting at 65) Note: This is more than 30 minutes after PMCD/RDC already made the determination, had sent workers to the hospital and were attempting to control the situation from the construction site. (Violates MOU ).

d) In response to DEQ question, " When was the EOC first notified that the incident had occurred?" ) Lt. Col. Woloszyn stated, The first notification, I believe, came at 11:30." (Violates MOU). (Public Record at 67);

e) In response to DEQ question, " Who was in command? Who was making decisions?"

RDC's Mr. Bluestein stated, "At that time (11:30) my deputy and as well as the construction manager were working with the safety manager and making decisions on the spot." (Violates MOU). ( Public Meeting Record at 69).

PMCD/RDC failed to provide adequate medical attention to stricken workers and knowingly falsely represented their handling of the medical attention provided immediately after the incident at the November 1, 1999 public meeting.

a) According to the RECORD transcribed at the November 1, 1999 public meeting:

RDC's Mr. Bluestein: "We did have a couple of employees who were seriously injured, at least indicated they were serious, Those were treated first. The balance were then treated." (at 6).

RDC's Mr. Bluestein: "...in the period of about 11:05 to around 12:00 as we triaged the system, we discovered 34 people that were experiencing symptoms."

Lt. Col. Woloszyn, in response to the question, "But in this case, your clinic was not part of the process?" Stated, "That's correct." (at 42)

Mr. Bluestein, in response to the question, "How come it took two hours for workers to go from the site to Hermiston hospital?", stated, "The EMT's took care of two that were I'm going to use the word more seriously injured than the other two. And then they went to the triage and worked their way down." (at 46)

According to the following individuals' presentations at that same meeting, the following statements were given:

Mr. Brian Zazzo: "I'm one of the workers, and I was refused medical care. I wasn't triaged on this job. I was told to sit in the shade on the side of the trailer. I asked continually from an hour after the incident and I was told the people that were up there did not have the

authority to have me transported. This was not just a learning process. This was a process to keep us from having medical attention.

There was no triage going. The millwrights were giving first aid to one of the people that was injured, not anybody from Raytheon. And the safety personnel just flat refused us medical care. And I have documented this, and have witnesses to this fact."

Mr. Zazzo continued, "We were kept on the job against our will. We were refused transportation to the hospital or medical care."

Mr. Tony Kimball: "I'm an injured worker. They sent us to the trailer, and then they sent us up there, and I sat there for an hour and a half, and Brian is sitting there looking at me saying, 'He needs to go to the hospital now.'"

"No. He needs some fresh air. We'll just let him get some fresh air," said RDC Management.

Kimball continued, "For an hour and a half after -- when we first left the trailer -- we sat there and were denied, completely denied, medical attention.

#### Conclusion

Based on the facts as presented it is the commentors position that RDC and PMCD have, in an attempt to mitigate any image or other problems which may have resulted in the information concerning this event getting into the public arena, violated their own procedures, put workers at undue risk and lied about their response during the incident.

Furthermore, it is the contention of Commentors that PMCD and Raytheon

Chemical Demilitarization Corporation have shown by their actions in this instance their inability and unwillingness to operate the proposed facility in compliance with the provisions of ORS 466.005 to 466.385 and 466.890 or any condition imposed on the Permittee by the Commission.

**B. Failure to consider the human health and environmental risks associated with operation of pollution abatement system carbon filter units**

The carbon filter unit has been permitted and is anticipated by the EQC to be installed and operated at UMCDF. The EQC, in its revised Findings and Conclusions regarding the UMCDF permit, determined that the carbon filter unit provided an additional measure of safety for the public.

However, despite the information provided in the permit application for UMCDF and the public comments taken on the draft permit, it now turns out that the Army does not even have a design in place for the PAS-CF unit. The National Research Council (NRC) confirmed this fact in the following statement. "Final designs for the carbon filter systems for the Umatilla or Anniston sites had not been presented to the committee at the time this report was completed." Carbon Filtration for Reducing Emissions from Chemical Agent Incineration. (NRC 1999) at 31. The NRC's revelation strongly indicates that the Army did not have a final design in place when it submitted its original permit application and later revisions. Under these circumstances the permit application was not complete and the EQC had no authority to issue the permit. OAR 340-105-0010(3)(a) and (b).



The EQC and the public have been misled about the carbon filter unit. Considering that the EQC had no authority to issue the permit for UMCDF, the Commentors request that the EQC immediately revoke the permit.

Moreover, without a design in place the Commission could not properly evaluate the operating conditions, malfunctions, upsets, and risks that could be encountered by installing and operating the PAS-CF unit. Both statute and regulation require the DEQ and EQC to set permit conditions necessary to protect public health and the environment: ORS § 466.055(5); 40 C.F.R. § 270.32(b). It is clear from available data that there are significant risks associated with the operation of a carbon filter unit.

Yet, despite prior concerns raised by the Commentors, the EQC and DEQ have failed to assess what negative impacts may result from the addition of a carbon filter unit. This is particularly troubling considering that construction of UMCDF is more than fifty percent complete.

The NRC report, presented to the Commission on August 18, 1999, makes clear that there are significant risks to consider including, carbon fire, accumulation and release of chemical warfare agents and other dangerous chemicals (i.e., dioxin, PCBs, etc.) from a carbon filter unit, and the subsequent treatment and disposal of contaminated carbon filters. NRC 1999 at 9). The estimated risk to workers alone due to upsets of a PAS-CF unit are significant ( $3.3 \times E-05$  or 33 per million). NRC 1999 at 42. The estimated risk to workers alone exceeds the Environmental Protection Agency's 10 per million risk standard for hazardous waste facilities.

As noted in previous comments to the DEQ, the Army has been aware of the potential risks of adding a PAS-CF unit. The summary of information provided below reflects the

Army's knowledge of some of the risks that may be associated with the operation of a carbon filter unit.

"Since the Army's initial assessment, additional risk assessment tools have been developed to assist in the characterization of baseline system performance, both with and without the proposed PAS filter system.

Preliminary assessments using these tools indicate that the addition of the PAS filter system may not contribute to any measurable reduction in risk and may actually be the source of new risk to both workers and to the public."

Department of Defense; Interim Status Assessment of the Chemical Stockpile Disposal Program: April, 1996.

"Two areas where cost reductions have been identified in developing the December 1996 cost estimate are associated with the filter system for the Pollution Abatement System (PAS) and optimizing operations. The Program Manager has completed a value engineering study that modified the design and found reductions in capital and operating costs." (Statement before the House National Security Committee of the House of Representatives by Mr. Gil Decker, Assistant Secretary Army/Research Development and Acquisition).

A risk assessment performed for the Army by Mitretek acknowledges a large percent increase in the frequency of some accident events (from 168% to 385% more likely) due to addition of the PFS carbon filters. Mitretek at 4-13 (Table 4-8). Moreover, the addition of PFS carbon filters presents new accident scenarios "not present in the baseline QRA [Quantitative Risk Assessment]." Mitretek at 4-14 to 4-18. The addition of PFS carbon filters also presents "a 13 percent increase in worker fatality risk for the UMCDF." Mitretek

RA at 4-30. Finally, the Mitretek PAFS Risk Assessment acknowledges that significant uncertainties in the QRA process have not been "treated", "including uncertainty in the parameters affecting the downwind transport of agent and in the dose/response behavior of the population." Mitretek at 4-35. See, Mitretek Systems, Inc. "Risk Assessment of the Pollution Abatement Filter System for the Umatilla Chemical Agent Disposal Facility" (Draft September 1998). The prior analysis as well as the following pages of the Mitretek assessment were previously offered into the record, cover - vii; 1-1 to 1-2; 3-2 to 3-7; 4-7 to 4-18; 4-30 to 4-36. These pages directly address PAS carbon filter issues as well as other issues related to the overall risk of the baseline incineration system.

It is important to point out that the analyses performed regarding the possible risks of a carbon filter unit were performed, as the NRC noted, "by comparing results for alternative designs." NRC 1999 at 41. Such results are not an accurate assessment of what the risks might be at UMCDF because the design of the PAS-CF unit is still undetermined. While the Army and NRC might feel they are at liberty to speculate about the risks of a system of uncertain design, the DEQ and EQC who are assigned by law to protect public health and the environment cannot take such liberties. The ability of the Agencies to perform their mandated duties to protect public health and the environment has been thwarted by the Army's deception or confusion regarding the design and operation of the PAS-CF unit, and possibly other important systems (i.e., the dunnage incinerator).

**C. Failure to consider and assess the real toxicity of chemical warfare agents**

Before reviewing the latest toxicity information it is important to understand the process by which the existing exposure limits were derived. Air concentrations for

occupational limits were calculated, based on data demonstrated herein to have been tied directly to acute exposure effects. A safety factor for workers was applied to these levels. A further safety factor was then applied for civilians, taking into consideration populations that could be more susceptible to chemical agent effects than others. However, regardless of the safety factors applied, if the data upon which these exposure limits are calculated is invalid, it follows that the resultant "safe" exposure standards are also invalid.

The National Research Council's Review of Acute Human-Toxicity Estimates for Selected Chemical Warfare Agents (NRC Toxicity Review - Exhibit 50) offers important information not previously considered by the Agencies. Commentors offer this document to establish that the EQC was misled concerning a critical aspect of the permitting process (i.e., the likely toxicity of CW agents). Such information is critical to assessing the best available technology (BAT), and establishing emissions standards/limits, as well as determining appropriate emergency procedures. The EQC has not reviewed and considered this information. In sum, the NRC Toxicity Report states in part:

The U.S. Army's Chemical Defense Equipment Process Action Team (CDEPAT) recently conducted an extensive review of the scientific basis for toxicity estimates in use by the Army for several chemical-warfare (CW) agents: GA, GB, GD, GF, VX, and HD. Following a detailed analysis of the toxicity of these agents and using contemporary methods of analysis, CDEPAT concluded that many of the human-toxicity estimates in use would not protect the soldier adequately (CDEPAT 1994). Recalculations of the potencies of several of the CW agents are greater than previously determined. As a result, lower exposure levels of CW are expected to elicit adverse effects.

NRC Toxicity Review at 17. (emphasis added). Thus, the Army has known that the toxicity data concerning the referenced CW agents was incorrect since as early as 1994. Two years before this permit was issued. Yet, the NRC Toxicity

Report was not issued until December 1997, and only became publicly known sometime after that date.

The report also makes the following statement regarding individual sensitivity to CW agents:

The U.S. Army's original purpose for developing human-toxicity estimates for CW agents was to enable it to predict the number of casualties that would occur during an offensive action in which the goal was to kill or incapacitate a certain fraction of the enemy forces (for example, killing or incapacitating a minimum of 50% of the least-sensitive (most-resistant) individuals). Such an approach would actually result in more than half of the exposed individuals dying (the bonus effect), because a certain percentage of those exposed would be expected to be more susceptible than the least-sensitive individual.

NRC Toxicity Report at 1 (emphasis added). Thus, the sensitivity of individuals to nerve agent is a critically important factor when considering accidents and emissions involving CW agents. The EQC/DEQ did not complete such an analysis. Thus, the actions of the Agencies approving the UMCDF permits are inconsistent with statutory requirements. See, ORS 466.010(1)(b)(A); 466.055(5).

The new agent toxicity information creates serious questions and severely undermines the validity of the following:

- \* the Army's Time Weighted Average (TWA) "safe" exposure levels for workers;
- \* the General Population Limits (GPL) for "safe" exposure levels;
- \* the adequacy of the monitoring systems deployed within the CSDP;
- \* the Allowable Stack Concentrations (ASC) currently used within the CSDP;
- \* the Army's CSDP Environmental Impact Statements;
- \* the Army's Quantitative and Human Health Risk Assessments; and, the adequacy of the Chemical Stockpile Emergency Preparedness Program (CSEPP).

See, e.g., Exhibits 40, 41.

**D. Failure to consider and assess the human health and environmental impacts of low level (non-lethal) exposures to nerve agents**

Data from the Gulf War has not been explored in the Human Health Risk Assessment (HHRA). Addendum to Risk Assessment at 5. One of the lessons taught by the Gulf War is that low-level agent exposure alone or in combination with other chemicals can generate a range of disturbing health effects. A July, 1996 report requested by the DOD stated that "[i]t appears that a single exposure ... to a very small amount of GB will produce observable acute signs and/or symptoms." Environment Committee- Armed Forces Epidemiological Board, "Long-term Health Effects Associated with Sub-clinical Exposures to GB and Mustard," July 18, 1996 (Exhibit 51). This document responds in part to the EQC's/DEQ's position in court that the effects of low-level impacts from agents were addressed in an addendum to the risk assessment. See AR 2377 (CD1, Folder 10B, Addendum p. 5.) This statement is misleading as the term addressed suggests the issue was considered substantively. This is not the case. The Addendum states that "[a]t the time the PreRA [pre-trial burn risk assessment] was conducted, additional data on Gulf War veterans was not available." Id. This statement ignores information that was available through the Army.

The report goes on to note:

There are no No Observable Effects Levels (NOELS) established with any degree of confidence for any of the chemical agents. These NOELS would be useful for answering questions related to DESERT STORM, but also for establishing workplace and general population exposure limits for demilitarization efforts.

Exhibit 51 at 6 (emphasis added). This means that exposure to low-levels of agent should be assumed to have some adverse effect. Yet, neither the EQC/DEQ nor their contractor took this into consideration when evaluating BAT, emissions, and accidents involving chemical warfare agents.

Another important low-level agent effects survey was conducted by a committee of the U.S. Congress: Gulf War Veterans Illnesses: VA, DOD Continue to Resist Strong Evidence Linking Toxic Causes to Chronic Health Effects by the Committee on Government Reform and Oversight (Exhibit 52). This report provides further rebuttal to the EQC's/DEQ's arguments in court, and supports the Commentors contention that low-levels (i.e., non-lethal concentrations) of agents must be fully evaluated for potential long term impacts. The report specifically states as part of its findings that "[e]xposures to low levels of chemical warfare agents and other toxins can cause delayed, chronic health effects." Exhibit 52, Findings in Brief (p.6). The information and conclusions of the report establish that the Commentors were correct to be concerned about low-level agent impacts and demonstrates that the Agencies and their contractor clearly erred when they refused to fully assess this issue.

Next is Exhibit 53: Chemical Weapons: DOD Does Not Have a Strategy to Address Low-Level Exposures by the U.S. General Accounting Office (GAO) (September 1998). This report notes that "[p]ast research indicates that low-level exposures to some chemical warfare agents may result in adverse short-term performance and long-term health effects." Exhibit 53, GAO Report at 3. This confirms Petitioners' earlier analysis that the Army has information indicating that low-level impacts were critical to evaluate. It is uncertain whether the Army provided and the EQC/DEQ evaluated the "[p]ast research" referred to by the GAO. -

The GAO report makes several important findings, which include:

\*Past research indicates that low-level exposures to some chemical warfare agents may result in adverse short term performance and long term health effects.

\*Past research by DOD and others indicates that single and repeated low-level exposures to some chemical warfare agents can result in adverse psychological, physiological, behavioral, and performance effects . . . The research, however, does not fully address the effects of low level exposures to a wide variety of agents, either in isolation or combination with other agents and battlefield contaminants; chronic effects; reliability and validity of animal human extrapolation models; the operational implications of the measured adverse impacts; and delayed performance and health effects.

\*Research on animals and humans conducted by DOD and others has identified some adverse psychological, physiological, behavioral and performance effects of low-level exposure to some chemical warfare agents. . . . At low doses, nerve agents [and related pesticides] produce a wide range of effects on the central nervous system, beginning with anxiety and emotional instability. Psychological effects in humans from nerve agent VX on skin have been noted earlier than physical effects (e.g. nausea and vomiting) or appeared in the absence of physical effects. The psychological effects were characterized by difficulty in sustaining attention and slowing of intellectual and motor processes. Doses considerably below the LD50 can degrade performance and alter behavior. . . . Moreover, the detrimental effects of exposure to single doses of nerve agents may be prolonged.

\*In the 1980's, the Air Force conducted research on the bioeffects of single and repeated exposures to low levels of the nerve agent soman . . . . The Air Force found that the nerve agent degraded performance on specific behavior tasks in the absence of obvious

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physical deficits in primates. . . . The research examples reveal that sub-lethal exposures of an agent can have a variety of effects (depending on the species, exposure parameters, time and combination of exposures) and produce measurable, adverse effects on physiology and behavior (both motor and cognitive performance). (GAO at 3-12.)

\*We noted that, as early as the 1950s, studies demonstrated that repeated oral and subcutaneous exposures to neurotoxic organophosphates produced delayed neurotoxic effects in rats and mice. In addition, German personnel who were exposed to nerve agents during World War II displayed signs and symptoms of neurological problems even 5 to 10 years after their last exposure. Long term abnormal neurological and psychiatric symptoms, as well as disturbed brain wave patterns, have also been seen in workers exposed to sarin in manufacturing plants. The same abnormal brain wave disturbances were produced experimentally in non-human primates by exposing them to low doses of sarin. Delayed, chronic neurotoxic effects have also been seen in animal experiments after the administration of organophosphate. In other experiments, animals given a low dosage of the nerve agent sarin for 10 days showed no signs of immediate illness but developed delayed chronic neurotoxicity after 2 weeks. (GAO at 16-17.)

\*Regarding the 2010 Study, we disagree with DOD's statement that there may not be medical effects for low-level chemical agents. Rather our work shows that low-level exposure can have medical effects that cannot only result in casualties, but also disrupt [military] operations. (GAO at 23.)

Careful analysis of low level agent impacts is critical to understanding the risks posed by the UMCDF incinerator because as TOCDF has demonstrated low-levels of agent will be

released throughout life of incineration activities. The failure to perform this analysis requires revocation and re-analysis of the permits for UMCDF.

**E. The analysis of human health and environmental risks posed by dioxin and dioxin-like compounds relied upon by the EQC/DEQ is flawed and seriously underestimates the risks of these dangerous chemicals**

Perhaps the most troubling aspect of the HHRA relied upon by the EQC is its refusal to consider the non-cancer health effects from expected exposures to PCBs, dioxin, dioxin-like chemicals, and the sulfur analogs of dioxins and furans. The risk assessment contractor attempted to justify the failure to recognize non-cancer health impacts from dioxin and related chemicals in the following passage.

EPA does not endorse using RfDs [reference doses] to assess the noncancer effects posed by dioxin. Rather, the margin of exposure approach has been recommended ... If the facility-specific exposures are a small fraction (i.e., 1% to 3%) of the background exposures, [level of contamination that already exists] then the facility is assumed to pose negligible noncancer risks ... Rough calculations for this scenario were performed for the subsistence farmer scenario located at the fence line at UMCDF. This scenario resulted in a dose of .03 picogram per kilogram per day (pg/kg/day), which is within the 1% to 3% range. Therefore ... noncancer effects from potential dioxin emissions do not exceed EPA's benchmark.

Risk Assessment Addendum at 5.<sup>5</sup> This explanation, which was not specifically adopted by the EQC, must be rejected as completely contrary to public health protection principles and inconsistent with Oregon's BAT requirement.

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<sup>5</sup> It is interesting to note that EPA used a reference dose for dioxin identical to the 1 pg/kg/day value established by ATSDR in a recent risk assessment for a dioxin incinerator in Times Beach, Missouri. Apparently, EPA does not strictly prohibit use of a RfD for calculation of dioxin non-cancer risks.

What the quoted passage attempts to avoid is the stark reality that residents of Oregon, and most of the rest of the United States, already have too much dioxin in their bodies. EPA's Dioxin Health Assessment Study concludes that an appropriate RfD for non-cancer effects from dioxin exposure would be 10 to 100 times less than the current national exposure levels for dioxin (1 to 3 pg/km/day).<sup>6,7</sup> Relying, for the moment on EPA's assessment, this would place the dioxin RfD in the range between .01 and .03 pg/km/day.

The "rough" calculation for the subsistence farmer provided in the addendum to the risk assessment reached .03 pg/km/day, the upper end of the RfD. If proper adjustments were made to consider a breast-feeding infant or developing fetus, the .03 RfD would be easily exceeded. Therefore, the EQC has failed to adequately protect these sensitive sub-populations. See, 42 U.S.C. § 6925(c); Ecolotec; ORS §§ 466.010(1)(b), 466.055(5).

Moreover, in light of the serious accumulation of dioxin in the environment and the low threshold for non-cancer effects, the EQC should have taken the position that the best available technology is one that produces no dioxin or dioxin-like chemical emissions. Oregon's prudent BAT requirement, which is more stringent than EPA's approach, dictates that the EQC take full account of the dioxin emergency and reassess the technologies that may be used alone or in combination with others at UMCDF in order to avoid further damage to human health and the environment.

In sum, the excuse that there is no RfD (i.e., safe dose) for dioxin non-cancer effects is so misleading that it could be considered scientific fraud. See, Exhibits 39, 40. The fact that we are all already over the limit for what might be considered a safe dose of dioxin exposure

<sup>6</sup> EPA Health Assessment for TCDD and Related Compounds, Chapter 9, Draft, May 2, 1994, at 51.

<sup>7</sup> A picogram (pg) is a trillionth of a gram.  
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is the obvious reason why EPA chose not to provide a RfD. This reality clearly counsels against permitting sources like the proposed UMCDF incinerator that will emit more dioxin into the environment.

These and other inadequacies of the assessment of risks posed by UMCDF are well described and documented in the Commentors' Exhibits. See, Exhibit 27, Affidavit of Lisa Brenner and Tom Stibolt; Exhibit 28, Affidavit of Trygve Steen; Exhibit 29, Affidavit of J.R. Wilkinson at ¶¶ 8 - 16; Exhibit 74, April 12, 1999 Affidavit of Lisa Brenner and Tom Stibolt. These affidavits describe the failings of the previous EQC/DEQ process. In particular these affidavits support Petitioners' well founded concerns that the EQC/DEQ failed to: (i) thoroughly and properly assess the impacts of the Army's proposed incineration facility; (ii) fully evaluate alternative technologies; (iii) consider impacts of incineration on sensitive populations (i.e., children, elderly, persons with illness); (iv) assess the current environmental burdens of the area; and (v) compare the risks of storage, storage after reconfiguration, alternative technologies and incineration.

Such significant flaws are errors demonstrating that the Agencies failed to completely fulfill their obligation to protect public health and the environment to the maximum extent possible by ensuring that the disposal process chosen would not have a major adverse effect. Moreover, aside from the flaws in the risk assessment process, it is clear that the DEQ/EQC did not undertake an effort to answer the question: will the incineration system proposed by the Army cause a major adverse effect on public health or the environment.

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- F. Non-incineration alternatives must be considered by the EQC/DEQ and implemented at UMCDF in order to comply with the statutory mandate to ensure use of best available technology and that there will be no major adverse effect on public health and safety or the environment of adjacent lands

Department of Defense Assembled Chemical Weapons  
Assessment Program (ACWA)

On September 30, 1996 P.L. 104-208 became law. In significant part, P.L. 104-208 provides:

\$40,000,000 shall only be available for the conduct of a pilot program to identify and demonstrate not less than two alternatives to the baseline incineration process for the demilitarization of assembled chemical munitions: Provided, That the Under Secretary of Defense for Acquisition and Technology shall, not later than December 1, 1996, designate a program manager who is not, nor has been, in direct or immediate control of the baseline reverse assembly incineration demilitarization program [i.e. PMCD] to carry out the pilot.

P.L. 104-208 also provides:

That no funds may be obligated for the construction of a baseline incineration facility at the Lexington Blue Grass Army Depot or the Pueblo Depot Activity until 180 days after the Secretary of Defense has submitted to the Congressional defense committees a report detailing the effectiveness of each alternative chemical munitions demilitarization technology identified and demonstrated under the pilot program and its ability to meet the applicable safety and environmental requirements.

Both the Lexington and Pueblo sites contain explosively-configured chemical weapons. The Lexington site includes 51,740 GB M55 rockets.

The ACWA program is looked at alternative technologies that can be used to retrofit TOCDF/ANCDF/UMCDF. The ACWA program "involves a three-phased approach, evaluation criteria development, technology assessment, and demonstration of not less than two technologies." ACWA has completed the evaluation criteria development and technology

assessment phases as follows: a) evaluation criteria development completed by December 1997; b) technology assessment phase completed on July 29, 1998. ACWA evaluated three technologies that claimed they could destroy all of the waste streams, including the explosives and propellants.

On September 30, 1999, ACWA submitted its Supplemental Report to Congress (Exhibit 79). That report documented two technologies capable of fully treating all munitions and agents (General Atomics Neutralization/SCWO) and munitions containing mustard agent only (Parsons/Allied Signal Neutralization/Biotreatment). A copy of the full ACWA report is available on the ACWA web site and will be forwarded under separate cover.

Both ACWA demonstrated technologies would provide substantial benefits for the disposal of the Umatilla stockpile from both human health and environmental perspectives. Both technologies are superior to incineration. Significantly, the General Atomics technology was designed to be directly retrofitted into the baseline incineration configuration with minimal disruption.

#### Alternative Technology Program (Maryland and Indiana)

As a result of a Congressional mandate to do so, PMCD is building an alternative technology facility in Aberdeen, Maryland to dispose of the chemical weapons stockpiled there. See, Exhibit 63. This alternative technology facility is full-scale and uses a neutralization process that involves mixing the mustard agent with hot water. The resultant sludge is then composted, or "biotreated." After the composting, the "waste" is sent to a sewer plant, not a hazardous waste incinerator. The neutralization-based process was selected as the preferred alternative technology to the incineration process. The State of Maryland has

issued a permit for the facility. See, Letter from Richard W. Collins to Col. Robert J. Spidel dated February 22, 1999 (Exhibit 80).

Similarly, PMCD is in the process of building an alternative technology treatment facility at Newport, Indiana because Congress directed them to consider it. The technology used at Newport involves neutralization by mixing VX with a solution of sodium hydroxide in water near the boiling point. After neutralization, the waste generated would be treated at an on-site Supercritical Water Oxidation (SCWO) facility. After the SCWO process, the liquid "waste" would be sent to a sewer plant.

#### V. CONCLUSION AND RELIEF REQUESTED

The evidence presented by the Commentors herein demands prompt action by the EQC to suspend construction at UMCDF and revoke the Army's permits. The Army's baseline incineration technology is a flawed and failed technology that has been kept alive, not on its merits, but by the unjustifiable commitment of vast amounts of taxpayer dollars. The resources and influence of the Army and its contractors have been overwhelming for most state agencies and local governments. However, those governmental entities, now fully informed, can no longer justify failures to take firm action to get control of the chemical warfare agent disposal process.

It is time for the EQC to mandate a course correction. The baseline incineration technology (whatever form it may take) must be rejected in favor of new and more protective technologies. Such a course change is morally correct and required by federal and state law.

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# ATTACHMENT F

(DEQ Item No. 99-2186)

***“Comments on the Request for Revocation of Permits”***  
***Umatilla Chemical Agent Disposal Facility***  
***Submitted by***  
***Oregon Clearinghouse for Pollution Reduction***

(Comments C-3, C-3A, and C-3B, without additional attachments)  
(See Attachment G for list of documents that were attached)

December 16, 1999

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# OrCPR

The Oregon Clearinghouse for Pollution Reduction

Protecting public health and the environment from toxic substances that disrupt natural systems including improper use, manufacture, transport, storage, release and disposal.

## FILE

99-2186

Wayne Thomas, Umatilla Program Manager  
Oregon DEQ, Hermiston Office  
256 Hurlburt, Suite 105  
Hermiston, OR 97838

December 16, 1999

RE: Comments on the Request for Revocation of Permits  
Umatilla Chemical Agent Disposal Facility  
Permit # ORQ000009431

Enclosed are two separate comments. The first is an abstract provided to us by Dr. Halstead Harrison of his findings from running his air dispersion model against Umatilla Army Base meteorological data. We had hoped that he would complete his report on this exercise so that it could be included in the Chance to Comment on the Request for Revocation of permits, but the written report on the results was not completed in time.

Dr. Harrison's abstract contains important conclusions, and we urge you to follow up by commissioning a full report from him as well as arranging DEQ and public presentations of his results. This is the type of excellent, independent academic work that should characterize data used by DEQ in its decision making process.

The other submission includes the comments from Oregon CPR along with its attachments. We feel that both these submissions, in addition to all the new information submitted since the original permits were granted, support reconsidering the ill advised permit to incinerate chemical weapons at the Umatilla army base. We encourage you to revoke the permit and require advanced technology for disposal of the chemical weapons.

Regards,



Lisa P. Brenner, President

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**FILE**

**99-2187**

**Air-Quality Dispersion Modeling in Complex Terrain  
near the Umatilla Chemical Agent Disposal Facility,  
Hermiston, Oregon.**

**Halstead Harrison  
University of Washington  
Seattle, WA 98195  
<harrison@atmos.washington.edu>**

**December 15, 1999**

**Abstract:**

Meteorological data collected since 1994 with a 30 meter tower at the Umatilla Chemical Demilitarization Facility now under construction near Hermiston, Oregon, indicate a remarkable 42% of 41,617 total hours with stable air. These occur mostly at night, and maximize in winter, but are present in all seasons.

A consequence of this stability will be many episodes with reduced efficiency for the dispersion of chemical tracers emitted by the facility. Simulations with a time-dependent, Lagrangian-Puff air-quality dispersion model suggest infrequent plume "hits" in the neighboring communities of Hermiston, Umatilla, Plymouth, Irrigon, and Boardman, but at concentrations several hundred fold higher than annual averages. Attention should therefore be paid to non-linear effects on the health of the exposed populations and, especially, to off-design emissions during the very frequent conditions with stable air.

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99-2188

Comments on the Request for Revocation of Permits  
Umatilla Chemical Agent Disposal Facility  
Permit # ORQ000009431

Provided by Lisa P Brenner, PhD and Thomas B. Stibolt MD  
Oregon Clearinghouse for Pollution Reduction

## INTRODUCTION

### A Flawed Public Process

This November DEQ held several stakeholder meetings at which a brochure was passed out titled: "Oregon Department of Environmental Quality: Mission, Vision, Values, Strategies and Goals, July 1999." In the brochure under "Value, Excellence and Integrity," is the statement: "We make decisions based on facts and science."

It is ironic, then that since the beginning of the permit process for the Umatilla Chemical Weapons Disposal facility DEQ has encouraged but then ignored public presentations of fact and science. This one way street has become an exercise in futility.

The November 1999 DEQ Carbon Filter report to the EQC by Sue Oliver is a disheartening continuation of the agency's failure to objectively "make decisions based on facts and science." The report, and its acceptance by the EQC without comment, was the latest act in the judicially arranged review of the EQC's original decision to permit incineration of chemical weapons based on issues surrounding the role of carbon filters.

To volunteers who are involved on behalf of public interest concerns and who have not received a penny in compensation for many months of work over many long years, DEQ's unwillingness to accept good arguments at face value, to pursue important concerns that have been raised both locally and at other chemical weapon depot sites, and to continue using sources such as E&E that have close ties and major funding from the U.S. Military which the DEQ then calls "independent" is extremely disheartening.

Included as Attachment 1 is E&E's web information showing Department of Defense contracts totaling over 50 million awarded in 1999. E&E's July 31 fiscal 1999 year report lists 63.3 million in total revenue. The large majority of E&E's business comes from DOD and EPA. Reasonable persons would not hire them as an independent source to review Army submissions. But DEQ relied on E&E for its risk assessment and for continuing consulting. (DEQ did not provide Oregon CPR a copy of their contract with and payments to E&E as requested.)

### Vitiating important evidence

In addition to our previously submitted critique of Kristiina Iisa's Carbon Filter Report (the rebuttal by E&E is discussed here), we submitted testimony regarding carbon filters in September of 1999. We, as well as other commentators, faulted the current incinerator designs as not including carbon injection. Kristiina Iisa cited carbon injection as being "used extensively in Europe," Nonetheless, Sue Oliver claimed in her report that the permitted incinerator would include all components mentioned in the *Journal of Hazardous Materials* article, "Overview of municipal waste incineration industry in west Europe (based on the German experience."

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Oregon CPR Testimony Dec. 16, 1999

Carbon injection is not, in fact, a component of the Umatilla incinerator, and we point out yet again that our September testimony specifically mentioned carbon injection as a component of modern incineration systems as mentioned in that 1996 article. It is extremely frustrating to have DEQ sidestep to avoid a discussion of European incinerators which use carbon bed filters only as a "polishing" finishing touch, while the same incinerators rely on carbon injection for major dioxin removal.

This particular point, and the referenced article is terribly important because it calls into question the NRC claim that European incinerators use carbon bed filters as a major component of their PAS. In a deposition taken in the Arkansas court case contesting their proposed chemical weapons incinerator, Marty Hopkins, current Program Manager for Chemical Demilitarization, Aberdeen Proving Ground, Maryland, states (Questioned by Richard Condit. See Attachment 2):

A. Well, most recently the National Research Council conducted an evaluation of the Army's evaluation of the Anniston and Umatilla PFS risk assessment. In that report they identified approximately 20 other industrial or industrial incinerator applications, including hazardous waste incinerators, that applied carbon filter technology.

Q. Are any of those facilities regulated and located in the United States?

A. I believe most of them are in Europe. All of them may be in Europe. I'd have to go back and check.

Q. So are you aware as you sit here today of any hazardous waste incinerator in the United States of America subject to United States or state laws that has a carbon filter unit like the one that you've been discussing here today?

A. No, sir.

When important evidence is submitted and vitiated, no sound decisions can result.

### **Demonizing**

Sue Oliver describes our critique of the Lisa Carbon Filter Report, "Exhibit 74": "The critique contains extensive and serious allegations about 'whether the report authored by Kristiina Iisa...is a deliberate attempt to mislead the reader.' Why did she leave out the rest of the sentence, which was: "...or instead, simply poor writing on the part on an individual who is unskilled in or inexperienced with scientific inquiry and reporting techniques."? Frankly, Kristiina Iisa was an inexperienced Assistant Professor who had few publications and left the University environment two months after submitting her report. It is our bet that the latter explanation is the most likely, although we also expect that she may also have been "helped" by the army.

In light of all this, it is laughable that the E&E authors continue to describe Kristiina Iisa as "Professor Iisa". Outside of the classroom only tenured, full professors are officially identified as "Professor".

We are tired of DEQ's lumping commentators into the same pool and characterizing us or hiring someone to characterize us in unflattering terms as this selective quoting indicates. For example, EQC minutes characterize Dr. Stibolt's comments (at the carbon filter EQC work session) as on behalf of "the petitioners." Oregon CPR is not a petitioner. Dr. Stibolt's comments (as he stated at the time) were on behalf of Oregon CPR and the greater environmental community, that has been discouraged by DEQ's failure to act on their previous comments. Inviting community participation and then belittling those who participate is a petty strategy

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### Not pursuing important information

As a part of that testimony we also urged DEQ to obtain important depositions produced as a component of the ongoing court case relating to the Utah chemical weapons incinerator as soon as they were available. We know that the depositions were available well before the November report to the EQC. We know what DEQ could have learned about carbon filter and dioxin emissions from those depositions and could have, but did not include them in their report.

For example, here are brief samples from one deposition concerning the decision to not include carbon filters at Utah, in the words of the contractor's former chief permit coordinator. The first excerpt documents known problems with the use of carbon bed filters:

51. PMCD wanted to avoid schedule delays from what would otherwise be legally required permit modifications and engaged in illegal conduct to avoid such delays. One example was the PAFS (Carbon Stack Filter) PMCD wanted EG&G to convince the state that the PAFS was not required and would not work. My engineers were used, and spent a lot of time to show why it was not needed. The flyash that was visible on cars and other surfaces at TOCDF that is emitted from the stack would have plugged the carbon stack filter. Use of the carbon stack filter would have complicated the delicate balance among the pressures that must be maintained throughout the incineration and HVAC systems, increasing the likelihood that an incinerator will go positive. Use of the carbon stack filter would have reduced combustion air, combustion air turbulence and oxidizing air. Use of the carbon stack filter would have required a class 3 permit modification with resulting substantial schedule delays.

54. We were told not to take the DUN out of the permit as that would bring up questions about how to handle the waste streams including the carbon filters with agent, and we had no answers. This would lead to permit delays, so my department (environmental) was to proceed as though the incinerator worked. My objections again brought verbal reprimands.

86. One possible alternative explanation for the agent break through in the first and second carbon filter banks during the first day of agent operations was that the shock from OD had caused the charcoal in the filters to settle in a manner that left cracks between the charcoal and the frame through which agent could bypass the charcoal.

This explosive vibration from OBOD on the charcoal had been discussed in engineering meetings with EG&G. We also discussed this pressure wave hitting the mustard munitions stored in the open was adding to the "leakers". Mr. \_\_\_\_\_, PMCD instructed EG&G to rotate the charcoal back into banks two and three, but keep using it.

And a brief sample from the same source relating to known problems with emissions sampling at the Utah incinerator that renders data presented by both Lisa and E&E about dioxin emissions erroneous.

105. Mr. \_\_\_\_\_, DEQ, was concerned about down drafts on the common stack during the trial burns. He was concerned about a frequently observed phenomenon of down drafts both outside and inside the stack causing dilution of air samples from combustion gases. As a result DEQ instructed that the sampling cord be moved lower in the stack to reduce this problem. However, the ACAMS sampling port or ports used during operations have not been relocated.

106. Because of cyclonic flows of the exhaust gases from the various incinerators that feed into the large common stack and because of the size of the common stack, it happens that the exhaust gas streams from each of the four incinerators do not intermix with each other but maintain separate paths

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while going through the stack. This phenomenon not only allows for down drafts into the voids in the stack but also creates sampling voids in which sampling probes could be placed which would sample only ambient air and not combustion gas.

108. Because of the cyclonic flow phenomenon in the common stack EG&G Engineers concluded there was a need to monitor at each incinerator duct. This cyclonic flow and non intermixing incinerator plumes with resulting voids in the stack could explain how a duct alarm might not be accompanied by a stack alarm.

109. The Army will never allow stack ACAMS validation testing because they know incineration does not destroy agent--My opinion.

Another deposition taken in the Arkansas court case contesting their proposed chemical weapons incinerator includes statements by Marty Hopkins, current Program Manager for Chemical Demilitarization, Aberdeen Proving Ground, Maryland. These quotes document the Army's reasons for not testing carbon bed filters at JACADS or at Tooele, Utah, including money and difficult questions asked by Utah's Department of Environmental Quality. The quotes also give a sample of the process used in developing PMCD risk assessments for the sites:

In my current -- prior to my current position as the associate state project manager, I was working as an engineer with the what's known as the operations branch or operations team at PMCD. I was largely responsible for a number of special projects, one of which was the risk assessment of the PAS filter system.(p2)

Q. Now, what year, Mr. Hopkins, was the Army considering testing the carbon filter units at the Utah facility?

A. I want to say 1995.

Q. And I wasn't clear. You said that -- in your testimony that JACADS was already in operation. Is that the reason why JACADS was not using it -- used as a test site?

A. Yes, it was believed that there would be less of an impact to the overall program by retrofitting a system at Tooele than at JACADS.

Q. In other words, the Army didn't want to stop the JACADS operation in order to test the carbon filter unit on JACADS; is that correct?

A. That's correct.

Q. You mentioned in discussing the potential testing of the carbon filter units in Utah that there were -- that the life cycle costs were significantly higher, that's what my notes have; is that correct?

A. Yes, sir.

Q. Can you tell us what you're talking about when you're referring to life cycle costs please?

A. The life cycle costs refers to the cost to build, install and operate carbon filters at all of the baseline facilities. During the Army's preliminary assessment or -- and report to Congress, the life cycle costs for adding carbon filters -- adding and operating carbon filters at all of the sites with the exception of JACADS, we were looking at the scenario of putting them on all of the -- what are known as the CONUS sites, the continental United States sites. The cost estimate was approximately 260 million dollars. After we began the contracting process at Tooele and began to get actual cost information in from the contractors, it became apparent that our original estimates had been low and that the life cycle cost across -- across the entire program would be somewhere in the range of 600 million dollars.

Q. And is that a reason -- well, let me ask it this way. What -- what action did the Army take or what steps did the Army take following that -- coming to that conclusion that it was a 600 million dollar life cycle cost to add to the continental U.S. facilities?

A. Well, we went back and we reassessed some of the conclusions from the -- from the preliminary assessments. The preliminary assessments or the conclusions and the recommendation to the Congress on the preliminary assessment was that it paralleled with testing the units at -- at Tooele, testing the prototype units at Tooele. Because it was felt that the largest risk to the community was continued risk of storage, we would go ahead and in parallel install the full scale systems at the follow-on sites, Anniston, Umatilla, Pine Bluff, in anticipation that the Tooele test would indicate that the carbon filters were beneficial. We did not -- the reason

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we went in parallel with that is we did not want to have to wait for the -- we wanted to minimize the time it would take to get the PFS up and operational at the follow-on sites following the testing at Tooele. Now, what the Army did is we went back and that original decision in part was based on the fact of a certain capital investment that would be required on the part of the Army at the follow-on sites in advance of the Tooele test results. When we went back and we reassessed the cost increase, that capital -- that capital cost investment at the follow-on sites that would be required prior to the -- to obtaining the Tooele test results were several hundred million dollars higher than -- than had been originally estimated when the decision was made to perform prototype testing and -- and -- excuse me, to perform prototype testing and install the full scale system in parallel. Based on that, with that new information, the Army determined that it would -- it would be more cost effective for the Army and also that we could probably obtain the same sort of test results sooner by going with a -- with a program of modeling and simulation and performing the risk assessment as opposed to the prototype tests.

Q. So cost was a significant consideration in determining whether or not to build and test full scale carbon filter units at the Utah facility; is that correct?

A. Well, they would have been prototype.

Q. Prototype, I'm sorry.

A. Yes. Cost was one consideration, yes.

Q. All right. Now, what type of modeling and simulation work did the Army do in lieu of building these prototype facilities at -- at Tooele?

A. Okay.

Q. And all I'm interested in for the moment is a list, not a detailed description of the activities, but just what's the list of activities that the Army engaged in to do this modeling and simulation?

A. The Army performed some laboratory scale testing of -- of carbon absorption in the laboratory. Based on those results, a computer model was generated to simulate carbon performance. Those results added to -- were used to update the baseline health risk assessment, quantitative risk assessment, to determine potential impacts of the PFS.

Q. So this simulation was simply an assessment of how the carbon would handle the agent and other contaminants? Is that a fair way to characterize it?

A. It was -- we estimated what the -- the model predicted, excuse me, what the removal efficiency -- projected removal efficiency of the carbon would be for those compounds, yes, sir.

Q. And about what year or date, if you know, was this deduction or calculation about the removal efficiency done or created? When did you have that information?

A. 1995, '96 timeframe.

Q. All right. Now, you also indicated that there were some concerns raised by the Utah regulators regarding the addition of carbon filters to the facility there; is that correct?

A. Yes, sir.

Q. All right. Let me show you what has been marked and admitted into evidence as Petitioners' Exhibit Number 6. I'd ask that you take a look at it for a few moments and tell me if you're familiar with it please?

A. Yes, sir, I've seen this.

Q. What is that document as you understand it, sir?

A. This document was the State's response to -- the State of Utah's response to the Army's submission of a class three permit modification request to install the prototype units at Tooele.

Q. As I understand it looking at Petitioners' Exhibit 6, the State of Utah raises about 19 different points or questions regarding the addition of carbon filter units to the Tooele facility; is that correct?

A. Yes, sir. We were in the initial stages of discussion and negotiation with the state.

Q. Was there an Army response prepared to that document?

A. Yes, I believe there was.

Q. All right. And did it review each of those points, the 19 points?

A. No, sir. Approximately a month later, the Army rescinded -- for the reasons I've stated before, made the decision to go with modeling and simulation and issued a letter to the State of Utah requesting to withdraw the permit application.

Q. So just to make sure I understand then, the sequence of events is that the State raises those questions that we just mentioned, and the Army considers it, but the Army's response is to withdraw the request to modify the permit. Is that a fair characterization?

A. Yes, sir. The -- a number of the questions that were raised by the state were things that we were hoping to determine, to utilize the test itself, the prototype test, to determine the answers to. And based on some of the concerns raised by the state, again, that added to the -- to the feeling that modeling and simulation could give us a way to determine some of the results without actual testing at Tooele.

Yet again we urge DEQ to obtain complete copies of all depositions in the Utah and Arkansas cases and read them. We wonder why Utah regulators found the courage to ask the Army hard questions about carbon filter technology and our DEQ does not?

### **DEQ's Blanket Acceptance of E&E's Rebuttal of our critique of the Lisa Carbon Filter Report**

The DEQ report contains a blanket acceptance of the E&E rebuttal of our critique of Kristiina Lisa's Carbon Filter Report. Had they submitted resumes from the E&E authors showing extensive publications and academic recognition in the field of incineration control, we might have had some understanding of DEQ's deference. However, the E&E authors were not presented as academic experts, and we expect that they are not. No credentials of the E&E authors were presented and we are puzzled by what authority they include subjective judgments. Our search of Elsevier publications for articles in the field of incineration by the E&E authors came up with nothing, and we have not seen their names on any scientific publications in the field.

Examining their writing, we conclude that the rebuttal is not a fair examination of our points. An ethical, academic writer would not participate in the tricks of logic used by E&E to obscure our valid points. Their techniques frankly have no credible explanation, nor does DEQ's wholehearted swallowing of the rebuttal.

For example, the E&E authors state:

"The suggestion that the EQC was not aware of Dr. Lisa's involvement is highly unlikely, as she presented the report to the EQC. As discussed below, her report was technically accurate and would not be any more accurate were it also signed by Dr. Frederick or any other professors."

First, our original critique stated concerns that the EQC was unaware, not of Dr. Lisa's involvement, but of the fact that Dr. Frederick was NOT involved, as when we quoted the EQC Chair's stating "And my conclusion in this regard is directed substantially by the results of the two professors from Oregon State University and the testimony provided at the last commission meeting by Professor Lisa..." We were clear in our presentation. Why would E&E substitute Lisa for Frederick and misrepresent a very important point that we made? Would you buy a used car from these authors?

Next, E&E's statement that Dr. Frederick's signature wouldn't make the report any more accurate is an attempt to reduce our concern to the ridiculous by equating the preparation of an independent scholarly report by a full professor and department head with a simple signature. Why didn't DEQ or E&E get a statement from Dr. Frederick validating the report and saying that he would have written the same report? We expect it was because of the points made by our

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critique, that Dr. Lisa's report was that of an inexperienced academic, not the kind of scholarly report that a full professor would produce, or certify as accurate.

Their comments about scholarly writing also reveal a profound failure to properly represent what any educated person understands. They state that "authors do not directly quote their sources to avoid accusations of plagiarism. The opposite is more true. The real issue is inaccurate quoting and inappropriate paraphrasing. Having made this statement, the E&E authors then go on to later include a long, direct quote from the difficult to obtain, industry study that was the subject of our complaint about not using direct quotes. (p7) Their own quote is an example of the same use of citations in scholarly writing that we claim is standard practice. Clearly here they have included an example of correct citation practice while simultaneously claiming that the practice is inappropriate. They conclude that not using direct quotes "does not affect the accuracy of these references." Our main concern was and still is that the lack of quotes from difficult to obtain references prohibits critical examination by the reader, which is a basic element of scientific inquiry.

The E&E authors also dismiss our placing some studies in the context of the political, regulatory arena by stating, in part that "The fact that the authors of these reports work for companies that operate incinerators does not in any way invalidate the results of these studies. These studies are technically accurate, and no contradictory studies are available from other sources." They give no further arguments or references to support these broad assertions. Again, we have to wonder, with what experience and authority do these authors speak.

There is a large and growing body of literature demonstrating that politics and corporate sponsorship affects the reliability of scientific studies. Most recently in the medical field in which we have most experience, Problems in the Design and Reporting of Trials of Antifungal Agents Encountered During Meta-analysis by Helle Krogh Johansen and Peter C. Gøtzsche was published in the Journal of the American Medical Association (1999;282:1752-1759) with an excellent accompanying editorial, "Fair Conduct and Fair Reporting of Clinical Trials" by Drummond Rennie, JAMA editor. (1999;282:1766-1768) which gives a clear example of a growing problem.

#### **No more casting pearls to the swine**

E&E and DEQ are apparently counting on readers being overwhelmed by the difficulty in sorting through E&E's references to us, having forgotten our presentation, and not taking the time to verify their statements. If DEQ would like to hire Oregon CPR as a consultant to rebut the E&E rebuttal at the same rate that they hired E&E, we would do a line by line rebuttal. But we are disheartened by DEQ's failure to utilize our previous hard work, to seek accuracy and facts in this extremely important case. In this submission, we include only enough information to demonstrate the extremely disappointing lack of balance and scientific objectivity in E&E's rebuttal in hopes that someone will bring DEQ to task for not following its stated value of making decisions based on "facts and science."

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## A BRIEF CRITIQUE OF THE REBUTTAL OF THE CRITIQUE OF THE CARBON FILTER REPORT

### What's the point?

The E&E rebuttal does not state its purpose, limit itself to our stated purpose, or include the bulk of our substantive testimony refuting the assertions in the Lisa Carbon Filter Report. Puzzled at the scope of the rebuttal, we asked for a copy of DEQ's directions to E&E in preparing our response. The August 20 DEQ memo to E&E provided to us includes the statement, "Please review the Affidavit, and supporting documents, and provide us a Technical Memorandum concerning the validity of the statements and claims that are made in the Affidavit." The memo also mentions an earlier telephone conversation, where we have to assume the purpose of the rebuttal was frankly discussed.

We have to ask: Why didn't DEQ utilize its own professional staff to evaluate our assertions? Were they as unwilling as Dr. Frederick? Is DEQ issuing permits with perfunctory reviews?

### Out of focus

The E&E rebuttal is a one sided dismissal of not only our critique but also a defense of Lisa's claims using recent EPA and NRC publications. However, our introduction, Focus of Our Analysis, made it clear that we would not include any information outside of the references used by Kristina Lisa:

"The following critique brings no outside information to the Lisa Report other than the content of the references therein. The critique attempts to deconstruct Lisa's knowing manipulation of the data by using the report's own sources, looked at in their entirety. Additionally, this critique points out fallacies and tactics used to distract and mislead the reader of the report."

The main point of our affidavit was to make it clear that Dr. Lisa's report did not appropriately state the uncertainty and contrary conclusions that exists in the literature which she references. This remains an issue, despite the EQC's apparent comfort with assurances from DEQ and E&E.

### Lack of recent information used to discredit us

We directed the reader of our critique to the Pat Costner critique for a technical rebuttal, including additional information known at the time. We did not bring in new information, because that was not the purpose of the report, yet E&E discredits our effort with the inappropriate statement that, "Drs. Brenner and Stibolt seem unaware of these more recent technical documents." Let us respond with the appropriate comment that the E&E authors apparently failed to note our reference to the Pat Costner report or respond to its new evidence while they inappropriately included new test data from the Utah incinerator but failed to include data from the Utah trial depositions indicating problems with incinerator performance, or Utah incident reports.

We also respond with the observation that the EPA report cited by E&E chose to include only four of Dr. Lisa's references out of their forty non-EPA references. The E&E authors can't have it both ways. If they choose EPA as their authority, then EPA did not find the majority of Lisa's references compelling.

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### **An inauspicious beginning**

E&E starts their rebuttal with four quotes from an EPA 1988 Peer Review Draft side by side with quotes from the Lisa Carbon Filter Report, claiming that: **"Although the EPA document does not directly address the merits of carbon filtration or other emission control technologies or specifically discuss the potential for dioxin formation during chemical agent combustion, as can be seen from the above it supports the majority of Professor Lisa's conclusions."** Only two of the quotes actually support the "parallel" Lisa statements included by E&E in its comparison, and even these statements do not represent her most important conclusions. None of the quotes answer the "Although" phrase included by E&E at the beginning of their sentence, which does include the main questions put, not to EPA, but to Jim Frederick, by the EQC. Any reasonable person would question such an opening to the E&E rebuttal.

Under "On the relationship between chlorine feed and dioxin/furan emissions," the second EPA quote states: "Obviously, no D/Fs could be formed without the presence of chlorine." There you have it! No chlorine = no dioxin. E&E provides EPA refutation of Lisa's statement listed in parallel that "... Factors other than the chlorine content have a greater impact on the formation of dioxins and it is impossible to predict dioxin concentrations solely based on the chlorine content of the feed."

The third comparison, "On design technology for preventing dioxin production," E&E quotes Lisa's conclusion, "Hence the incineration technology is not nearly as crucial as the design of the pollution abatement system for formation of dioxin..." The EPA quote only discusses that "...even in systems achieving good combustion ...D/F reformation may occur...downstream." The citation makes no comparison between the relative importance of incineration technology and pollution abatement systems to the absolute production of D/F.

In the case of their last comparison, "On design elements of a pollution abatement system for controlling dioxin emissions," they feature a quote from the Lisa report that we had no complaint with. They should have left "well enough alone" because the similarity between EPA and Lisa's quotes is not even close. She states that "below 250°C the net rates of dioxin formation are negligible. The minimization of the exposure to these temperatures is one of the most efficient methods of preventing dioxin formation." They then quote EPA's example of temperatures of 170-185°F for "low D/F emissions." Astoundingly, they have asked us to equate Lisa's value of 250°C to EPA's value of 170 to 185°F which is 77 to 85°C. **These are significantly different values!**

### **The EPA is not an independent academic source**

If the EQC had wanted advice from EPA they wouldn't have gone to the head of the Chemical Engineering Department at OSU to prepare a report with the latest scientific information. Subsequent to the draft document included with the E&E report, EPA produced and promulgated a MACT rule for Medical Waste Incinerators and a MACT rule for Hazardous Waste Incinerators. The Medical Waste Incinerator rule has been subsequently struck down through a court challenge by the Sierra Club, which has also sued EPA over its Hazardous Waste MACT Rule with a predicted similar prognosis for success in court.

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All of these rules are, as we stated in our critique, a highly politicized process that has little to do with state of the art science, which was what the Carbon Filter Report was to summarize.

### **Beating a dead horse**

To utterly and completely make our point, here are even more recent quotes that directly apply to the question that the EQC asked about the relationship of chlorine to dioxin production. The quotes come from EPA's Response to Comments to the Proposed HWC MACT Rule. We include commentator statements that yet again show how politicized the rule making process is. Note that the EPA acknowledges an exception for incinerators not feeding chlorine, as well as the narrow definition of their mandate. (Misspellings come directly from EPA's web site.)

*Grossman Consulting Comment: "EPA's reconsideration of industry data for preparation of this NODA constitutes nothing less than the clearest form of "junk-science" imaginable. We strongly urge the agency to step back away from their predetermined conclusions. Return to the law and quality science. Continued failure to analyze the available data in a scientifically sound manner is an embarrassment to both the agency and the industry. We need sound rules and limits based on scientific principles designed to protect human health and the environment, not the politically motivated, predetermined approach used to date. Gossman Consulting, Inc. continues to support sound regulation based on congressional intent and scientific principals. Regulations developed to satisfy political agendas does not best serve human health and the environment."*

*Sierra Club Comment: We do not support the unproven theory that suggests that chlorine input is not well correlated to dioxin output. It is too obvious that dioxin output requires chlorine input, and that there is available peer-reviewed scientific evidence to support that such correlations are present in hazardous waste combustors as a fundamental concern in evaluating how to reduce dioxin emissions.*

*British Petroleum Comment: "Feed streams at BP Chemicals Lima plant do not contain the major precursors of concern in the proposed regulation. These streams principally come from distillation operations, with no chlorine use in the unit processes. As such, these streams contain deminimis concentrations of chlorine, particulate, mercury, and metals. Our Lima plant has historic stream composition data to support this conclusion."*

*EPA Response to Commentors: "Response: CAA §112 does not provide us with the outright authority to promulgate regulations that prohibit the combustion of chlorine-containing wastes."*

*" • Potentially low risk on-site incinerators which burn relatively "clean" wastes (referred to by the commenters as needing more relaxed standards) may be exempt based on classification under the new comparable fuels exemption, or get waivers from metals or chlorine emissions testing and operating requirements other than feedrate limits based on low waste metals and/or chlorine levels. Additionally, even if these exemptions are not appropriate, it of course will be all the more easy for these facilities to meet the MACT floor standards because they are low HAP emitting facilities."*

(We include as Attachment 3, these excerpts in their context from comments and EPA's responses to comments.

### **There's lots of sulfur in hell as well as in dioxin reduction**

E&E's page 4, 1<sup>st</sup> paragraph, claims that our critique "misquotes or misrepresents the references such that they are portrayed as stating the opposite of their actual conclusions." This extremely strong accusation is presented in the answer to the first question, in which we actually agreed that four of her references supported her assertions. Although this section does not contain the

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most important questions posed by the EQC, the above accusation is so egregious that we take the time to work through the intricacies of a complicated reference and our attempt to present it.

The E&E authors quote us as saying that "Lisa seriously misquotes several references". They leave off our qualifier, which is: "Lisa seriously misquotes several references **when she equates the effects of sulfur operating alone and sulfur operating in the presence of coal.**" They turn a highly qualified introductory statement into a blanket accusation. This is not ethical.

The E&E authors follow their accusation by analyzing Lisa's reference #2, quoting what they claim to be the article's conclusion "...the conclusion of the reference is that 'the apparent lack of PCDD and PCDF in the emissions from coal-fired combustors may be due to the relatively high concentrations of SO<sub>2</sub>.'" However this quote from Reference 2 is actually taken from the **abstract**, not the conclusion of article itself, which does, as we pointed out, focus on the relationship between copper and sulfur. The authors are making the point in the abstract that the **reduced PCDF/PCDD** is due to the **high concentration** of SO<sub>2</sub>, not the mere presence of SO<sub>2</sub>. The **actual** conclusion of the article on page 1943 states:

"Formation of PCDD between 300 and 500 °C under simulated MWC conditions is **dependent upon a catalyst (e.g. CuO)** that produces Cl<sub>2</sub>, the primary chlorinating agent of the aromatic structures, reaching a maximum at 400 °C. While gas-phase SO<sub>2</sub> has little apparent effect upon the production of PCDD, the presence of S as an upstream reaction product, CuSO<sub>4</sub>, results in minor (less than 1 order of magnitude) reduction of the overall PCDD production mechanism. Although CuSO<sub>4</sub> also catalytically forms Cl<sub>2</sub>, the temperature of maximum Cl<sub>2</sub> production shifts upward to ~500 °C. However, the decreased ability of the CuSO<sub>4</sub> catalyst to produce PCDD is not necessarily linked to the production of Cl<sub>2</sub>. Rather the 2 order of magnitude difference in PCDD production between CuO and CuSO<sub>4</sub> catalysts in the presence of chlorophenol precursors suggests a second catalytic role of Cu species – the CuSO<sub>4</sub> appears to have lower activity than CuO in a biaryl synthesis reaction. **Additional understanding of the PCDD and PCDF formation mechanism is necessary before apparently lower levels of PCDD and PCDF in coal-fired utility boilers can be definitively attributed to CuSO<sub>4</sub> formation alone.**"

Our statement about reference 2 was that it "finds the role of copper as a catalyst negates the effects of sulfur." Another way of stating this is that as the amount of copper increases the effect of sulfur diminishes, and overall the article concludes that it is the relationship between copper and sulfur that appears to determine PCDD formation.

We included the following quote from reference 2, "Addition of SO<sub>2</sub> to these 'baseline' synthesis conditions appears to have little, if any, effect on the production of PCDD at all three temperatures, 300, 400, and 500°C." The E&E rebuttal comments about this quote were, "...however, in some cases dioxin concentrations were below detectable levels in these tests even before the addition of sulfur, and the standard deviation in these results is large. These uncertainties were noted in the text of the paper and did not affect the conclusion." We have quoted the REAL conclusions of the article here, they do not contradict our critique's statements. Why did the E&E authors confuse an abstract with a conclusion?

In our review of this article we neither, as the E&E authors claim, misquoted or misrepresented reference 2. We simply pointed out that this reference does not support Lisa's statement that *"Thus the sulfur in the mustard gas will behave in exactly the same manner as sulfur dioxide*

*added to the incinerators in the tests or sulfur in coal and the results are applicable to combustion of mustard in the incinerators."*

The E&E sulfur discussion continues to incorrectly state that "it remains true that all tests of sulfur as a waste feed additive resulted in the significant inhibition of dioxin formation under most conditions". In fact, the references show that the effect can be quite small under a number of scenarios. They also state that "the potential physical processes by which sulfur inhibits dioxin formation have been identified, namely, that sulfur may reduce chlorine gas (necessary for dioxin formation) to hydrogen chloride". Not a very convincing statement, it is further refuted in Lisa's reference 2 on page 1942, fifth paragraph "In the declining temperature flue gas environment, it follows then that the apparently minimal amounts of PCDD and PCDF detected in coal-fired combustors is not attributable to depletion of the  $Cl_2$  chlorinating agent through direct homogeneous reaction with  $SO_2$ ".

The real world is considerably more complicated than Lisa presented it to be, or that the E&E authors believe when they say "There is no reason to believe that sulfur mustard would behave in a significantly different manner than coal..." They conclude "... nor is any such reason stated in the affidavit.". We encourage the reader to read page 9 of our affidavit, where we do state reasons quite clearly.

#### **S...LIME, waste of time attack**

The E&E document wins the prize for confusing the reader with more errors of statement than Lisa's report and our rebuttal combined. Their tendency was to couple acknowledgement of the validity of our observations with attack statements which may or may not have been related to or important points in our critique; embedded in a writing style that requires a careful reading of the Lisa report, our critique, and the references themselves in order to sort out fact from fiction.

Although the main importance of Reference 20 was really to support the importance of carbon injection, the article researches adding both Calcium Carbonate and Lime to the carbon as it is injected. Our critique correctly pointed out Dr. Lisa's error in citing the reference, where she states that "limestone" was used. The E&E authors could have chided us for picking at a not very important error of Lisa's and of having confused lime with limestone and stopped there.

However they compound the irrelevancy of the issue and collective errors by claiming that "The affidavit incorrectly states that Reference 20 refers only to  $CaCO_3$ , and not limestone. In fact,  $CaCO_3$  is chemical shorthand for calcium carbonate, which is a technical term for limestone." The article, in fact used only the term Calcium Carbonate, which is indeed a major but not the sole component of limestone. Limestone contains magnesium, carbon and other impurities. The reference cited used calcium carbonate, which was likely obtained from limestone but purified before use. There is indeed a difference.

A more serious mistake on the part of the E&E authors is their statement on p7, paragraph two that:

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"As documented in several references and described by Professor Lisa, measurable dioxin formation in combustion facilities does not occur in the incineration process itself, but rather downstream, under conditions that may be similar to those described in this reference."

Now this is a really major mistake on the part of the authors! How could they discuss the temperature ranges under which dioxin forms without realizing that the temperature at which the incinerator operates determines whether dioxins will form in the incinerator. Of course dioxins production can occur in the incineration process. Their statement indicates such a profound lack of understanding of incineration that this sentence alone calls for the whole rebuttal to be tossed in the waste basket.

Wouldn't it have been wonderful to have had a real academic expert in hazardous waste incineration write the very first report, and to have saved all of us this scrabbling over meaning, relevancy, and accountability?

### Putting Carbon Filters to Bed

The E&E authors defend Lisa's statement, "The efficiency of activated carbon filters is unsurpassed by other method," which we pointed out was "notable" because the one reference that she uses refers to experiments with "three small incinerators."

"It is common scientific practice to study technologies first at the bench scale, and subsequently at pilot scale prior to implementation at full scale. Use of these data aids understanding of complex processes and furthers the body of knowledge about subjects of concern and helps prevent capital expenditures for full-scale facilities only to find critical design flaws."

Exactly! We brought up the basis for Lisa's recommendation of carbon bed filters so that the EQC wouldn't commit Oregon to being the FIRST facility to try a prototype carbon filter bed on a very dangerous chemical weapons incinerator. How the E&E authors thought that their statement would "support" Lisa's conclusions is a puzzle.

E&E quotes Lisa's reference 21 several times, first claiming that "This article indicates that each of the methods is effective in removing dioxin to required levels, and compares the capital and operating costs for each." It would have been very useful for the E&E authors to have included a quote here to support their statement that "each of the methods is effective in removing dioxin to required levels," because we can't find that statement in the article. The article does conclude with, "In summary, **considering the technical benefits and costs we believe that the most favorable solutions, overall, are the wet dediox process, followed by the Flugstrom and the SCR.**"

Let's get this article straight. It considers not just costs as E&E claims, but **technical benefits**. It does not include carbon bed filters in its recommendations. Period. In addition, our critique quoted in full the article's statements about carbon bed filters, which included their technical analysis. the E&E authors write that:

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"This article indicates that each of the methods is effective in removing dioxin to required levels, and compares the capital and operating costs for each. Static carbon beds were reported in this reference to be the most expensive option evaluated, but cost should not be confused with their efficiency in removing dioxin from the waste stream."

Oops, no one confused cost with efficiency. E&E left out the article's consideration of technical benefits (and we still can't find that sentence in the article about how effective carbon bed filters are.) And then, in a later paragraph on p12, the E&E authors, correctly this time, characterize reference 21: "As stated earlier, although this article is focused on comparing these technologies in terms of their effectiveness and cost ..."

E&E repeatedly appeals to their own authority to cover for Lisa's failure to convey all the information about carbon bed filters actually included in her references. They suggest that "Question 4a does not ask Professor Lisa to provide detailed list of the drawbacks associated with design elements, but rather asks her to list the essential design elements. She should not be faulted for failing to outline all of the possible pitfalls." One wonders, if Dr. Lisa doesn't outline the pitfalls, who will? What were these questions intended for if not to educate the EQC about the viability of carbon bed filters. Two paragraphs later, however, they claim that "Professor Lisa addresses the drawbacks of several post-combustion treatment methods." She either did or she didn't.

Then, again using their authority only, the E&E authors state that "the design elements and drawbacks of this system are not relevant for the UMCDF..." Several times they refer the reader to the permit application and subsequent permit modifications. These statements go well beyond a rebuttal of our critique. They go beyond, but do not explain their comments. Kristiina Lisa was provided with the permit application and chose not to cite it in her report. By what authority do the E&E authors speak?

Under the discussion of Question 5, Design of the carbon filters and best available control technology, our critique points out:

"Lisa repeatedly used carbon filters throughout her document as the 'magic bullet' that would eliminate all dioxin that one would normally find in incinerator operations. Having done so, there was a large burden of proof on her to demonstrate the consistent reliability of this control method. But she did not marshal a single substantial reference to support her assertion. In fact, she did not include the disadvantages listed in her reference (21) of cost and engineering problems, nor that carbon beds are not a recommended technology..."

The E&E authors suggest that she did not reference her answer to this question because she had used her references in the previous question. They attempt then to confuse "the merits of using activated carbon as an adsorbant as part of the PAS" with the desirability of using carbon bed filters. Authors who see no difference between limestone and calcium carbonate might also not see the difference between carbon injection and carbon bed filters.

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**Aloha**

In conclusion, let us reiterate our disheartened stepping away from any belief that ODEQ is actually seeking objective information presented to them with only a presentation of facts and science in mind. How have our comments about the Lisa report been handled by DEQ and E&E? We weren't thanked for providing an unpaid public service. The veracity of our good points were not acknowledged. Our stumblings over technical terms were not stretched to find the valid points that underlay our efforts. Instead we have been treated to a not very clever "roast" by hired consultants with unknown credentials and at best sloppy writing. This hardly seems to be making decisions based on "fact and science".

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# ATTACHMENT G

## *TABLE OF COMMENTS AND EXHIBITS*

*Comments received during the "Request for Revocation" comment period*

October 18 through December 17, 1999

(See also Attachment E for Comment C-5 and Attachment F for Comment C-3)

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### Comments received during the "request for revocation" comment period (October 18-December 17, 1999)

EXHIBIT/ COMMENT NO. <sup>1</sup>	DOCUMENT TITLE (IF APPLICABLE)	DATE OF DOCUMENT	AUTHOR/ COMMENTER	ADMIN RECORD NO.	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
C-1	Letter, transmitted via e-mail	10/21/99	Bill Fujii, Oregon Water Resources Department	99-2273	Mr. Fujii offers the Department assistance in review of any water right issues related to UMCDF.
C-2	Facsimile Transmission (one page)	12/17/99	Nathan and Allison Butz, and Andrew Butz	99-2193	The Commenters express their support for the revocation of the UMCDF permits.
C-3	Letter transmitting comments	12/16/99	Lisa Brenner, President  Oregon Clearinghouse for Pollution Reduction (OCPR)	99-2186	Dr. Brenner transmits an abstract of the findings of Dr. Halstead Harrison concerning an atmospheric dispersion model, and transmits the comments of the OCPR (see Comments C-3A through C-3E, below).  <b>(This document is included in its entirety in Attachment F.)</b>
C-3A	Abstract of "Air-Quality Dispersion Modeling in Complex Terrain near the Umatilla Chemical Agent	12/15/99	Dr. Halstead Harrison  University of Washington	99-2187	Comment C-3A is an abstract summarizing Dr. Harrison's findings using an air quality dispersion model that "suggest[ed] infrequent plume 'hits' in the neighboring communities... but at concentrations

<sup>1</sup> The comments from G.A.S.P. et al., included "Exhibits" with numbering that continued from previous legal briefs. Because these Exhibits were not actually part of the August 1997 lawsuit or revocation request, the Exhibit number has been preceded by a "C" to indicate that the Exhibit was received in the context of a comment period.

<sup>2</sup> No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (Included as Attachment A)  
 No. 98-1275: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)  
 No. 98-1285: "Petitioners' Additional Documentary Evidence," November 10, 1998 (Case No. 9708-06159)  
 No. 99-0704: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)  
 No. 99-2201: "Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF]," December 17, 1999 (Included in Attachment E)

# ATTACHMENT G

Comments received during the "request for revocation" comment period  
(October 18-December 17, 1999)

EXHIBIT/ COMMENT NO. <sup>1</sup>	DOCUMENT TITLE (IF APPLICABLE)	DATE OF DOCUMENT	AUTHOR/ COMMENTER	ADMIN RECORD NO.	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
	Disposal Facility"				<p>several hundred fold higher than annual averages." (A full copy of the report was received January 11, 2000.)</p> <p>Item No. 99-2186 cites Dr. Harrison's findings and urges the Department to "follow up by commissioning a full report from him as well as arranging DEQ and public presentations of his results."</p> <p style="text-align: center;"><b>(This document is included in its entirety in Attachment F.)</b></p>
C-3B	"Comments on the Request for Revocation of Permits"	12/16/99	Lisa P. Brenner, Ph.D. and Thomas B. Stibolt, M.D.  Oregon Clearinghouse for Pollution Reduction (OCPR)	99-2188	<p>Comment C-3B focuses primarily on responding to the Department's November, 1999, staff report related to the carbon filter systems.</p> <p style="text-align: center;"><b>(This document is included in its entirety in Attachment F.)</b></p>
C-3C	"Information from Ecology and Environment's Web Site" (labeled as "Attachment 1")	12/99	Ecology and Environment	99-2189	<p>Comment C-3C (Attachment 1 to Comment C-3B) is information from Ecology and Environment's website concerning corporate acquisitions, recently awarded contracts, and financial statements.</p>
C-3D	"Deposition of Martin Hopkins In the Matter of United States Department of the Army Pine Bluff Arsenal"	9/21/99	Martin Hopkins	99-2190	<p>Comment C-3D (Attachment 2 to Comment C-3B) is a copy of the Testimony (including Examination and cross-examination) of Mr. Martin Hopkins during a hearing before the Arkansas Pollution Control &amp; Ecology Commission related to the Pine</p>



# ATTACHMENT G

Comments received during the "request for revocation" comment period  
(October 18-December 17, 1999)

EXHIBIT/ COMMENT NO. <sup>1</sup>	DOCUMENT TITLE (IF APPLICABLE)	DATE OF DOCUMENT	AUTHOR/ COMMENTER	ADMIN RECORD NO.	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
	(labeled as "Attachment 2")				Bluff Arsenal Chemical Agent Disposal Facility.  Mr. Hopkins was questioned concerning his work related to carbon filters when he was an engineer with the Operations Team of the Army Program Manager for Chemical Demilitarization.
C3-E	"Selected Excerpts from the EPA Response to Comments to the Proposed HWC MACT Rule, Volume 1 Standards, Taken from the EPA web site"  (labeled as "Attachment 3")	Undated	EPA	99-2191	Comment C3E (Attachment 3 to Comment C3-B) is described as an excerpt of EPA's response to Comments to the Proposed Hazardous Waste Combustor Maximum Achievable Control Technology.  OCPR cites this excerpt when discussing the relationship of chlorine to dioxin production.
C-4	(Transmittal letter)	12/18/99	Richard E. Condit, Esq. and Stuart Sugarman, Counsel for the Commentors (G.A.S.P., et al.) <sup>1</sup>	99-2200	Comment C-4 is a transmittal letter of Comment C-5 and related Exhibits C-75 through C-80.
C-5	"Comments of G.A.S.P., et al., In Support Of Their Request To Suspend And Revoke Permits For The Umatilla Chemical Demilitarization Facility"	12/17/99	Submitted by:  Richard E. Condit, Esq. and Stuart Sugarman, Counsel for the Commentors (G.A.S.P., et al.)	99-2201	<b>(This document is included in its entirety in Attachment E.)</b>
C-75	Affidavit of Gary E. Harris	12/16/99	Gary E. Harris	99-2202	Exhibit C-75 is an Affidavit from Mr. Gary E. Harris, a former employer of EG&G who worked at

# ATTACHMENT G

Comments received during the "request for revocation" comment period  
(October 18-December 17, 1999)

EXHIBIT/ COMMENT NO. <sup>1</sup>	DOCUMENT TITLE (IF APPLICABLE)	DATE OF DOCUMENT	AUTHOR/ COMMENTER	ADMIN RECORD NO.	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
<p style="text-align: right; vertical-align: top;">174</p>					<p>TOCDF until 1996. Mr. Harris was formerly EG&amp;G's "Permits Coordinator" and states that he "supervised Environmental Engineers, Permitting Technicians and other technical and non-technical staff" and that he "was involved in preparation of emergency and contingency plans as well as permitting, compliance, and trial burn testing.</p> <p>Mr. Harris explains the purpose of his affidavit "is to inform Oregon officials of the serious problems I witnessed regarding the permitting, testing, and operation of the TOCDF. Mr. Harris' Affidavit contains 128 individual allegations related to:</p> <p>Agent Monitoring; Emissions/Releases; Lessons Learned Program; Munitions Storage, Handling &amp; Tracking; Permit Modifications; Permit Violations; Questionable Procedures; Risk Assessments; System Inadequacies/Failures; Trial Burns; Waste Characterization, Handling &amp; Tracking; and Worker Exposures.</p> <p>(The Affidavit submitted as Exhibit C-75 was arranged numerically. Later publication of the Affidavit by the Chemical Weapons Working Group provided the subject area listings given above.)</p> <p>Item No. 99-2201 (pp. 10, 14, and 15) cites Exhibit C-75 in relation to issues surrounding the Dunnage Incinerator, Trial Burns, and the Permit Modification process.</p>

## ATTACHMENT G

Comments received during the “request for revocation” comment period  
(October 18-December 17, 1999)

EXHIBIT/ COMMENT NO. <sup>1</sup>	DOCUMENT TITLE (IF APPLICABLE)	DATE OF DOCUMENT	AUTHOR/ COMMENTER	ADMIN RECORD NO.	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
C-76	Memorandum: “DAAMS Analysis and UOR #99-06-04-A1”	10/15/99	Sam Guello and Fred Burton  (EG&G)	99-2203	Exhibit C-76 is an internal EG&G (the Army’s contractor at the Tooele facility) memorandum related to the use of the Depot Area Agent Monitoring System (DAAMS).  Item No. 99-2201 (pp. 12-13) cites Exhibit C-76 to support their contention that it is an “Army myth” that there have been “no confirmed releases of nerve agents from the stack at TOCDF.”
C-77	Letter from EG&G to the Department of the Army related to a confirmed agent reading in the Toxic Maintenance Area at the Tooele facility	8/6/99	Jackson Maddox, EG&G	99-2204	Exhibit C-77 is a letter from EG&G’s “Deputy General Manager—Risk Management” to the “Administrative Contracting Officer” of the Department of the Army’s Industrial Operations Command. The letter transmits a report (“Occurrence Report No. 99-05-26-A1”) related to a confirmed agent reading in the Toxic Maintenance Area at the Tooele facility and the exposure of workers to the agent.  [Cited in Item No. 99-2201 as an indication that “workers have clearly been exposed to agents during operations.”]
C-78	“Issue and Directed Actions with Fact Sheet” (Issue # 95-104)	12/6/99	Unknown  (from Army’s “Programmatic Lessons Learned” Program)	99-2205	Exhibit C-78 is a document titled “Issue and Directed Actions with Fact Sheet” related to the “Agent Quantification System Tank Problems Requiring Repeat Draining of Rockets.”  Item No. 99-2201 (p. 14) cites Exhibit C-78 to support the Petitioners’ contention that the “the

# ATTACHMENT G

Comments received during the "request for revocation" comment period  
(October 18-December 17, 1999)

EXHIBIT/ COMMENT NO. <sup>1</sup>	DOCUMENT TITLE (IF APPLICABLE)	DATE OF DOCUMENT	AUTHOR/ COMMENTER	ADMIN RECORD NO.	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
					Army was able to manipulate the trial burn process at TOCDF in order to avoid being tested in ways that might result in failure."
C-79	"Assembled Chemical Weapons Assessment Program, Supplemental Report to Congress"	9/30/99	Department of Defense	99-2206	Exhibit C-79 is a partial copy of a "Supplemental Report to Congress" from the Department of Defense.  Item No. 99-2201 (pp. 34-35) cites Exhibit C-79 to support the contention that "both ACWA demonstrated technologies would provide substantial benefits for the disposal of the Umatilla stockpile from both human health and environmental perspectives."
C-80	Letter	2/22/99	Richard W. Collins Director, Waste Management Administration, Maryland Department of the Environment	99-2207	Exhibit C-80 is a letter from the Maryland Department of the Environment to the Commander of the Aberdeen Proving Ground approving a modification to the "Controlled Hazardous Substances Permit" to include the Aberdeen Chemical Agent Disposal Facility (which will use neutralization to destroy the mustard agent stockpile stored at Aberdeen).  Item No. 99-2201 (pp. 35-36) cites Exhibit C-80 to support the use of an alternative treatment technology for the Umatilla stockpile.

# ATTACHMENT H

## ***TABLE OF COMMENTS AND EXHIBITS***

***“Exhibit 74” Documents Reviewed During the 1999 Comment Period  
Related to the Use of the UMCDF Pollution Abatement System Carbon Filter System***

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## ATTACHMENT H

**“Exhibit 74” Documents Reviewed During the 1999 Comment Period  
Related to the Use of the UMCDF Pollution Abatement System Carbon Filter System  
(See also “EQC Clarifying Order” from March, 1999, and Department Staff Report from November, 1999)**

EXHIBIT NO.	TITLE	DATE	AUTHOR (IF APPLICABLE)	NOTES AND CITATIONS TO DOCUMENT <sup>12</sup>
74	Affidavit of Dr. Lisa P. Brenner & Dr. Thomas Stibolt with “Analysis of Kristina Iisa's Report Concerning the Emission of Dioxin and the Use of PAS Carbon Filters”	4/12/99	Dr. Lisa P. Brenner & Dr. Thomas Stibolt	DEQ Item Nos. 99-0704 (p. 15), Item No. 99-2186, and Item No. 99-2201 cite this Exhibit and its various attachments. (Previously reviewed.)
74.1	Appendix 1 - Iisa Report References With Quotes from the References (attached to Exhibit #74)	4/12/99	Dr. Lisa P. Brenner & Dr. Thomas Stibolt	(Previously reviewed.)
74.2	Appendix II to Exhibit 74 - Summary of the events found in the record	4/12/99	Dr. Lisa P. Brenner & Dr. Thomas Stibolt	(Previously reviewed.)
74.3	Appendix III to Exhibit 74 - Copies of the References from Kristina Iisa's Dioxin Report to the EQC	4/12/99	Dr. Lisa P. Brenner & Dr. Thomas Stibolt	(Previously reviewed.)
74.301	A New Theory of Dioxin Formation in Municipal Solid Waste Combustion	11/1/86	Roger D. Griffin	Reference 1 to Exhibit 74. From Chemosphere, Volume 15, Nos. -9-12, pp. 1987-1990, 1986 (date of 11/1/86 is approximated).

<sup>1</sup> The DEQ Chemical Demilitarization Program maintains a database of documents related to the Umatilla Chemical Agent Disposal Facility. Most documents are assigned a record number for tracking purposes. Individual “Exhibits” submitted during the course of G.A.S.P., et al., v. EQC, et al., (Case No. 9708-06159, Oregon Circuit Court) were not assigned record numbers at the time of submittal—only the document the Exhibit was attached to was assigned a number. Some Exhibits do have Administrative Record Numbers because the document had been previously received.

<sup>2</sup> No. 99-0704: “Petitioners’ Opposition to Respondents’ Supplemental Motion for Summary Judgment,” April 12, 1999 (Case No. 9708-06159)  
 No. 99-2186: “Comments of the Oregon Clearinghouse for Pollution Reduction,” December 15, 1999 (listed in Attachment G)  
 No. 99-2201: “Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF],” December 17, 1999 (Included in Attachment E)

## ATTACHMENT H

**“Exhibit 74” Documents Reviewed During the 1999 Comment Period  
Related to the Use of the UMCDF Pollution Abatement System Carbon Filter System  
(See also “EQC Clarifying Order” from March, 1999, and Department Staff Report from November, 1999)**

EXHIBIT NO.	TITLE	DATE	AUTHOR (IF APPLICABLE)	NOTES AND CITATIONS TO DOCUMENT <sup>12</sup>
74.302	Effect of Sulfur Dioxide on the Formation Mechanism of Polychlorinated Dibenzodioxin and Dibenzofuran in Municipal Waste Combustors	6/1/92	Brian K. Gullett	Reference 2 to Exhibit 74. From Environmental Science Technology, Vol. 26, No. 10, pp. 1938-1943, 1992 (date of 6/1/92 is approximated).
74.303	Combustion Dioxin Suppression in Municipal Solid Waste Incineration with Sulphur Additives	10/1/92	Ralf L. Lindbauer, Friedrich Wurst and Theodor Prey	Reference 3 to Exhibit 74. From Chemosphere, Volume 25, Nos. 7-10, pp. 1409-1414, 1992 (date of 10/1/92 is approximated).
74.304	Effect of Sulfur in Reducing PCDD/PCDF Formation	5/11/98	K. Raghunathan and Brian K. Gullett	Reference 4 to Exhibit 74. From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 225-230, May 11, 1998.
74.305	Dioxin Reduction by Sulfur Component Addition	1/1/96	Hiroshi Ogawa, Norihiko Orita, Mitsuhiro Horaguchi, Takumi Suzuki, Mitsuhiro Okada and Shirzuo Yasuda	Reference 5 to Exhibit 74. From Chemosphere, Volume 32, No. 1, pp. 151-157, 1996 (date of 1/1/96 is approximate).
74.306	Dioxin Emissions from Full Scale Hazardous Waste Combustion Units Handling Variable Chlorine Feed Compositions	5/11/98	J.D. Wilson, C.N. Park and D.I. Townsend	Reference 6 from Exhibit 74 (also Reference 8). From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 387-391, May 11, 1998.
74.307	Effects of Facility Contamination on Dioxin Emissions	5/1/96	K. Raghunathan	Reference 7 to Exhibit 74. From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 681-683, May, 1996.



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**“Exhibit 74” Documents Reviewed During the 1999 Comment Period  
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EXHIBIT NO.	TITLE	DATE	AUTHOR (IF APPLICABLE)	NOTES AND CITATIONS TO DOCUMENT <sup>12</sup>
74.308	Dioxin Emissions from Full Scale Hazardous Waste Combustion Units Handling Variable Chlorine Feed Compositions	5/11/98	J.D. Wilson, C.N. Park and D.I. Townsend	Reference 8 from Exhibit 74 (also Reference 6). From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 387-391, May 11, 1998.
74.309	The Relationship Between Chlorine in Waste Streams and Dioxin Emissions from Waste Combustor Stacks (CRTD 36)	10/20/95	H. Gregor Rigo, A.J. Chandler, and W.S. Lanier	Reference 9 to Exhibit 74. This Exhibit provides only a copy of a web page with ordering information from the ASME International Publications Catalog. The document is 716 pages long.
74.31	Evaluation of Carbon Injection for Controlling PCDD/PCDF Emissions at WTI's Commercial Hazardous Waste Incineration Facility	5/11/98	Douglas R. Roeck, Alfred Sigg	Reference 10 to Exhibit 74. From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 393-396, May 11, 1998.
74.311	Mechanisms for Formation and Options for Control of Emissions of PCDD'S/PCDF'S from Incineration	5/11/98	D.I. Townsend, J.D. Wilson and C.N. Park	Reference 11 to Exhibit 74. From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 331-335, May 11, 1998.
74.312	Dioxin/Furan Formation and Control in Waste Combustors	5/1/96	K. Raghunathan and Brian K. Gullett	Reference 12 to Exhibit 74. From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 685-688, May, 1996.
74.313	Formation of Polychlorinated Dibenzofurans by Chlorination and de Novo Reactions with FeCl <sub>3</sub> in Petroleum Refining Processes	3/3/93	Adrian Beard, K.P. Nalkwadi and F.W. Karasek	Reference 13 to Exhibit 74. From Environmental Science Technology, Vol. 27, No. 8, pp. 1505-1511, 1993 (date of 3/3/93 is approximated).
74.314	PCDD and PCDF Formation From Hydrocarbon Combustion in the Presence of Hydrogen Chloride	7/1/92	R. De Fre and T. Rymen	Reference 14 to Exhibit 74. From Chemosphere, Vol. 19 Nos. 1-6, pp. 331-336, 1989 (date of 7/1/92 is approximated).

## ATTACHMENT H

**“Exhibit 74” Documents Reviewed During the 1999 Comment Period  
Related to the Use of the UMCDF Pollution Abatement System Carbon Filter System  
(See also “EQC Clarifying Order” from March, 1999, and Department Staff Report from November, 1999)**

EXHIBIT NO.	TITLE	DATE	AUTHOR (IF APPLICABLE)	NOTES AND CITATIONS TO DOCUMENT <sup>12</sup>
74.315	Mechanisms of Formation and Destruction of Polychlorinated Dibenzo-p-dioxins and Dibenzofurans in Heterogeneous Systems	6/1/95	Ruud Addink and K. Olie	Reference 15 to Exhibit 74. From Environmental Science & Technology, pp. 1425-1435, Volume 29, No. 6, 1995 (date of 6/1/95 is approximated).
74.316	Prevention of PCDD Formation in MSW Incinerator by Inhibition of Catalytic Activity of Fly Ash Produced	7/1/89	Naikadi K.P. and F.W. Karasek	Reference 16 to Exhibit 74. From Chemosphere, Volume 19, Nos. 1-6, pp. 229-304, 1989 (date of 7/1/89 is approximated).
74.317	Reduction of Dioxins by Combustion Control and Prevention of Reformation (Control of the Denovo Reaction)	5/1/96	William Prescott	Reference 17 to Exhibit 74 (also Reference 19). From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 617-619, May, 1996.
74.318	Effects of Copper Contamination on Dioxin Emissions from CFC Incineration	1/1/96	G.W. Lee, J.V. Ryan, R.E. Hall, et al.	Reference 18 to Exhibit 74. From Combustion Science and Technology, 1996. Petitioners point out that they were unable to locate this reference. DEQ located Combustion Science and Technology via “Chemweb.” This document was not located in any of the titles listed for the issues from 1996-1998.
74.319	Reduction of Dioxins by Combustion Control and Prevention of Reformation (Control of the Denovo Reaction)	5/1/96	William Prescott	Reference 19 to Exhibit 74 (also Reference 17). From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 617-619, May, 1996.
74.32	Inhibition Effect of Calcium Compound Fed to Furnace on PCDDS/PCDFS from Incineration Plant	5/11/98	S. Matsui, T. Iwasaki and T. Noto	Reference 20 to Exhibit 74. From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 381-385, May 11, 1998.

## ATTACHMENT H

**“Exhibit 74” Documents Reviewed During the 1999 Comment Period  
Related to the Use of the UMCDF Pollution Abatement System Carbon Filter System  
(See also “EQC Clarifying Order” from March, 1999, and Department Staff Report from November, 1999)**

EXHIBIT NO.	TITLE	DATE	AUTHOR (IF APPLICABLE)	NOTES AND CITATIONS TO DOCUMENT <sup>12</sup>
74.321	A Survey of Post-Combustion PCDD/PCDF Control Technologies	5/11/96	B. Siret, K. Gilman	Reference 21 to Exhibit 74. From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 583-586, May, 1996.
74.322	Comparison of Dry Sorbent Injection of Sodium Bicarbonate Lime and Carbon and their Control of Dioxins/Furans, Mercury, Chlorides and Sulfur Dioxide	5/1/96	John Maziuk, Jr	Reference 22 to Exhibit 74. From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 595-602, May, 1996.
74.323	Reduction of Dioxin/Furan Emissions from an Incineration Plant by Means of an Activated Carbon Filter	5/11/98	G. Steinhaus and F. Dirks	Reference 20 to Exhibit 74. From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 273-275, May 11, 1998.
74.324	Catalyst Development for the Destruction of Volatile Organic Compounds in the Flue Gas of Municipal Waste Incinerators	5/1/96	H. Dropsch, J. Stohr and J. Furrer	Reference 24 to Exhibit 74. From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 613-616, May, 1996.
74.325	Rotary Kiln Incinerator at Bayer AG in Germany Sets New Performance Standards for Air Emissions	5/1/96	Dr. Hans Piechura and Dr. Peter K. Zeeb	Reference 25 to Exhibit 74. From the Proceedings of the International Conference on Incineration and Thermal Treatment Technologies, pp. 603-607, May, 1996.

# ATTACHMENT H

**“Exhibit 74” Documents Reviewed During the 1999 Comment Period**

**Related to the Use of the UMCDF Pollution Abatement System Carbon Filter System**

**(See also “EQC Clarifying Order” from March, 1999, and Department Staff Report from November, 1999)**

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***TABLE OF COMMENTS AND EXHIBITS***

***Documents Related to the Use of the  
UMCDF Pollution Abatement System Carbon Filter System***

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## ATTACHMENT I

**Documents Related to the Use of the UMCDF Pollution Abatement System Carbon Filter System  
(See also "EQC Clarifying Order" from March, 1999, and Department Staff Report from November, 1999)**

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
57	Review of Systemization of Tooele Chemical Agent Disposal Facility	3/1/96	National Research Council	98-1355	Exhibit 57 is an excerpt of the full document, which was received in the Hermiston office in July, 1996.  Item No. 98-1285 (p. 6) cites this Exhibit in relation to the UMCDF carbon filter system.  Also cited in Item No. 98-1247 and Item No. 99-0704.
58	Interim Status Assessment for the Chemical Demilitarization Program	4/15/96	Department of Defense	1856	Exhibit 58 is a two-page excerpt of a discussion of the carbon filter study undertaken in response to NRC recommendations.  Item No. 98-1285 (p. 6) cites this Exhibit in relation to the UMCDF carbon filter system.  Also cited in Item No. 98-1247 and Item No. 99-0704.

<sup>1</sup> The DEQ Chemical Demilitarization Program maintains a database of documents related to the Umatilla Chemical Agent Disposal Facility. Most documents are assigned a record number for tracking purposes. Individual "Exhibits" submitted during the course of G.A.S.P., et al., v. EQC, et al., (Case No. 9708-06159, Oregon Circuit Court) were not assigned record numbers at the time of submittal—only the document the Exhibit was attached to was assigned a number. Some Exhibits do have Administrative Record Numbers because the document had been previously received.

<sup>2</sup> No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (Included as Attachment A)  
 No. 98-1419: "Petitioners' Motion for Relief from an Order of Court," December 28, 1998 (Case No. 9708-06159)  
 No. 98-1285: "Petitioners' Additional Documentary Evidence," November 10, 1998 (Case No. 9708-06159)  
 No. 99-0704: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)  
 No. 99-1752: "Petitioners' Reply to Opposition to Motion for Relief," January 19, 1999 (Case No. 9708-06159)

## ATTACHMENT I

**Documents Related to the Use of the UMCDF Pollution Abatement System Carbon Filter System  
(See also "EQC Clarifying Order" from March, 1999, and Department Staff Report from November, 1999)**

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
66	Attachment A, Appendix 3 - PAS Carbon Filter Unit and Emission to the Carbon Filters--Permit Conditions	12/28/96	Oregon Department of Environmental Quality	40	An excerpt from the February, 1997 "Findings and Conclusions of the Commission" related to the UMCDF permits.  Item No. 98-1419 (p. 2) cites this Exhibit in relation to the UMCDF carbon filter system.
67	Appendix 3 - Commission Response - February 7, 1997	2/7/97	Environmental Quality Commission	40	An excerpt from the February, 1997 "Findings and Conclusions of the Commission" related to the UMCDF permits.  Item No. 98-1419 (p. 2) cites this Exhibit in relation to the UMCDF carbon filter system.
68	Agenda Environmental Quality Commission Meeting (EQC) January 29, 1999	1/1/99	Environmental Quality Commission	99-0546	Item No. 99-1752 (p. 3) cites this Exhibit in relation to the UMCDF carbon filter system.
71	Comments on EQC Order Clarifying Permit Decision	3/15/99	Stuart Sugarman & Richard Condit	99-0402	Item No. 99-0704 (p. 15) cites this Exhibit in relation to the UMCDF carbon filter system.  Also cited in Item No. 99-0704.
71.1	Risk Assessment of the Pollution Abatement Filter System for the Umatilla Chemical Agent Disposal Facility	9/1/98	Mitretek Technical Report	99-0066	Item No. 99-0704 (p. 15) cites this Exhibit in relation to the UMCDF carbon filter system.



## ATTACHMENT I

**Documents Related to the Use of the UMCDF Pollution Abatement System Carbon Filter System  
(See also "EQC Clarifying Order" from March, 1999, and Department Staff Report from November, 1999)**

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
72	Supplement to March 15, 1999 Comments	3/18/99	Stuart Sugarman & Richard Condit	99-0426	Item No. 99-0704 (p. 15) cites this Exhibit in relation to the UMCDF carbon filter system.  Also cited in Item No. 99-0704.
72.1	Department of Defense's Status Assessment for the Chemical Demilitarization Program	1/1/97	Department of Defense	99-0426	Item No. 99-0704 (p. 15) cites this Exhibit in relation to the UMCDF carbon filter system.
73	Petitioner's Attorney's Affidavit Supporting Memorandum Opposing Supplemental Motion for Summary Judgment	4/12/99	Stuart Sugarman	No Record Number assigned	Item No. 99-0704 (p. 15) cites this Exhibit in relation to the UMCDF carbon filter system.  Also cited in Item No. 99-0704.

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Documents Related to the Use of the UMCDF Pollution Abatement System Carbon Filter System  
(See also "EQC Clarifying Order" from March, 1999, and Department Staff Report from November, 1999)

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# ATTACHMENT J

## ***TABLE OF COMMENTS AND EXHIBITS***

***Documents related to dioxin issues, including toxicity, noncancer effects,  
and EPA's use of a "reference dose" for dioxin noncancer effects.***

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## ATTACHMENT J

### Documents related to dioxin issues, including toxicity, noncancer effects, and EPA's use of a "reference dose" for dioxin noncancer effects

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
35	Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds Volume III of III (External Review Draft)	8/1/94	U.S. Environmental Protection Agency	1573	Exhibit 35 is a nine-page excerpt from a three volume "external review draft." This document was included in the original administrative record used for the UMCDF permit decision.  Item No. 98-1275 (p. 41, lines 11-17) cites this Exhibit as supporting the Petitioner's contention that "most adult persons in the U.S. are already exposed to dioxin doses higher than' EPA's and ATSDR's RfD of 1 pg/kg/day without additional dioxin exposure from sources such as TOCDF and UMCDF."
38	Final Screening Risk Assessment Resource Conservation and Recovery Act Part B Pine Bluff Chemical Agent Disposal Facility	10/8/97	United States Army Center for Health Promotion and Preventive Medicine	No Record Number Assigned	This exhibit is a single page (page 3-11) from the Pine Bluff risk assessment. The excerpted page contains a discussion of how the infant breast milk pathway was calculated in the Pine Bluff HRA.  Item No. 98-1275 (p. 43, lines 0-2) cites this Exhibit as supporting the Petitioner's contention that there is a dioxin "non-cancer reference dose" in use for infants.

<sup>1</sup> The DEQ Chemical Demilitarization Program maintains a database of documents related to the Umatilla Chemical Agent Disposal Facility. Most documents are assigned a record number for tracking purposes. Individual "Exhibits" submitted during the course of G.A.S.P., et al., v. EQC, et al., (Case No. 9708-06159, Oregon Circuit Court) were not assigned record numbers at the time of submittal—only the document the Exhibit was attached to was assigned a number. Some Exhibits do have Administrative Record Numbers because the document had been previously received.

<sup>2</sup> No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (Included as Attachment A)  
 No. 98-1275: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)  
 No. 98-1285: "Petitioners' Additional Documentary Evidence," November 10, 1998 (Case No. 9708-06159)  
 No. 99-0704: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)  
 No. 99-2201: "Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF]," December 17, 1999 (Included in Attachment E)

## ATTACHMENT J

**Documents related to dioxin issues, including toxicity, noncancer effects,  
and EPA's use of a "reference dose" for dioxin noncancer effects**

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
39	Affidavit of Dr. Peter deFur	7/31/98	Dr. Peter deFur	No Record Number Assigned	<p>Dr. deFur's Affidavit discusses the issues surrounding the cancer and non-cancer effects of dioxins. The Affidavit indicates that there is an Attachment (Curriculum Vitae of Dr. deFur), but the Attachment was not included with the Exhibit.</p> <p>Dr. deFur reviewed the TOCDF Health Risk Assessment and states his belief that the TOCDF Health Risk Assessment is "not complete without adding the non-cancer risks from dioxin exposure to all target groups or individuals, and especially to fetuses, infants and young children..."</p> <p>Dr. deFur also states he has reviewed Exhibit 32 (TOCDF MPF incident report) and Exhibit 34 (Holmes' deposition related to the incident), and provides his opinion on how the risk assessment process should account for similar incidents.</p> <p>Item No. 98-1275 (p. 44, lines 11-23; p. 45, lines 0-24 , p. 55, Lines 13-15) cites this Exhibit when explaining how dioxins and PCBs act upon an organism, the toxic effects associated with exposures to dioxins, and the endocrine-disrupting effects of dioxins, furans, and PCBs.</p> <p>Item No. 99-2201 (p. 32) also cites Exhibit 39 to support the statement that "...the excuse that there is no RfD (i.e., safe dose) for dioxin non-cancer effects is so misleading that it could be considered scientific fraud."</p>

## ATTACHMENT J

**Documents related to dioxin issues, including toxicity, noncancer effects,  
and EPA's use of a "reference dose" for dioxin noncancer effects**

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
40.1	Public Health Effects of Chemical Weapons Incineration	3/1/98	Richard Clapp, Ph.D.	No record number assigned	Dr. Clapp (Center for Environmental Studies, John P. Snow Institute, Boston, Massachusetts) discusses the toxicity and health effects of dioxins and dioxin-like compounds and states his belief that the Health Risk Assessments undertaken for the chemical agent incineration facilities are "inadequate and incomplete" because the failure to account for dioxin and dioxin-like compounds.  Cited in Item No. 99-2201 (p. 32). See Exhibit 40.
40.3	Critique of Chemical Weapons Incineration Risk Assessment	3/1/98	Peter deFur, Ph.D.	No record number assigned	Dr. deFur (Affiliate Associate Professor of Environmental Studies at the Center for Environmental Studies at Virginia Commonwealth University and Adjunct Senior Scientist, Environmental Defense Fund) discusses the issues surrounding the cancer and non-cancer effects of dioxins. Dr. deFur reviewed the TOCDF Health Risk Assessment and states his belief that the TOCDF Health Risk Assessment is "not complete without adding the non-cancer risks from dioxin exposure to all target groups or individuals, and especially to fetuses, infants and young children..."  Cited in Item No. 99-2201 (p. 32). See Exhibit 40.
40.6	Synthetic Chemicals as Endocrine Disruptors	3/1/98	Peter deFur, Ph.D., and Carolyn Raffensperger, M.A., J.D.	No record number assigned	Dr. deFur (Affiliate Associate Professor of Environmental Studies at the Center for Environmental Studies at Virginia Commonwealth University and Adjunct Senior Scientist, Environmental Defense Fund) and Ms. Raffensperger (Director, Science and Environmental Health Network) describe the endocrine system and the effects of chemicals known as endocrine disruptors, and the pathways through which human exposure occurs.

## ATTACHMENT J

**Documents related to dioxin issues, including toxicity, noncancer effects,  
and EPA's use of a "reference dose" for dioxin noncancer effects**

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
					<p>The authors urge individuals to take action to reduce exposures, and also state that "to act responsibly and with precaution in light of the known effects of endocrine disruption in animals and humans and the uncertainty of the extent of human exposure, the Army must shut down the existing [chemical weapons] incinerators and choose alternative technologies with no toxic emissions."</p> <p>Cited in Item No. 99-2201 (p. 32). See Exhibit 40.</p>
45	Fact Sheet - EPA Special Report on Endocrine Disruption	2/1/97	U.S. Environmental Protection Agency	No Record Number assigned	<p>The fact sheet discusses EPA's findings as of February 1997 concerning the effects of endocrine disrupters on human health and the environment. (There is also a reference to the EPA's "Special Report on Endocrine Disruption," but the report was not included with this Exhibit).</p> <p>Item No. 98-1275 (p. 55, lines 5-7) cites a quotation from this fact sheet describing the effects of endocrine-disrupting agents.</p>
54	Toxicological Profile for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin	6/1/89	Syracuse Research Corporation for ATSDR (U.S. Public Health Service) and EPA.	No Record Number assigned	<p>Exhibit 54 includes two pages from "Section 9" of this document.</p> <p>Item No. 98-1285 (p. 5) cites this Exhibit to support the Petitioner's assertion that EPA has a "reference dose" for determining the non-cancer effects of dioxin exposure.</p> <p>Item No. 98-1247 (p. 7) also cites this Exhibit to support the Petitioner's assertion that there is a "reference dose" for dioxins.</p> <p>Also cited in Item No. 99-0704 (p. 11).</p>



## ATTACHMENT J

**Documents related to dioxin issues, including toxicity, noncancer effects,  
and EPA's use of a "reference dose" for dioxin noncancer effects**

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
55	Drinking Water Criteria Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (Final Draft, EPA 600/X-84-194-1)	3/1/85	U.S. Environmental Protection Agency, Environmental Criteria and Assessment Office	No Record Number assigned	<p>This Exhibit is a two-page excerpt from a document of unknown total length. The Document cover page is stamped with "Draft: Do Not Cite of Quote." The excerpted sections are related to "sensitive sub-populations" and "carcinogenic risks."</p> <p>Item No. 98-1285 (p. 5) cites this Exhibit to support the Petitioner's assertion that EPA has a "reference dose" for dioxins.</p> <p>Item No. 98-1247 (p.5) also cites this Exhibit as providing "further support that the Agencies erred in failing to consider the 1 pg/kg/day non-cancer standard..."</p> <p>Also cited in Item No. 99-0704 (p. 11).</p>
56	"Remedial Activities at Uncontrolled Hazardous Waste Sites in the Zone of Regions VI, VII, VIII." (from the "Final Times Beach Site Multimedia Risk Assessment - Volume I")	3/28/95	U.S. Environmental Protection Agency	No Record Number assigned	<p>This is a one-page excerpt ("Table 5-2" from page 5-8) from a document of unknown total length. The Table in the Exhibit shows the "Toxicity Values for Chemicals of Potential Concern--Noncancer Effects."</p> <p>Item No. 98-1285 (p. 6) cites this Exhibit to support the Petitioner's assertion that EPA has a "reference dose" for dioxins.</p> <p>Item No. 98-1247 (p.5) also cites this Exhibit as establishing "that EPA currently uses a non-cancer reference dose for reproductive impacts of dioxin."</p> <p>Also cited in Item No. 99-0704 (p. 11).</p>

## ATTACHMENT J

Documents related to dioxin issues, including toxicity, noncancer effects,  
and EPA's use of a "reference dose" for dioxin noncancer effects

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# ATTACHMENT K

## TABLE OF COMMENTS AND EXHIBITS

### *Documents related to the acute toxicity and/or the chronic health effects of nerve and blister agents*

and additional documents listed below:

TITLE OF DOCUMENT	PAGE
"Background Document on Gulf War-Related Research," by Syracuse Research Corporation for U.S. Department of Health and Human Services Centers for Disease Control and Prevention, February, 1999.	K-7
"Management Actions Needed to Answer Basic Research Questions," Government Accounting Office, January, 2000.	K-41
Letter to the Utah Citizens Advisory Commission from Centers for Disease Control and Prevention (date unknown).	K-73
"Review of [National Research Council's] Review of Acute Human-Toxicity Estimates for Selected Chemical Warfare Agents," Memorandum from Ecology and Environment to Oregon Department of Environmental Quality, September 11, 1998.	K-77
Letter to the Centers for Disease Control and Prevention from U.S. Army Program Manager for Chemical Demilitarization (date unknown).	K-79
Letter to the U.S. Army Program Manager for Chemical Demilitarization from Centers for Disease Control and Prevention, October 7, 1998.	K-81
Letter to the Alabama Department of Environmental Management from the U.S. Army Program Manager for Chemical Demilitarization, October 16, 1998.	K-83
Media Advisory and Question and Answer sheet about the "NRC Review of Acute Human-Toxicity Estimates for Selected Chemical Warfare Agents," U.S. Army, October 8, 1998.	K-87

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# ATTACHMENT K

## Documents related to the acute toxicity and/or the chronic health effects of nerve and blister agents

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
40	Public Health and Chemical Weapons Incineration	3/1/98	Kentucky Environmental Foundation	No record number assigned	<p>The Kentucky Environmental Foundation (KEF) was founded in 1990, by a local grassroots group, Common Ground. KEF's mission is "to further the cause of safe disposal of chemical weapons and environmental democracy by improving public access to information, coalition building, fostering cooperation between government and citizens, and encouraging grassroots participation in the decision-making process." (From the website of the Chemical Weapons Working Group)</p> <p>Exhibit 40 is a collection of papers by various scientists arguing against the use of incineration for stockpile disposal. See Exhibits 40.1 through 40.5 for a description of each paper.</p> <p>Item No. 98-1275 (p. 46, lines 0-7) cites this Exhibit (which includes 40.1 through 40.5) as supporting the Petitioner's contention that "studies of non-lethal agent exposures and chemicals containing ingredients similar to agent demonstrate that impacts to brain function and behavior may be likely."</p> <p>Also cited in Item No. 99-2201 (p. 32).</p>

<sup>1</sup> The DEQ Chemical Demilitarization Program maintains a database of documents related to the Umatilla Chemical Agent Disposal Facility. Most documents are assigned a record number for tracking purposes. Individual "Exhibits" submitted during the course of G.A.S.P., et al., v. EQC, et al., (Case No. 9708-06159, Oregon Circuit Court) were not assigned record numbers at the time of submittal—only the document the Exhibit was attached to was assigned a number. Some Exhibits do have Administrative Record Numbers because the document had been previously received.

<sup>2</sup> No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (Included as Attachment A)  
 No. 98-1275: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)  
 No. 98-1285: "Petitioners' Additional Documentary Evidence," November 10, 1998 (Case No. 9708-06159)  
 No. 99-0704: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)  
 No. 99-1751: "First Supplemental Petition for Review," April 5, 1999 (Case No. 9708-06159)  
 No. 99-2201: "Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF]," December 17, 1999 (Included in Attachment E)

## ATTACHMENT K

### Documents related to the acute toxicity and/or the chronic health effects of nerve and blister agents

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
40.2	Toxic Exposures and Chronic Illnesses	3/1/98	Howard Urnovitz, Ph.D.	No record number assigned	<p>Dr. Urnovitz (Scientific Director, Chronic Illness Research Foundation, Berkeley, California) discusses the implications of various research projects related to chronic illnesses and Gulf War Syndrome that indicate exposures to a combination of chemical compounds can have synergistic and additive effects. Dr. Urnovitz states that "there are several closed-loop disposal technologies available that have no toxic emissions and have proven out effective."</p> <p>Cited in Item No. 99-2201 (p. 32). Part of Exhibit 40.</p>
40.4	Toxicology of Chemical Agents	3/1/98	Robert Ginsburg, Ph.D.	No record number assigned	<p>Dr. Ginsburg (Research Director, Midwest Center for Labor Research, Chicago) reviewed the literature on the toxicity of the agents GB and VX. He found that "evaluation of the potential effects from exposure to low levels of these chemicals is difficult because of complications arising from the chemicals' extremely high acute toxicity." Dr. Ginsburg recommends further testing of sub-acute exposure effects because "despite the limitations in testing, long-term consequences from low-level exposure to nerve agents as well as commercial organophosphate pesticides have been demonstrated."</p> <p>Cited in Item No. 99-2201 (p. 32). Part of Exhibit 40.</p>

## ATTACHMENT K

### Documents related to the acute toxicity and/or the chronic health effects of nerve and blister agents

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
40.5	Health Effects of Low-level Exposure to Nerve Agent	3/1/98	Jerry Buccafusco, Ph.D.	No record number assigned	Dr. Buccafusco (Professor of Pharmacology and Toxicology, Medical College of Georgia and Director, Neuropharmacology Laboratory, Department of Veterans Affairs Medical Center, Augusta, Georgia) discusses the research conducted by the Medical College. The research found that chronic low-level exposure to an organophosphorus agent "produced a subtle but reproducible memory impairment."  Cited in Item No. 99-2201 (p. 32). Part of Exhibit 40.
41	Nerve gas danger underestimated, study says	7/29/98	James Long, The Oregonian	No Record Number Assigned	This Exhibit is a news article from the Oregonian concerning the NRC "Acute Human Toxicity" Report.  Item No. 98-1275 (p. 47, lines 3-5) cites this Exhibit as supporting the Petitioner's contention that "chemical warfare agents are even more dangerous than originally thought." (See Exhibit 50.)
50	Review of Acute Human-Toxicity Estimates for Selected Chemical Warfare Agents	1/1/97	National Research Council	98-0727	This Exhibit is an excerpt of the NRC Report (approximately 22 pages out of 90). This document was received in Hermiston in September, 1998.  Item No. 98-1275 (p. 47, lines 5-9) cites this Exhibit as supporting the Petitioner's contention that "chemical warfare agents are even more dangerous than originally thought."  Item No. 98-1285 (pp. 2-3) states that "Petitioners offer this document to establish that the EQC was misled concerning a critical aspect of the permitting process(i.e., the likely toxicity of CW Agents)."  Also cited in Item No. 98-1247 (pp. 5-6); Item No. 99-0704 (p. 8); Item No. 99-1751 (p. 4); and 99-2201 (pp. 24-27).

## ATTACHMENT K

### Documents related to the acute toxicity and/or the chronic health effects of nerve and blister agents

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO.	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
51	Long-term Health Effects Associated with Sub-Clinical Exposure to GB and Mustard	7/18/96	Dennis M. Perrotta, Ph.D., CIC, Chair	2479	<p>This is an excerpt of a review conducted by the "Environment Committee" of the "Armed Forces Epidemiological Board." It appears to have been printed on August 18, 1998 from a website (<a href="http://www.gulflink.oed.mil/agent.html">http://www.gulflink.oed.mil/agent.html</a>). This document was originally received by the DEQ in April, 1997.</p> <p>The document was prepared at the request of the Assistant Secretary of Defense (Health Affairs) to conduct a literature review and to critique and comment on the question "Are there observable long-term health effects associated with exposure to Sarin (GB) and mustard at concentrations below that needed to cause acute signs, symptoms, or injury?"</p> <p>Item No. 98-1275 (p. 54, lines 1-4) cites this Exhibit as supporting the Petitioner's contention that "low level agent exposure alone or in combination with other chemicals can generate a range of disturbing health effects."</p> <p>Item No. 98-1285 (pp. 3-4) cites this Exhibit to counter the EQC/DEQ statements that there was insufficient information available concerning the "Gulf War Syndrome" to incorporate into the Pre-Trial Burn Health Risk Assessment.</p> <p>Also cited in Item Nos. 98-1247 (p. 6); 99-0704 (p. 9); and 99-2201 (pp. 27-28).</p>



## ATTACHMENT K

### Documents related to the acute toxicity and/or the chronic health effects of nerve and blister agents

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
52	105th Congress Report - Gulf War Veteran's Illnesses: VA, DOD Continue to Resist Strong Evidence Linking Toxic Causes to Chronic Health Effects	11/7/97	Committee on Government Reform and Oversight (House of Representatives)	No Record Number Assigned	<p>This Exhibit is a partial copy of a report in response to requests by Gulf War veterans. The Department obtained a full copy of the document.</p> <p>Item No. 98-1275 (p. 54, lines 3-5) cites this Exhibit as supporting the Petitioner's contention that "low level agent exposure alone or in combination with other chemicals can generate a range of disturbing health effects."</p> <p>Also cited in Item No. 98-1285 (pp. 4-5); Item No. 98-1247 (p. 6); Item No. 99-0704 (p. 10); and in Item No. 99-2201 (p. 28).</p>
53	Chemical Weapons: DOD Does Not Have a Strategy to Address Low-Level Exposures	9/1/98	US General Accounting Office	No Record Number Assigned	<p>This is a complete copy of a report by the GAO that concluded the Department of Defense "does not have an integrated strategy to address low-level exposures to chemical warfare agents."</p> <p>Item No. 98-1285 (p. 5) cites this Exhibit and questions whether the research referenced in the Report was reviewed by the Department.</p> <p>Also cited in Item No. 98-1247 (p. 7); Item No. 99-0704 (p. 10); and in 99-2201 (pp. 28-31).</p>

# ATTACHMENT K

Documents related to the acute toxicity and/or the chronic health effects of nerve and blister agents

2000

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**Background Document on Gulf War-Related Research  
for  
The Health Impact of Chemical Exposures During the Gulf War:  
A Research Planning Conference**

February 28 - March 2, 1999  
Atlanta, Georgia

*Sponsored by*  
**Centers for Disease Control and Prevention**  
in coordination with  
the Office of Public Health and Science (Department of Health and Human Services),  
the National Institutes of Health, and  
the Agency for Toxic Substances and Disease Registry

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**ATSDP**  
Agency for Toxic Substances and Disease Registry

EOC Meeting May 18, 2000  
Attachment K, Page K-7

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### List of Acronyms and Abbreviations

ANG	Air National Guard
ATSDR	Agency for Toxic Substances and Disease Registry
CARC	Chemical Agent Resistant Coating
CCEP	Comprehensive Clinical Evaluation Program
CDC	Centers for Disease Control and Prevention
CIA	Central Intelligence Agency
DHHS	Department of Health and Human Services
DoD	Department of Defense
DSB	Defense Science Board
DU	Depleted Uranium
DVA	Department of Veterans' Affairs
EMG	electromyography
FDA	Food and Drug Administration
GAO	Government Accounting Office
ICD-9	International Classification of Diseases, Ninth Revision
IOM	Institute of Medicine
MCS	Multiple Chemical Sensitivity
MMPI	Minnesota Multiphasic Personality Inventory
NIH	National Institutes of Health
PAC	Presidential Advisory Committee on Gulf War Veterans' Illnesses
PAH	Polycyclic Aromatic Hydrocarbon
PGHR	Persian Gulf Health Registry
PGVCB	Persian Gulf Veterans Coordinating Board
PL	Public Law
PSOB	Presidential Special Oversight Board
RR	rate ratio or relative risk
RWG	Research Working Group
SIU	Special Investigation Unit on Gulf War Illness
SMR	Standardized Mortality Ratios
U.K.	United Kingdom
U.S.	United States
USAEHA	U.S. Army Environmental Hygiene Agency
VA	Veterans' Administration
VOC	Volatile Organic Compound

## EXECUTIVE SUMMARY

The purpose of this document is to provide background information to participants in the upcoming conference, *The Health Impact of Chemical Exposures During the Gulf War: A Research Planning Conference*, sponsored by the Centers for Disease Control and Prevention in coordination with the Office of Public Health and Science (Department of Health and Human Services), the National Institutes of Health, and the Agency for Toxic Substances and Disease Registry. In response to U.S. House of Representatives Report 105-205, the conference is to be held on February 28-March 2, 1999 in Atlanta, Georgia for the purpose of obtaining broad public input into the development of a multi-year research plan investigating the relationships of chemical exposures to illnesses among Gulf War veterans.

The 697,000 men and women of U.S. military services who served in the Gulf region in 1990 and 1991 were exposed to a wide array of known and potential hazards to health including blowing dust and sand particles, smoke from oil well fires, petroleum fuels and their combustion products, possible exposure to chemical warfare nerve agents and biological warfare agents, pyridostigmine bromide pills to protect against organophosphate nerve agents, insecticides, vaccinations, infectious diseases, depleted uranium, and psychological and physiological stress. Quantitative data for exposure of soldiers to most of these agents during Gulf deployment, however, are not available. Appendix A of this document gives an account of events related to health concerns of Gulf War veterans. Appendix B discusses what is known concerning exposures and potential health consequences of the most likely health risk factors associated with the Gulf War experience.

Gulf War veterans registered in the U.S. Department of Defense's Comprehensive Clinical Evaluation Program, the U.S. Department of Veterans' Affairs Persian Gulf Health Registry, and the United Kingdom Ministry of Defence Medical Assessment Programme show an array of health symptoms and a distribution of disease diagnoses involving a wide variety of organ systems. In these programs, clinicians were unable to assign a standard diagnostic disease category to about 20-30% of participants other than *symptoms, signs and ill-defined conditions*. Three diagnostic disease categories (*psychological conditions, musculoskeletal diseases, and symptoms, signs and ill-defined conditions*) represented more than 50% of the primary diagnoses. The overall symptom pattern for Gulf War veterans in the clinical programs has been noted to be consistent with experiences of U.S. veterans of previous wars.

Various review panels and groups have evaluated information regarding illnesses among Gulf War veterans within the past 4-5 years. Appendix A summarizes recommendations from many of these review panels. Given the broad range of illnesses and health symptoms noted among Gulf War veterans and the lack of exposure data, these groups generally have concurred that no single cause of the multiple illnesses could be established. These groups have made several recommendations for research including: 1) epidemiological research to compare prevalence rates of illnesses in Gulf War veterans with appropriate control populations; 2) in-depth neurophysiological, neuropsychological, and psychological evaluations comparing symptomatic

and asymptomatic Gulf War veterans; 3) research on health effects from specific risk factors such as stress, pesticides, depleted uranium, pyridostigmine bromide, and low-level exposure to chemical warfare nerve agents; 4) research on health effects from mixtures of chemicals (e.g., pesticides, pyridostigmine bromide, and chemical warfare nerve agents) alone and in combination with other risk factors; 5) epidemiological research on the health status of U.S. troops known to be in the vicinity of an Iraqi weapons storage site, near Khamisiyah, Iraq, in March 1991 when low-level exposure to sarin and cyclosarin may have occurred compared with troops outside of the area; and 6) research into the causes, methods of prevention, and methods of treatment for musculoskeletal conditions and stress-related disorders.

The U.S.-government sponsored research projects which are coordinated by the Research Working Group of the Persian Gulf Veterans Coordinating Board address a wide spectrum of basic and applied topics related to illnesses among Gulf War veterans. Appendix C describes and evaluates selected published studies related to health concerns of Gulf War veterans. Appendix D contains descriptions of ongoing research projects related to: 1) multiple symptom disorders; 2) genetic differences in susceptibility to chemicals; 3) health effects from mixtures of chemicals and other risk factors; 4) treatment of chronic multiple symptom disorders in Gulf War veterans; 5) health effects from low-level, subclinical exposures to chemical warfare nerve agents; 6) health effects from pyridostigmine bromide; 7) assessment and definition of Gulf War illnesses; 8) prevalence of illnesses and associations between chemical exposures and illnesses in Gulf War veterans; and 9) health effects from depleted uranium exposure.

Published epidemiological studies of mortality rates, rates of hospitalizations, and rates of birth defects after the Gulf War have not found consistent, statistically significant differences between active-duty U.S. military personnel who were deployed to the Gulf War compared with active-duty personnel who were not deployed to the Gulf, except for a higher rate of mortality from unintentional injuries (such as automobile accidents). Further epidemiological research efforts are ongoing to track mortality, hospitalization, and reproductive outcome among groups of Gulf-deployed veterans and non-deployed veterans of the same era.

In contrast to the hospitalization and mortality studies, numerous epidemiological studies of self-reported health symptoms consistently have found statistically significantly higher rates of self-reported symptoms in groups of Gulf-deployed compared with non-deployed veterans and provide evidence that there may be an increased frequency of chronic, multi-systemic conditions of ill health among groups of Gulf War veterans. The array of reported symptoms are, in general, difficult to diagnose into a disease category. The most frequently reported symptoms are similar to the most frequently reported symptoms among veterans diagnosed as having *symptoms, signs and ill-defined conditions* in the previously discussed clinical programs (fatigue, headache, memory problems, sleep disturbances, skin rash, joint or muscle pain, and shortness of breath) and appear to overlap with several of the symptoms in other symptom-based disorders including chronic fatigue syndrome, fibromyalgia, and multiple chemical sensitivity. Using a mathematical technique called factor analysis to examine associations among symptoms reported in groups of Gulf War veterans, one group of investigators proposed that there might be unique health

disorders among Gulf War veterans, whereas two other groups of investigators reported finding no evidence of a unique disorder among Gulf War veterans when control groups were included in the analysis.

The lack of exposure data makes it difficult, if not impossible, to know the cause of many of the illnesses among Gulf War veterans. In attempts to obtain clues to possible causes, however, several epidemiological studies are looking for associations between self-reported symptoms and self-reported Gulf War experiences and exposures. To date, a few published studies, mostly of a small scale, have reported some associations between self-reported symptoms and particular risk factors (e.g., receiving multiple vaccinations, exposure to pesticides or debris from Scud missiles), but results are not consistent across studies. Several planned and ongoing research projects are similarly designed to look for possible associations between health symptoms and self-reported exposure to risk factors, including the large-scale Veterans' Administration (VA) National Health Survey. Other ongoing projects are taking a different approach to searching for etiological clues by comparing hospitalization rates, self-reported symptoms, and/or clinical measurements of neurophysiological and neuropsychological variables in various groups of veterans known to be at different geographical locations in March 1991 when low-level exposure to nerve agents may have occurred near the Iraqi weapon storage site near Khamisiyah.

Several hypotheses concerning the cause of difficult-to-diagnose illnesses among some Gulf War veterans remain plausible: some investigators hypothesize physiological changes that are stress-induced; some hypothesize causative relationships to low-level exposure to neurotoxic chemicals; and others hypothesize causative interactions between stress and low-level exposure to mixtures of chemicals. Limited suggestive evidence from a few published animal studies has led some to suggest that delayed neurological effects may occur from short-term exposure to mixtures of anti-cholinesterase agents that may have additive or synergistic effects. To date, the relevance of these animal studies to possible chronic neurological impairment in Gulf War veterans is uncertain for several reasons including the high exposure levels to which the animals were exposed and other potential differences between mixtures to which the animals were exposed and mixtures that may have been experienced by soldiers in the Gulf region. Short-term, high-level exposure to certain carbamate and organophosphate nerve agents is known to produce delayed neurological effects in animals and humans, but the occurrence of delayed effects from short-term, low-level exposure to these types of chemicals (an exposure scenario presumed to be relevant to the Gulf War experience of some veterans) is uncertain. Ongoing research projects at several institutions are evaluating possible delayed effects on neuropathological, neurobehavioral, and immunological variables in several animal species exposed to low-levels of various mixtures of cholinesterase-inhibiting chemicals (e.g., sarin, insecticides, and pyridostigmine), alone and in combination with other risk factors such as stress and vaccinations.

Ongoing basic research projects at several institutions are examining hypotheses related to the biochemical and/or genetic basis for differences among individuals in susceptibility to neurotoxic, cholinesterase-inhibiting chemicals such as organophosphate chemical warfare nerve agents (e.g., sarin) and carbamate anti-nerve-agent drugs (e.g., pyridostigmine bromide). Results from these

projects may lead to new methods to identify individuals at greater risk for neurological effects from cholinesterase-inhibiting chemicals or new prophylactic methods against neurological effects from chemical warfare nerve agents.

Several studies have evaluated neurophysiological and neuropsychological variables in small groups of symptomatic Gulf War veterans, but, in general, have not found obvious or consistent changes. Some of the studies, however, have found subtle changes in several variables in some of the examined patients. Ongoing research projects at numerous institutions are examining a wide range of clinical and laboratory physiological variables in attempts to identify objective diagnostic variables that may be consistently affected in Gulf War veterans experiencing multiple chronic symptoms. Endpoints being evaluated include: brain activation patterns determined with magnetic resonance imaging; nerve firing rate of the peroneal nerve; quantitative electroencephalographic pattern analysis; changes in neurohormonal levels in response to different stressors; cerebral spinal fluid levels of neurotransmitters; pain threshold measurements; esophageal smooth muscle motility; viral infections; immune function; and various physiological responses (e.g., blood pressure, heart rate, eyeblink) to acute physical, chemical, or cognitive challenges. In general, it is believed that this body of research may lead to a better basis for proposing new methods of diagnosis and treatment for Gulf War veterans with multiple unexplained chronic symptoms including fatigue, headache, muscle and joint pain, and chemical sensitivities.

In response to the wide diversity of illnesses and symptoms experienced by Gulf War veterans and the uncertainty of their cause, several reviewers have noted that treatment should proceed on an individual basis. Treatment is best addressed when objective clinical measures of distinct illness can be made, but, in the absence of such measures, multidisciplinary treatment of symptoms may be effective (involving medical evaluations, exercise programs, various therapy programs, and counseling). The U.S. Department of Defense has a Specialized Care Program using such an approach for Gulf War veterans with persistent, non-specific symptoms, and, in collaboration with the Department of Veterans' Affairs, has established a 2-year, multiple-site, control trial of cognitive behavioral therapy, aerobic exercise programs, and usual and customary care for such patients. Two other ongoing treatment trials are based on limited evidence suggesting that some Gulf War veterans with non-specific, chronic symptoms may be infected with microorganisms that are difficult to detect. These are double-blind clinical trials of long-term antibiotic treatment; one with symptomatic patients with positive findings for mycoplasma infection and the other with symptomatic patients with bacterial remnants in their urine.

During the upcoming two-and-a-half day conference, participants from various disciplines will meet several times in Workgroups with the goal of discussing and recommending further research in one of four focus areas related to illnesses among Gulf War veterans:

- 1) Pathophysiology, Etiology, and Mechanisms of Action;
  - 2) Assessment and Diagnosis;
  - 3) Treatment; and
  - 4) Prevention.
- Final reports and recommendations from each Workgroup will be presented to the conference at large prior to adjournment.

## 1. Purpose of the Conference

The current conference, *The Health Impact of Chemical Exposures During the Gulf War: A Research Planning Conference*, is convened, under the support specified by House Report 105-205<sup>1</sup>, to obtain broad public input into the development of a multi-year research plan investigating relationships of chemical exposures to illnesses among Gulf War veterans (Eisenberg, 1998).

House Report 105-205 provided funding to the Office of the Secretary, Department of Health and Human Services (DHHS) to support research in the areas of:

- "multiple chemical sensitivity";
- "genetic differences in the ability to metabolize environmental agents commonly encountered during the Persian Gulf";
- "how multiple exposures of chemicals interact to exert their toxicity on an organism"; and
- "treatment protocols which are being developed in the public and private sectors for illnesses resulting from chemical and other environmental exposures" (Eisenberg, 1998).

The plan is to be developed without duplicating existing research efforts contained within the research plans of the Research Working Group (RWG) of the Persian Gulf Veterans Coordinating Board (PGVCB) (Eisenberg, 1998).

## 2. The Gulf War: Overview

Shortly after Iraqi armed forces invaded Kuwait on August 2, 1990, Coalition troops (i.e., troops from the United States [U.S.], United Kingdom [U.K.], Canada, France, Saudi Arabia, Egypt, Syria and other countries) began deployment in Operation Desert Shield. Within two months, 200,000 U.S. troops had been added to those already in the Gulf area. Beginning on January 16, 1991, air attacks against the Iraqi army opened the phase of operations known as Operation Desert Storm (IOM, 1996b). The first oil well fires were started in Kuwait by the Iraqis on January 20, 1991 and the majority of oil well fires had been started by February 19, 1991 (Spektor, 1998; DoD, 1998c; PAC, 1996b). By February, 1991, more than 500,000 U.S. troops were in the field facing the Iraqi armed forces. Operation Desert Storm ended after a brief ground war from February 24 to February 28. U.S. troops were removed quickly from the area, and by June, 1991, fewer than 50,000 U.S. troops remained. A total of approximately 697,000 U.S. military men and women served in Operations Desert Shield and Desert Storm in 1990 and 1991 (Joseph et al., 1997). During the war, deaths among U.S. troops were restricted to 148 combat deaths and 145 deaths due to disease or unintentional injuries; only 467 additional individuals among U.S. troops sustained injuries (PAC, 1996b). It was well known that Iraq had chemical and biological warfare capabilities, but several review panels have concluded that there is no convincing evidence that Iraq used chemical or biological warfare agents against U.S. troops (DSB, 1994; NIH, 1994a,b; IOM, 1996b; PAC, 1996a,b, 1997; see Appendix A: *Account of Events Related to Health Concerns of Gulf War Veterans*). The Department of Defense (DoD)

<sup>1</sup> House Report 105-205 accompanied the 1998 U.S. House of Representatives Appropriations Bill for the Departments of Labor, Health and Human Services, and Education and Related Agencies.

released information in June 1996 that, in March 1991, U.S. forces demolished Iraqi weapon-storage sites in the Khamsiyah region. After the demolition, the sites were determined to have contained chemical warfare agents (e.g., the nerve agents, sarin and cyclosarin), thus indicating the possibility that certain U.S. troops may have been exposed for short periods of time to low levels of nerve agents (see Appendix B: *Exposure to Chemicals During the Gulf War*).

Upon return from the Gulf War, some U.S. veterans reported an array of general symptoms of ill health including fatigue, skin rash, headache, muscle and joint pain, memory disturbance, concentration difficulties and memory loss, shortness of breath, sleep disturbances, and diarrhea. Health concerns among some veterans still persist in 1999.

Various review panels have concluded that no single cause has been established for these symptoms of ill health (DSB, 1994; NIH, 1994a,b; IOM, 1996b; PAC, 1996a,b; 1997; U.S. Senate, 1998), but several potential explanations have been proposed including: possible exposure to low levels of chemical or biological warfare agents; use of pyridostigmine bromide pills to protect against chemical warfare nerve agents; exposure to airborne sand particles and/or oil-well fire smoke; exposure to mixtures of pesticides, insect repellents, and other chemicals; anthrax and botulinum toxin vaccines; infectious diseases; depleted uranium; and physiological and psychological stress (see Appendix B: *Exposure to Chemicals During the Gulf War* for more details).

## 3. Illnesses Among Gulf War Veterans

*The Department of Veterans' Affairs Persian Gulf Health Registry and the Department of Defense Comprehensive Clinical Evaluation Program*

Health registries for U.S. Gulf War veterans were established in 1992 by the Department of Veterans' Affairs (DVA), the Persian Gulf Health Registry (PGHR), and in 1994 by the DoD, the Comprehensive Clinical Evaluation Program (CCEP). These programs were established to gather information from veterans regarding their wartime exposures and health histories and to offer veterans the opportunity to have comprehensive physical and laboratory examinations of their health. Veterans who choose to participate are clinically examined (including laboratory analysis of blood and urine samples) and administered a questionnaire regarding medical and family history, symptoms, recent debilitating illnesses, and self-perceived wartime exposures to specific risk factors (e.g., combat and specific chemicals) (Joseph et al., 1997; PGVCB, 1995).

Participation in these health registries is voluntary. The registries provide useful information to describe the health status of participants, but general prevalence rates of illnesses among Gulf War veterans cannot be assessed because participants are self-selected and do not constitute a representative sample of all U.S. soldiers who served in the Gulf region. Furthermore, no control group is available for comparison of rates of illness.

Table 1 cites the frequencies of diagnoses and the most frequent symptoms recorded for 20,000 participants in the CCEP registry through April 1, 1996 (DoD, 1996; Joseph et al., 1997). The diagnostic categories are based on the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9) established by the U.S. Department of Health and Human Services (DHHS, 1998).

**Table 1. Frequencies of symptoms and diagnoses for 20,000 Gulf War veterans participating in the DoD Comprehensive Clinical Evaluation Program (CCEP - through April 1, 1996). Adapted from DoD, 1996 (symptoms) and Joseph et al., 1997 (diagnoses).**

Self-reported Symptoms (13 most frequent symptoms: 10% of participants had no complaints)	Chief Complaint (%)	Any Complaint (%)
Joint pain	11	49
Fatigue	10	47
Headache	7	39
Memory loss	4	34
Sleep disturbance	2	32
Skin rash	7	31
Difficulty concentrating	<1	27
Depression	1	23
Muscle pain	1	21
Diarrhea	2	18
Dyspnea (shortness of breath)	3	18
Abdominal/gastrointestinal pain	3	17
Hair loss	<1	12
Diagnostic Category	Primary Diagnosis	Secondary Diagnosis
Disease of musculoskeletal system & connective tissue	18.6	29.5
Mental disorders	18.3	17.9
Symptoms, signs, ill-defined conditions	17.8	32.6
Respiratory system diseases	6.8	10.8
Skin and subcutaneous tissue diseases	6.3	13.7
Digestive system diseases	6.2	14.1
Nervous system & sense organ diseases	5.8	12.3
Infectious and parasitic diseases	2.6	6.4
Circulatory system diseases	2.2	5.9
Endocrine, nutritional & metabolic diseases & immunity disorders	2.1	6.1
Genitourinary diseases	1.3	4.2
Injury and poisoning	0.8	2.4
Neoplasms	0.8	2.1
Blood & blood-forming organ diseases	0.6	2.6
Congenital anomalies: conditions originating in perinatal period	0.2	0.9

Table 2 lists the ten most frequent self-reported symptoms and the distribution of diagnoses for 52,835 participants in the DVA PGHR, as of August 1997, showing similar frequencies of symptoms and diagnoses as those in the DoD CCEP (DVA, 1998a).

A more recent combined analysis of data in both the DoD and DVA registries through December 1997 (DVA, 1997 as cited in U.S. Senate, 1998) indicated that the frequencies of diagnoses were similar to the CCEP analysis by Joseph et al. (1997). Both registries indicate that there is concern among veterans regarding their health: 85,000 U.S. Gulf War veterans participated in the two clinical programs through 1997 (DVA, 1997 as cited in U.S. Senate, 1998).

**Table 2. Frequencies of self-reported symptoms and diagnoses in 52,835 participants in the DVA Persian Gulf Health Registry (PGHR). Data as of August, 1997. Source: DVA, 1998a.**

Symptoms	Number	Percent
Fatigue	10,847	20.5
Skin rash	9,719	18.4
Headache	9,525	18.0
Muscle, joint pain	8,871	16.8
Loss of memory and other general symptoms	7,406	14.0
Shortness of breath	4,190	7.9
Sleep disturbances	3,111	5.9
Diarrhea and other gastrointestinal symptoms	2,416	4.6
Other symptoms involving skin and integumentary tissue	1,916	3.6
Chest pain	1,847	3.5
No complaint	6,496	12.3
Diagnostic Category	Number	Percent
No medical diagnosis	13,998	26.5
Musculoskeletal and connective tissue	13,299	25.2
Mental disorders	7,995	15.1
Respiratory system	7,540	14.3
Skin & subcutaneous tissue	7,144	13.5
Digestive system	6,028	11.4
Nervous system	4,398	8.3
Circulatory system	3,747	7.1
Infectious diseases	3,715	7.0
Injury and poisoning	2,485	4.7
Genitourinary system	1,774	3.4
Neoplasm	232	0.4

In 1993, the British Ministry of Defence established a clinical assessment program, the Medical Assessment Programme, for British Gulf War veterans that is similar to the DVA PGVHR and the DoD CCEP (Coker, 1996). Among the approximately 51,000 British troops who were deployed to the Gulf region, 1,026 registered in this program by June 1996, and 608 completed the program. Coker (1996) reported on an analysis of information for 284 of the veterans who completed the program. Although from a much smaller study population, the frequencies of



symptoms and diagnoses among the examined British Gulf War veterans (see Table 3) show some similarities to the results in Tables 1 and 2.

Table 3. Frequencies of Symptoms and Diagnoses for 284 participants in the British Ministry of Defence Medical Assessment Programme. Adapted from Coker, 1996.

Symptom	Subjects reporting symptom (%)
Tiredness	55%
Muscle & joint pain	35%
Irritability	29%
Sleep disturbance	24%
Short-term memory loss	22%
Breathlessness	21%
Skin problems	16%
Tingling in limbs	11%
Principal Diagnostic Category (using ICD-9)	Frequency
Psychological conditions	35%
Signs, symptoms, and ill-defined conditions & chronic fatigue syndrome	15%
Respiratory system	9%
Skin and subcutaneous tissue	8%
Digestive system	7%
Nervous system	6%
Musculoskeletal system & connective tissue	6%
Circulatory system	3%
Genitourinary system	2%
Infectious diseases	1%
Endocrine	1%
Neoplasms	1%

The frequencies and types of symptoms and diagnoses of illnesses in participants in these clinical programs show that:

- common health problems involve a wide variety of organ systems including the musculoskeletal, gastrointestinal, respiratory, and nervous systems;
- a significant proportion of participants (20-30%) reported common symptoms (e.g., fatigue, headache, nervousness, heartburn, insomnia) that were without a clear physiologic or psychologic basis. Clinicians were not able to assign a standard diagnosis to these patients other than *symptoms, signs and ill-defined conditions*; and
- three diagnostic categories (psychological conditions, musculoskeletal diseases, and symptoms, signs and ill-defined conditions) represented more than 50% of the primary diagnoses.

The most frequent symptoms reported as a chief complaint by the 3,558 DoD CCEP participants who were assigned to the diagnostic category, *symptoms, signs, ill-defined conditions*, were: fatigue (20%), headache (9.2%), memory problems (6.3%), sleep disturbances (4.7%), skin rash (4.4%), joint pain (4.2%), and shortness of breath (1.8%) (Joseph et al., 1997). Twenty-six percent (914/3558) of these participants reported multiple symptoms without designating a chief complaint.

Hyams et al. (1996) noted that symptom patterns for Gulf War veterans are consistent with the experiences of U.S. veterans of previous wars. Reviewing English-language articles and books of war-related illnesses associated with the Civil War, World Wars I and II, the Korean Conflict, and the Vietnam War, Hyams recognized two general categories of war-related illnesses that were diagnosed after each of these wars: 1) psychological illnesses<sup>2</sup>; and 2) physiological illnesses<sup>3</sup>. The physiological illnesses were primarily defined by self-reported, chronic (i.e., long-lasting) symptoms including fatigue, shortness of breath, headache, sleep disturbances, impaired concentration, and forgetfulness. Hyams noted that these symptoms are non-specific and are frequently found in all adult populations, as well as among persons with illnesses associated with psychological stress, and that, in each of these wars, the onset of these illnesses was preceded by a high frequency of diarrhea. Hyams concluded that "poorly understood war syndromes" have recurred since the U.S. Civil War, that no single disease or underlying cause that is unrelated to psychological stress is apparent from his review, and that the relationships between chronic, non-specific symptoms and physiological and psychological illness need to be better understood.

Because of the limitations of the information from the health registry programs<sup>4</sup>, the DVA is conducting a three-phase National Health Survey of Gulf War veterans to obtain estimates of nationally representative prevalences of symptoms and other medical conditions among all U.S. Gulf War veterans, (DVA research project # 2; RWG, 1998, 1999). Phase 1 involved mailing a questionnaire to 30,000 randomly selected U.S. veterans (15,000 Gulf War veterans and 15,000 veterans who served during the period of the Gulf War, but were not deployed to the Gulf region). Phase 2 interviewed, by telephone, a sample of 8,000 non-respondents, and validated (through records review) self-reported data for randomly selected respondents (2,000 deployed and 2,000 non-deployed). Phase 3 involves comprehensive clinical examination of the 4,000 respondents (and their families) selected in Phase 2. Analysis of collected data is not available to date.

<sup>2</sup> Given various names through the years from *nostalgia* in the Civil War, through *shell shock* in WWI, and *battle fatigue* in WWII and Korea, to *post-traumatic stress disorder* after the Vietnam and Gulf Wars.

<sup>3</sup> *Da Costa syndrome* (irritable heart) after the Civil War, *Effort syndrome* during and after WWI and II, *Agent Orange exposure* after Vietnam, and *Gulf War syndrome*.

<sup>4</sup> For example, participants are not a random sample of all Gulf War veterans and there is no control group to compare prevalences.

### Conclusions and Research Recommendations from Review Panels

Four panels of experts have evaluated available data from the DoD and DVA health registries and other sources of information regarding illnesses among Gulf War veterans: the *Defense Science Board Task Force on Persian Gulf War Health Effects* (DSB, 1994); the *National Institutes of Health Technology Assessment Workshop Panel* (NIH, 1994a,b); the *Institute of Medicine Committee to Review the Health Consequences of Service During the Persian Gulf War* (IOM, 1996b); and the *Presidential Advisory Committee on Gulf War Veterans' Illnesses* (PAC, 1996a,b; 1997). Appendix A of this document provides an historical account of the establishment of these and other panels reviewing various aspects of illnesses among Gulf War veterans and also summarizes panel recommendations. Each of the panels concluded that there was no evidence consistent with the existence of a unique disease among Gulf War veterans (DSB, 1994; NIH, 1994a,b; IOM, 1996b; PAC, 1996a,b, 1997).

The panels considered a number of suggested causes of illnesses among Gulf War veterans including combat- and deployment-related stress, chemical and biological warfare agents, vaccines, pesticides, pyridostigmine bromide, infectious diseases, depleted uranium, smoke from oil-well fires, petroleum products, and exposures to mixtures of chemicals specific to the Gulf War experience (see Appendix B: *Exposure to Chemicals During the Gulf War* for further discussion of potential Gulf War health risk factors). Given the broad range of illnesses noted among Gulf War veterans and the incomplete exposure data that were available, each of the panels concluded that no single cause of the multiple illnesses could be established (DSB, 1994; NIH, 1994a,b; IOM, 1996b; PAC, 1996a,b, 1997). The Presidential Advisory Committee on Gulf War Veterans' Illnesses made three further conclusions that: 1) it was unlikely that the reported illnesses were caused by exposure to any of the previously mentioned physical risk factors; 2) stress was likely to be an important contributing risk factor; and 3) research should be pursued in areas of uncertainty, such as the long-term effects of low-level exposure to chemical warfare agents and the synergistic effects of exposure to pyridostigmine bromide and other risk factors (PAC, 1996a,b, 1997; Lashof and Cassells, 1998).

The Presidential Advisory Committee further recommended that, "To ensure credibility and thoroughness, further investigation of possible chemical or biological warfare agent exposures during the Gulf War should be conducted by a group independent of DoD." (PAC, 1996b, 1997). In response to this recommendation, President Clinton created the Special Oversight Board for Department of Defense Investigations of Gulf War Chemical and Biological Incidents, "to provide advice and recommendations based on review of DoD investigations into possible detections of, and exposures to, chemical or biological weapons agents and environmental and other factors that may have contributed to Gulf War illnesses" (PSOB, 1998). This group held its first public hearing in November, 1998.

In response to another recommendation from the Presidential Advisory Committee (PAC, 1997), the DVA contracted the Institute of Medicine of the National Academy of Sciences to conduct a periodic review of scientific evidence regarding associations between illnesses and Gulf War

service. To carry out this review, the Institute of Medicine Committee on Health Effects Associated with Exposures During the Gulf War was formed in 1998 and held its first meeting in January 1999 (IOM, 1998a).

Initial research recommendations from the review panels included:

- epidemiological research to compare prevalence rates of illnesses in Gulf War veterans with appropriate control populations;
- research to examine groups of symptomatic Gulf War veterans more closely with neuropsychological and psychological tests; and
- research on specific risk factors such as stress, pesticides, depleted uranium, and Leishmaniasis (DSB, 1994; NIH, 1994a,b; IOM, 1996b; PAC, 1996a).

More recent research recommendations include:

- research into the long-term effects of low-level exposure to chemical warfare agents, alone and in combination with exposure to other Gulf War health risk factors including stress, pesticides and pyridostigmine bromide;
- epidemiological research on groups of U.S. troops known to be in the vicinity of Khamsiyah when low-level exposure to nerve agents may have occurred;
- research emphasis should include investigations of the causes, methods of prevention, and methods of treatment of musculoskeletal conditions and stress-related disorders (PAC, 1996b, 1997).

The Institute of Medicine established the Committee on Measuring Health Status of Persian Gulf Veterans in 1998 to identify important research questions regarding Gulf War illnesses and develop research designs and methods to address the questions (IOM, 1998b). The committee held a workshop in May 1998 (IOM, 1998c), but the committee's findings and recommendations are not yet available.

Overviews of research results and ongoing research on illnesses among Gulf War veterans are presented in sections 5 and 6 and Appendices C and D of this document.

#### 4. Overview: U.S. Government-Supported Research on Gulf War Illnesses

In response to Public Law 102-585, President Clinton, in August, 1993, named the Secretary of Veterans Affairs to coordinate executive branch-funded research on the health consequences of the Gulf War. The Persian Gulf Veterans Coordinating Board (PGVCB) was formed in January, 1994 to coordinate interagency efforts in research, clinical care, disability compensation, resource allocation, and information dissemination. The Secretaries of the DoD, the DVA, and the DHHS chair the PGVCB. The RWG was established to assess the state and direction of research, identifying gaps in factual knowledge and conceptual understanding, identify testable hypotheses, recommend research directions for participating agencies, review research concepts as they are developed, and collect and disseminate scientifically peer-reviewed information (RWG, 1998).

In the 1994-1997 period, the RWG coordinated U.S.-government sponsorship of 121 research projects pertaining to illnesses in Gulf War veterans (RWG, 1998). New projects were funded in 1998.

As reported in the March 1998 RWG Annual Report to Congress, 39 of the 121 projects were completed through February, 1998. Total funding for research on Gulf War illnesses in the DoD, DVA, and the DHHS (in millions of dollars) was \$7.1 in 1994, \$17.3 in 1995, \$18.8 in 1996, \$34.2 in 1997, and \$37.9 (projected) in 1998 for a total of \$115 million to date (RWG, 1998).

In 1995 and 1996, the RWG established six focus areas of research:

- Symptoms/General Health
- Brain and Nervous System
- Reproductive Health
- Pyridostigmine Bromide
- Environmental Toxicology
- Leishmaniasis.

In response to the 1996 DoD announcement that U.S. troops demolished an Iraqi weapons bunker at Khamsiyah in March of 1991 and that certain troops may have experienced low-level exposure to nerve gas, the RWG (1998) added two additional focus areas related to possible health effects from low-level exposures to chemical weapons agents:

- epidemiological research on health outcomes in troops potentially exposed to sarin at Khamsiyah; and
- research on potential health effects from low-level, sub-clinical exposures to chemical warfare nerve agents, alone and in combination with exposure to other agents.

Ongoing, U.S. Government-funded research projects related to Gulf War illnesses and of interest to the focus of the current research-planning conference are briefly described in Appendix D and include:

- seven projects related to multiple symptom illnesses such as *multiple chemical sensitivity* and chronic fatigue syndrome;
- six projects (two human studies and four animal studies) related to *genetic differences in susceptibility to chemicals or stress*;
- thirteen projects (all animal studies) related to *toxic effects from mixtures of chemicals and other risk factors* (e.g., effects of sarin, pyridostigmine bromide and DEET, alone or in combination, on neurobehavior and immune function in rats);
- four projects related to *treatment of Gulf War symptoms* (two clinical trials of antibiotic treatment, one clinical trial examining cognitive behavioral therapy and aerobic exercise; and one animal study examining behaviorally-active drugs to modify behavior in mice);
- eight projects (three epidemiological studies and five animal studies) related to *toxicity of low-level, subclinical exposures to chemical warfare agents* (all but one project is related to exposure to nerve agents; the other examines possible DNA effects from nitrogen mustard);

- six projects (one human controlled-exposure study and five animal studies) related to *toxicity of pyridostigmine bromide*;
- and numerous clinical and epidemiological studies related to *assessment and definition of Gulf War illnesses* and *quantification of disease prevalence and associations between chemical exposures and disease*.

##### 5. Gulf War Illnesses: Research Results and Ongoing Research

This section discusses results from research related to illnesses in Gulf War veterans and relationships of the results to ongoing research projects. Included in the discussion are results from mortality and hospitalization studies, studies of self-reported symptoms in Gulf War-deployed and non-deployed veterans, studies of neurophysiological and neuropsychological variables in symptomatic Gulf War veterans, studies of health effects from mixtures of chemicals used in the Gulf War and other risk factors, studies of genetic differences in susceptibility to environmental agents, studies of multiple chemical sensitivity in Gulf War veterans, and studies of treatment of Gulf War veterans with non-specific chronic symptoms of ill health. Appendix C: *Research on Gulf War Illnesses: Description and Evaluation of Selected Studies* and Appendix D: *Ongoing Research Related to Illnesses Among Gulf War Veterans* provide additional details.

##### *Mortality and Hospitalization Studies*

Large-scale studies are available comparing the following in active-duty U.S. military personnel who served in the Gulf War with active-duty personnel who did not serve in the Gulf:

- rates of mortality (Writer et al., 1996; Kang and Bullman, 1996, 1997);
- rates of general hospitalizations (Gray et al., 1996);
- rates of hospitalizations for unexplained illnesses (Knoke and Gray, 1998);
- rates of hospitalization for testicular cancer (Knoke et al., 1998); and
- rates of general birth defects and a specific birth defect, Goldenhar syndrome (Cowan et al., 1997; Aranata et al., 1997).

The mortality rate studies found no differences between Gulf War-deployed and non-deployed personnel, except for a higher rate of mortality from unintentional injuries (i.e., accidents, in particular motor vehicle accidents) in deployed personnel (Writer et al., 1996; Kang and Bullman, 1996; 1997). The hospitalization studies, which focused on discharge rates from U.S. military hospitals, found no consistent evidence for increased hospitalizations in Gulf War-deployed personnel (Gray et al., 1996; Knoke and Gray, 1998; Knoke et al., 1998). The studies of children of deployed-personnel born in U.S. military hospitals found no statistically significant increase in

general birth defects or in Goldenhar syndrome<sup>5</sup> compared with children born to non-deployed personnel (Cowan et al., 1997; Aranata et al., 1997).<sup>6</sup>

Whereas these large-scale studies have not found evidence for increased incidence of grave illness among Gulf War veterans, they have several limitations including: not studying personnel who separated from the military; not studying geographically or exposure-defined subgroups; not examining non-military hospitalizations; and not examining outpatient treatment of illness (see Appendix C for more discussion). These studies, thus, do not negate the fact that Gulf War veterans have experienced, and still are experiencing, real illnesses, as demonstrated by the DVA and DoD clinical experiences. Discussion of the strengths and limitations of the published mortality, hospitalization, and reproductive-outcome studies are available in the literature (Doyle et al., 1997; Haley, 1998a,b; Kang and Bullman, 1998; Gray et al., 1998; Cowan et al., 1998). With respect to the possibility that reproductive outcomes (e.g., increased risk for fetal deaths, birth defects, miscarriages, medical termination of pregnancy, and infertility) might be influenced by Gulf War service, there are several on-going controlled epidemiological studies that were designed with these limitations in mind, but for which data are not yet available (see Doyle et al., 1997; RWG, 1997, 1998, 1999; Cowan et al., 1998).

#### *Studies of Self-reported Symptoms in Gulf War-Deployed and Non-deployed Veterans*

Results from several studies are available comparing self-reported health symptoms and medical conditions in groups of Gulf War deployed and non-deployed veterans (CDC, 1995; Fukuda et al., 1998; Iowa Persian Gulf Study Group, 1997; Stretch et al., 1995; Pierce, 1997; Canadian Department of National Defence, 1998; Unwin et al., 1999; Ismail et al., 1999; Proctor et al., 1998). These studies have found consistently higher rates of self-reported symptoms in deployed compared with non-deployed veterans; short descriptions of results follow. Results from these studies should be evaluated with the generally accepted understanding that self-reported symptoms are subject to individual and group biases ("recall biases") that can distort the magnitude of differences between groups. (More study details are included in Appendix C)

The CDC (1995) compared rates of self-reported health symptoms that persisted for more than six months among Gulf War deployed and non-deployed, active-duty personnel in Air Force units

<sup>5</sup> Goldenhar syndrome is a prenatal developmental disorder that leads to abnormal ear and facial structures; anecdotal reports in the popular press in 1995 suggested that there might be an excess of this birth defect among children of Gulf War veterans (Aranata et al., 1997).

<sup>6</sup> In addition to these studies of active-duty personnel, early news-media reports that there was an apparent cluster of birth defects in Gulf-deployed Mississippi National Guard units were not supported by a subsequent examination of the frequencies of birth defects, low-birth weight, or premature births in 54 of 55 children born to 52 veterans in these units compared to U.S. national rates, but the small sample size in this study does not allow a definitive conclusion that applies to all Gulf War veterans (Penman et al., 1996).

from Pennsylvania and Florida and found that the prevalence of each of thirteen symptoms<sup>7</sup> was significantly greater in deployed personnel compared with non-deployed personnel. Individuals in a sample of this study population were defined either as "cases" with chronic multiple symptoms or "noncases" based on their survey responses<sup>8</sup> and evaluated further in physical examinations, laboratory tests of blood, stool and urine samples, and serological examinations (Fukuda et al., 1998). Fukuda et al. (1998) reported that: 1) "cases" with chronic multiple symptoms were more frequent in the deployed group compared with the non-deployed group; 2) no findings in the physical, laboratory or serological tests were predictive of case definition<sup>9</sup>; and 3) no significant associations were found between having chronic multiple symptoms and several surrogate measures of exposure (e.g., date of deployment, season of deployment, occupational activity during war).

The Iowa Persian Gulf Study Group (1997) found significantly higher prevalence of similar self-reported symptoms indicative of several syndromes or disorders<sup>10</sup> in a group of Gulf War-deployed personnel from Iowa who served in U.S. regular military, National Guard, or reserve units compared with a similar group of non-deployed military personnel from Iowa. Stretch et al. (1995; 1996a,b) also found significantly higher percentages of self-reported physical health symptoms in Gulf-deployed veterans from Hawaii and Pennsylvania compared with non-deployed veterans, and noted that this difference was not explained by several demographic variables (e.g., age, rank, marital status) other than deployment.

In a study of female U.S. veterans, Pierce (1997) reported that self-reported frequencies of occurrence of general health symptoms<sup>11</sup> were higher in deployed versus non-deployed veterans, but the differences were not statistically significant. However, self-reported frequencies of occurrence of other symptoms<sup>12</sup> (lumps or cysts in breasts, abnormal Pap smear, headache) were statistically significantly higher, four years after the war, in deployed veterans than in non-deployed veterans, and a significantly greater percentage of deployed veterans (24%) met the

<sup>7</sup> For example: fatigue, joint pain, nasal congestion, diarrhea, joint stiffness, unrefreshing sleep.

<sup>8</sup> A case was defined as reporting one or more chronic symptom from at least two of three categories: fatigue, mood-cognition and musculoskeletal.

<sup>9</sup> Fukuda et al. (1998) reported that "mean values of a few routine blood tests differed among cases and noncases, but the differences were marginal and clinically unimportant". They noted that a more detailed summary of blood and urine data was available by request.

<sup>10</sup> For example: depression, posttraumatic stress disorder, chronic fatigue, cognitive dysfunction, asthma, and fibromyalgia.

<sup>11</sup> Rash, cough, depression, unintentional weight loss, insomnia and memory problems.

<sup>12</sup> Pierce (1997) termed these symptoms *gender specific*.

requirement for combat-related posttraumatic stress disorder (PTSD) than non-deployed veterans (15%) (Pierce, 1997).

In a study of self-reported health symptoms in Canadian Gulf War veterans compared with non-Gulf-deployed Canadian veterans, Gulf-deployed veterans reported higher prevalences of symptoms of chronic fatigue, cognitive dysfunction, multiple chemical sensitivity, major depression, post-traumatic stress disorder, anxiety, fibromyalgia and respiratory diseases (bronchitis and asthma together), as well as higher numbers of children with birth defects (before, during, and after the Gulf War) (Canadian Department of National Defence, 1998).

Investigators at the Boston Environmental Hazards Center found significantly higher percentages of veterans who reported health symptoms<sup>13</sup> in Gulf-deployed groups from New England (n=186) and New Orleans (n = 66) compared with a group of U.S. veterans (n = 48) who were deployed to Germany during the Gulf War period (Proctor et al., 1998). Statistical analysis of symptom scores (that were based on self-reported frequency of occurrence of the symptoms) and self-reported military-experience exposures found significant associations between specific symptoms<sup>14</sup> and exposures to pesticides, debris from Scud missiles, chemical or biological warfare agents, and smoke from tent heaters.

In a survey study of U.K. veterans, significantly higher percentages of Gulf-deployed veterans reported numerous health symptoms<sup>15</sup> compared with non-deployed veterans from the same era or veterans deployed to Bosnia (Unwin et al., 1999). Most of these differences persisted after statistical adjustment for possible confounders and diagnosed psychological disorders. Statistical associations between self-reported symptoms and self-reported exposures to numerous health risk factors<sup>16</sup> were examined in each of the studied groups, after defining individuals with multiple

<sup>13</sup> Skin rashes, stomach cramps or excessive gas, joint pains, headaches, difficulties learning new material, inability to fall asleep, and frequent periods of anxiety or nervousness.

<sup>14</sup> The analysis excluded 12 subjects in the Gulf-deployed groups who were diagnosed with current PTSD. Statistically significant associations included those between: 1) self-reported exposure to pesticides and musculoskeletal or neurological symptoms; 2) self-reported exposure to debris from Scud missiles and musculoskeletal, neurological, neuropsychological or psychological symptoms; 3) self-reported exposure to chemical or biological warfare agents and musculoskeletal, neurological, neuropsychological, and psychological symptoms; and 4) self-reported exposure to smoke from tent heaters and cardiac, neurological, and pulmonary symptoms.

<sup>15</sup> For example, fatigue, sleep disturbances, irritability, headaches, loss of concentration, joint stiffness or pain, tingling in fingers and arms, chest pain, and night sweats

<sup>16</sup> For example, smoke from oil-well fires, use of personal pesticides, use of pyridostigmine bromide, belief of exposure to chemical attack, multiple routine vaccinations, or vaccinations for biological warfare agents.

symptoms<sup>17</sup> as "cases" and others as "noncases". In all three groups of veterans, statistically significant associations were found between reporting multiple symptoms and reporting exposure to numerous agents, including nerve gas, exhaust from heaters or generators, and pyridostigmine bromide. A weak, although statistically significant, association between reporting multiple symptoms and reporting receiving multiple vaccinations was found in the Gulf-deployed U.K. veterans, but not in the Bosnia U.K. veterans (Unwin et al., 1999). In a companion study, Ismail et al. (1999) used a mathematical technique, two-step factor analysis, to examine if the self-reported symptoms represented a unique Gulf War disorder. Using this technique, a three-factor structure was identified among the Gulf-deployed veterans; the "factors" were labeled mood, respiratory system and peripheral nervous system based on their defining symptoms. Ismail et al. (1999) reported that this three-factor structure also reasonably fit the Bosnia-deployed veterans and the non-deployed, Gulf War-era veterans, and concluded that their findings do not support a unique Gulf War syndrome.

Other studies also looked for relationships between self-reported health symptoms and measures of stress or self-reported exposures to specific health risks such as combat, poisonous gas or occupational exposure to petroleum products (Stretch et al., 1996a,b; Baker et al., 1997; Wolfe et al., 1998). Relationships between war-related stress and physical symptoms of ill-health were found (Stretch et al., 1996a,b; Baker et al., 1997), but these studies do not indicate the strength of the relationship and do not exclude possible relationships between symptoms and other risk factors. One study found that, in a group of Gulf-deployed U.S. veterans, self-reported exposure to poisonous gas was related to higher symptom reporting (Wolfe et al., 1998).

Based on the results of several psychological tests, Stretch et al. (1996a,b) reported that, in addition to more frequently reporting health symptoms, deployed veterans from Hawaii and Pennsylvania exhibited more stress than non-deployed veterans. In a study of 188 Gulf War veterans, half of whom were patients at the Cincinnati Veterans' Administration Medical Center, Baker et al. (1997) found that the 24 Gulf War veterans in this group with PTSD had statistically significantly greater combat exposure and reported more symptoms than others in the group. Wolfe et al. (1998) found that, in a study of 2,119 Gulf-deployed troops who returned to the U.S. through Fort Devens, veterans who reported having been exposed to poison gas were more likely to report health symptoms (such as aches/pains, lack of energy, etc.), even after excluding from the analysis those subjects with presumptive PTSD, and that deployed veterans with combat exposure or occupational exposure to motor vehicles (i.e., petroleum products) were not more likely to report health symptoms.

As discussed earlier, an on-going large-scale project, the VA National Health Survey, is designed to estimate and compare the prevalence of various symptoms, medical conditions, and unexplained illnesses in Gulf War-deployed and non-deployed U.S. veterans and look for relationships between exposure to specific risk factors and frequencies of health symptoms (DVA

<sup>17</sup> Following the convention of Fukuda et al. (1998), a case was defined as reporting one or more chronic symptom from at least two of three categories: fatigue, mood-cognition and musculoskeletal.

research project #2; RWG, 1998, 1999). Data from this project are not currently available. Other on-going large-scale projects for which data are not yet available include:

- a University of Oregon study comparing health survey responses and clinically evaluated neuropsychological and neurophysiological variables in: subjects from U.S. troops located within a 50-km radius of Khamisiyah in March, 1991; subjects from other U.S. Desert Storm and Desert Shield troops; subjects from other U.S. troops that were not deployed to the Gulf region; and civilians with a documented history of exposure to organophosphate insecticides (DoD research project #63; RWG, 1998, 1999); and
- an Institute of Medicine/Medical Follow-up Agency study comparing hospitalization rates and mortality rates during a 5-year post-Gulf War period in: subjects directly involved in the March 1991 Khamisiyah demolition, subjects from two battalions located within a 50-km radius of the Khamisiyah demolition site during March, 1991; subjects from Gulf War battalions never located within a 50-km radius of Khamisiyah; and subjects from non-deployed U.S. troops (DoD research project #69; RWG, 1998, 1999).

#### *Neurophysiological and Neuropsychological Evaluations of Symptomatic Gulf War Veterans*

Several studies have carried out neurophysiological and neuropsychological evaluations of small groups of symptomatic Gulf War veterans (Jamal et al., 1996; Amato et al., 1997; Goldstein et al., 1996; Axelrod and Milner, 1997; Haley et al., 1997a,b; Haley and Kurt, 1997). In general, these studies have not found obvious and consistent changes in objective measures of numerous neurophysiological or neuropsychological variables; however, some of the studies have found subtle changes in several variables in some of the examined patients. Several hypotheses concerning the cause or physiological basis of difficult-to-diagnose chronic illnesses among some Gulf War veterans remain plausible; some investigators hypothesize relationships to stress (e.g., Goldstein et al., 1996; Amato et al. 1997), whereas other investigators hypothesize relationships to low-level chemical exposure (Haley and Kurt, 1997).

In an evaluation of neuromuscular function<sup>18</sup>, Jamal et al. (1996) found statistically significant changes in two variables of nerve conduction velocity<sup>19</sup> and one variable of cold sensation in fourteen symptomatic<sup>20</sup> British Gulf War veterans compared with ten healthy civilians, but noted that the clinical relevance of these findings was unknown.

<sup>18</sup> The evaluation included a physical examination of reflexes, muscle power, and response to stimulation (e.g., pin prick), nerve conduction velocity tests, electromyographic analysis of muscles, and quantitation of sensory thresholds to heat and vibration. 14 subjects (12 men and 2 women) were randomly selected by Jamal et al. from a list, compiled by a voluntary organization, of 40 U.K. veterans who complained of unexplained illness after the Gulf War.

<sup>19</sup> Among 19 nerve conduction and electrophysiological variables that were measured.

<sup>20</sup> These veterans reported musculoskeletal symptoms including fatigue, weakness, numbness and spontaneous sensations of heat or cold.

In evaluations of neuromuscular function and muscular structure<sup>21</sup> in 20 Gulf War veterans who complained of severe and debilitating muscle fatigue, weakness, or pain, Amato et al. (1997) reported that the only abnormalities<sup>22</sup> found were "mildly increased" levels of serum creatine kinase or non-specific histological changes in biopsied muscle tissue in 8/20 of the patients. Amato et al. (1997) did not believe these changes to be clinically significant or indicative of a specific neuromuscular disorder.

Axelrod and Milner (1997) administered 36 neuropsychological tests to a group of 44 self-selected U.S. Gulf War veterans<sup>23</sup> and found that average performances for the group only showed slight, but statistically significant, impairments, relative to normal values, in two of six tests of finger dexterity and in three of twelve tests of executive functioning<sup>24</sup>.

Goldstein et al. (1996) compared performance by 21 symptomatic Gulf War veterans and 38 healthy civilian volunteers in a battery of neuropsychological tests<sup>25</sup>, and reported that no statistically significant differences were found between the two groups on scores in fourteen tests of cognitive processes (i.e., attention and memory). No statistically significant difference was found between the Gulf War veterans and the control group in a cognitive impairment index<sup>26</sup>, when adjustment for psychological distress was made (Goldstein et al., 1996).

Using a mathematical technique, principal factor analysis, to identify associations among symptoms reported by a group of 249 Gulf War veterans, Haley et al. (1997a) identified and named six possible syndromes and studied subjects with the three syndromes showing the strongest associations among symptoms: *impaired cognition* (associated with: attention,

<sup>21</sup> The evaluation included physical examination, determinations of serum creatine kinase and erythrocyte sedimentation rate, thyroid function tests, nerve conduction velocity tests, repetitive nerve stimulation tests, electromyographical analysis of several muscle groups, and microscopic examination of biopsied muscle tissue.

<sup>22</sup> Amato et al. (1997) noted that the frequencies of abnormalities which they observed in their group of 20 patients were less than that seen in other larger studies in which patients were referred for in-depth evaluation of muscle pain.

<sup>23</sup> This group of veterans reported experiencing joint pain (65%), skin rashes (57%), fatigue (57%), sleep disturbances (50%), shortness of breath (41%), and cognitive difficulties (39%).

<sup>24</sup> The three executive function tests with lower scores involved color naming and word naming. The other executive functioning tests administered included Trail Making tests, card-sorting tests, oral word association tests, and a test of semantic fluency.

<sup>25</sup> Included were tests of attention, memory, psychomotor function, and problem solving.

<sup>26</sup> The impairment index was based on the number of tests performed by a subject in which the score was below one standard deviation of the mean of the control group.

memory, and reasoning problems; insomnia; depression; daytime sleepiness; and headaches), *confusion-ataxia* (associated with: thinking problems; disorientation; balance disturbances; vertigo; and impotence), and *anthro-myo-neuropathy* (associated with: joint and muscle pain; muscle fatigue; difficulty lifting; and extremity paresthesias). In 23 symptomatic "cases" with these syndromes and 20 controls<sup>27</sup>, Haley (1997b) examined performance in a battery of neuropsychological tests, auditory and vestibular function variables, brain stem auditory evoked potentials, somatosensory and visual evoked potentials, clinical motor and reflex functions, brain images, and numerous blood cytological and biochemical variables (see Appendix C for more details on administered tests and results). The following statistically significant differences between cases and controls were found: 6/22 cases showed weakness of the lower extremities compared with 1/20 controls; mean scores on composite indices of neuropsychological dysfunction were higher in cases than controls; and 4/23 cases versus 0/20 controls showed abnormal spontaneous nystagmus (rhythmic movement of the eyeball). In addition, mean values of several auditory and vestibular function variables<sup>28</sup> and several variables associated with evoked potentials<sup>29</sup> were significantly different (in the direction of impairment) in cases compared with controls.

The clinical significance of these differences is uncertain. Six neurologists, who were blinded to the identity of the subjects, reviewed the findings on each individual and concluded that "the clinical and laboratory findings were nonspecific and not sufficient to diagnose any known syndrome in any subgroup of the subjects." Haley et al. (1997b) speculated that the observed statistically significant differences between cases and controls in several objective measures of neurophysiological and audiovestibular variables may have a relationship with "sublethal exposures to cholinesterase-inhibiting chemicals", and noted that additional research is necessary, including examining the same, and additional, endpoints (e.g., neuromuscular and nerve conduction velocity variables) in a greater number of subjects (cases and controls).

Haley and Kurt (1997) hypothesized that the three previously discussed factor analysis-derived syndromes may represent variants of organophosphate-induced delayed peripheral neuropathy due to exposure to mixtures of anti-cholinesterase agents (e.g., chemical warfare nerve agents, pesticides, insect repellent, and/or pyridostigmine bromide). In support of this hypothesis, several statistically significant associations were found between self-reported exposures to anti-cholinesterase agents and the syndromes (e.g., wearing of pet flea and tick collars and *impaired cognition*; adverse reactions to pyridostigmine bromide and *confusion-ataxia* or *arthro-myo-*

<sup>27</sup> Cases included 5 subjects with *impaired cognition*, 5 with *arthro-myo-neuropathy*, and 13 with *confusion-ataxia*. Controls, matched for age, sex, and educational level, included 10 deployed asymptomatic veterans and 10 non-deployed veterans. See Appendix C for more details.

<sup>28</sup> For example, increased interocular asymmetry in response to rotation.

<sup>29</sup> For example, increased latency of the lumbar-to-cerebral peaks on the posterior tibial somatosensory evoked potential.

*neuropathy*. See Appendix C for more details.) Landrigan (1997) has noted that the hypothesis put forth by Haley and colleagues is important and deserves serious investigation, but limitations<sup>30</sup> in the studies conducted to date "substantially weaken the authors' strong conclusions."

Several ongoing research projects are making efforts to identify specific physical or laboratory neurological variables that may be consistently affected in Gulf War veterans who are experiencing multiple chronic symptoms such as fatigue, headaches, and difficulty concentrating.

- At the University of Texas Southwestern Medical Center (DoD research project #65; RWG, 1998, 1999), a battery of clinical and laboratory tests are being developed to assess neurological variables that may be differentially affected in subjects with unexplained, multiple chronic symptoms compared with healthy subjects (e.g., regional cerebral blood flow before and after challenge with a carbamate cholinesterase inhibitor, nerve firing rate of peroneal nerve, quantitative electroencephalographic pattern analysis, and blood levels of serum butyrylcholinesterase). This group is also developing a plan to conduct another health and exposure survey of randomly selected national samples of deployed and non-deployed Gulf War-era veterans.
- At Georgetown University (DoD research project #31; RWG, 1998, 1999), several physiological variables (pain threshold, esophageal smooth muscle motility) and biochemical variables (changes in neurohormonal levels in response to different stressors, cerebral spinal fluid levels of neurotransmitters) are being examined in groups of ill Gulf-deployed veterans compared with groups of civilians experiencing similar multiple chronic symptoms and groups of healthy subjects.
- At Boston University, brain activation patterns (determined with magnetic resonance imaging) will be examined in groups of ill and healthy Gulf War-deployed U.S. veterans, a group of Germany-deployed veterans of the Gulf War era, and a group of ill, non-Gulf War deployed veterans (DHHS research project #5; RWG, 1999). Brain activation patterns will be assessed in subjects challenged with a test of working memory, a brain function thought to be affected in various disorders such as chronic fatigue syndrome, multiple chemical sensitivity, and post-traumatic stress disorder. This project will also administer neuropsychological tests to two groups of Danish veterans. One group was deployed to the Persian Gulf region in 1991 after the ground war ceased, and the other was not deployed to the Gulf.

<sup>30</sup> Landrigan (1997) noted that the studies are focused on a single battalion of naval construction workers whose Gulf War experiences may not be representative of most Gulf War veterans; that only 41% of the battalion participated in the examinations raising the possibility of selection bias; that most information collected on illnesses was self-reported - detailed clinical and neuropsychological examinations were performed on only 23 symptomatic veterans representing less than 4% of the battalion; that motor nerve conduction velocity tests to confirm organophosphate-induced delayed peripheral neuropathy were made on only 5 veterans; and that exposure information was entirely self-reported.

### *Studies of Neurological Effects from Mixtures of Chemicals and other Risk Factors*

As discussed in the previous section, there is limited suggestive evidence for the hypothesis that some Gulf War veterans with chronic, non-specific symptoms may be experiencing neurological dysfunction due to low-level exposures to mixtures of anti-cholinesterase agents that might have additive or synergistic effects (Haley et al., 1997a,b; Haley and Kurt, 1997).

Suggestive evidence of additive or synergistic effects among anti-cholinesterase agents is provided by three animal studies of acute (i.e., short-term) exposure: one with hens exposed to the anti-nerve agent, pyridostigmine bromide, the insect repellent, DEET, and the insecticide, permethrin, alone and in various combinations with each other (Abou-Donia et al., 1996a)<sup>31</sup>; another with hens exposed to pyridostigmine bromide, DEET, and the insecticide, chlorpyrifos, alone and in combination<sup>32</sup> (Abou-Donia et al., 1996b); and a third with rats given single doses of pyridostigmine bromide, DEET, and permethrin, alone and in various combinations<sup>33</sup> (McCain et al., 1997). The rat study found a significant increase in lethality when all three compounds were given compared with expected additive values based on lethality from exposure to the individual compounds; these findings suggest that the compounds interacted in a synergistic (greater than additive) manner (McCain et al., 1997). In the hen studies, individual compounds were administered at exposure levels that produced mild signs of neurological effects (e.g., transient leg weakness or diarrhea) and no, or minimal, microscopic changes in spinal cords or sciatic nerves (Abou-Donia et al., 1996a,b). Co-exposure to various combinations of two of the compounds produced signs of greater neurotoxicity (e.g., gait disturbances, tremors) and mild to moderate microscopic changes in the spinal cord and sciatic nerve of some of the hens; co-exposure to all three compounds produced marked neurotoxic signs and mild to severe changes in spinal cords and sciatic nerves (Abou-Donia et al., 1996a,b). Although the design of the hen studies does not allow definitive conclusions about synergistic interactions, the results suggest that additive effects occurred. The physiological or biochemical basis of these interactions is not

<sup>31</sup> Hens were exposed 5 days/week for 2 months to oral doses of 5 mg/kg-day pyridostigmine bromide, subcutaneous doses of 500 mg/kg-day DEET, and subcutaneous doses of 50 mg/kg-day permethrin, alone, in binary combination, or all three together. Although the individual doses of these compounds did not produce marked neurotoxic effects in the hens, they were higher than doses experienced by Gulf War soldiers; for example, the prescribed dose of pyridostigmine bromide of 30 mg per 8 hours corresponds to about 1.3 mg/kg-day for a 70-kg subject.

<sup>32</sup> Hens were exposed 5 days/week for 2 months to oral doses of 5 mg/kg-day pyridostigmine bromide, subcutaneous doses of 500 mg/kg-day DEET, and subcutaneous doses of 10 mg/kg-day chlorpyrifos, alone, in binary combination, or all three together.

<sup>33</sup> Rats were exposed to several oral doses of each compound alone to determine acute oral lethal dose-response relationships. Interaction studies were then conducted examining lethality that occurred when low-level exposure to two of the compounds was constant and the dosages of the third compound were varied.

understood, but Abou-Donia et al. (1996a,b) hypothesized that competition among the compounds for esterases in the liver and plasma may lead to impaired breakdown and subsequent increased concentrations in nervous tissues<sup>34</sup>.

The relevance of these animal studies to possible chronic neurological impairment in Gulf War veterans is uncertain due to the high exposure levels to which the animals were exposed<sup>35</sup>, differences in routes of administration, potential physiological differences between humans and the studied animals, and other potential differences between mixtures to which the animals were exposed and mixtures that may have been experienced by Gulf War veterans (e.g., use of insecticides and insect repellents may have been low in the winter of 1991 when the use of pyridostigmine bromide occurred).

Acute exposure to some cholinesterase-inhibiting agents, such as certain organophosphate and carbamate insecticides, at exposure levels that produce acute symptoms of poisoning<sup>36</sup> is documented to produce different types of delayed or chronic neurological effects including persistent performance deficits on neuropsychological tests (Rosenstock et al., 1991; Ecobichon, 1994a,b; Steenland et al., 1994). Recent studies of subjects who experienced acute sarin poisoning in the Tokyo, Japan subway incident provide additional evidence that persistent subtle neurological deficits or changes may occur following acute high-level poisoning from cholinesterase-inhibiting chemicals (Murata et al., 1997; Yokoyama et al., 1998a,b). However, there are fewer data concerning persistent or long-term neurological effects from acute low-level exposures to cholinesterase inhibiting agents. Mice exposed to air concentrations of the organophosphate nerve agent, sarin, that did not produce obvious acute signs or symptoms of neurological damage<sup>37</sup> developed signs of peripheral neuropathy after exposure ceased, suggesting that obvious acute symptoms may not be a requirement for later developing neurological effects (Husain et al., 1993). Another study measured impairment in spatial learning in rats throughout a 21-day period following a 14-day treatment period with a potent organophosphate cholinesterase inhibitor at a dose that did not produce obvious signs of neurotoxicity (Prendergast et al., 1997).<sup>38</sup>

<sup>34</sup> Buchholz et al. (1997) reported that co-exposure of rats to pyridostigmine bromide and permethrin caused a 30% decrease in nervous tissue doses of permethrin compared with permethrin exposure alone, and concluded that their results do not support Abou-Donia's proposed mechanism.

<sup>35</sup> McCain et al. (1997) noted that to achieve the lowest doses used in the rat study, a person weighing 70 kg would have to simultaneously ingest 107 30-mg pyridostigmine bromide tablets, 23 six-ounce aerosol cans of 0.5% permethrin, and 6.6 two-ounce tubes of 33% DEET.

<sup>36</sup> Acute symptoms can include increased secretions, tremors, and mental confusion due to stimulation of cholinergic nerves in the central and peripheral nervous system.

<sup>37</sup> 5 mg/m<sup>3</sup>, 20 minutes/day for 10 days.

<sup>38</sup> Rats were given subcutaneous injections of 0, 50, 250, or 500 µg diisopropylfluorophosphate/kg per day for 14 days (Prendergast et al., 1997). Diisopropylfluorophosphate is a potent organophosphate



In contrast, a recent study found no symptoms of neurological effects in a group of rescue workers, one year after they were involved in a sarin incident in Matsumoto, Japan without experiencing acute symptoms of neurological effects (Nakajima et al., 1997).

Animal studies have indicated that physically-induced stress may disrupt the blood-brain barrier (Sharma et al., 1991; Friedman et al., 1996), thus leading to the hypothesis that war-related stress may have facilitated increased nervous system concentrations of pyridostigmine bromide and caused adverse acute neurological reactions that would not have occurred under non-stress conditions. In support of this hypothesis, Friedman et al. (1996) reported that, after mice were subjected to a stress-inducing forced-swim protocol, the dose of pyridostigmine bromide that was required to inhibit brain acetyl cholinesterase activity by 50% was reduced to less than 0.01 of the usual dose under non-stress conditions. Friedman et al. (1996) suggested that this hypothesis may partially explain the findings that acute symptoms of central nervous system dysfunction<sup>39</sup> were reported by more than 23% of 213 soldiers who took pyridostigmine under wartime conditions and were surveyed within 24 hours, whereas in a double-blind, placebo-controlled study under non-stressed conditions, about 8% of subjects given the same dose of pyridostigmine bromide reported similar acute symptoms. Whether or not stress-induced acute effects on the blood-brain barrier are related to subtle neurological changes observed in some Gulf War veterans with chronic non-specific symptoms of ill health remains unknown.

Numerous animal studies relevant to interactions between various neurotoxic Gulf War chemicals and other risk factors (such as stress and botulinum toxoid vaccination) are in progress or are being prepared for publication.<sup>40</sup> Given the extensiveness of this research effort, it appears that

inhibitor of acetylcholine esterase. The highest dose produced obvious signs of neurotoxicity (slowed movement, ataxia) that were not observed at the lower doses; at the two lower doses, subtle changes in behavior were noted during treatment. In rats from the two lower dose groups, cognitive function was assessed in a test of spatial learning at several intervals up to 21 days after treatment ceased; performance was impaired in rats treated with 250 µg/kg, but not in 50-µg/kg rats.

<sup>39</sup> Headaches, insomnia, drowsiness, nervousness, difficulties in focusing attention.

<sup>40</sup> These projects include: an examination of neurobehavioral variables in rats exposed to jet fuel vapor alone and in various combinations with insect repellent (DEET), pyridostigmine bromide, and periodic electric shock to induce stress (DoD research project #2; RWG, 1999); evaluation of neurobehavior and immune function variables in rats exposed to pyridostigmine bromide, permethrin, and DEET, alone or in combination (DoD research project #37; RWG, 1999); examination of possible delayed neurobehavioral and neuropathological effects in rats or monkeys following exposure to various cholinesterase inhibiting chemicals, alone or in various combinations or in combination with the administration of botulinum toxoid (DoD research projects # 54 and 61; RWG, 1999); examination of possible delayed respiratory and nervous system effects in guinea pigs and marmosets exposed to low-levels of sarin, with or without pretreatment with pyridostigmine (DoD research project #55; RWG, 1999); examination of possible delayed effects on neuromuscular and sensory systems in mice and hens exposed to low levels of sarin alone or in combination with pyridostigmine bromide (DoD research project #56; RWG,

additional animal studies currently are not needed, at least until research results from the ongoing studies can be evaluated.

#### *Genetic Differences in Susceptibility to Environmental Agents*

The Gulf War experience with and the clinical trials of the use of pyridostigmine bromide at the recommended dosage rate of 30 mg per 8 hours indicate that variable percentages of individuals experience acute symptoms of acetylcholinesterase inhibition including eye pain and headache, dizziness, runny nose, tightness in the chest, nausea, and/or abdominal cramps (Taylor, 1996; Keeler et al., 1991; Friedman et al., 1996). Keeler et al. (1991) reported that, during wartime use at this dose, the incidence of such "side effects" was around 1% and that about 0.1% of subjects experienced sufficiently severe effects to discontinue its use. Friedman et al. (1996) reported that in double-blind clinical trials with 35 healthy volunteers about 8% experienced acute symptoms of central nervous system dysfunction (e.g., headaches, insomnia, drowsiness, nervousness) and that, in studies with 213 soldiers under war-time conditions, similar symptoms were reported by about 24% of the subjects. In another report of the same study of 213 soldiers, Sharabi et al. (1991) noted that most individuals who experienced symptoms reported them as mild, but small percentages (3-10%) of subjects reported symptoms to be severe.

The underlying physiological, biochemical and/or genetic basis of why some individuals experience "side effects" from this pyridostigmine dosage rate is not understood and could vary from individual to individual. One hypothesis that is receiving some research attention is that differences among individuals in the level or the genotype of the blood serum enzyme, butyrylcholinesterase, may be responsible, at least in part, for differences among individuals in susceptibility to acute effects from nerve agents that inhibit cholinesterases. Butyrylcholinesterase is thought to provide a normal protective mechanism whereby nerve agents, including pyridostigmine and organophosphate nerve agents, are "scavenged" and detoxified by chemical interaction with the enzyme. In support of this hypothesis, Loewenstein-Lichtenstein et al. (1995) reported that an Israeli soldier who had experienced severe acute symptoms after taking pyridostigmine during the Gulf War, was found to have an 'atypical' butyrylcholinesterase that had a low potential to interact with pyridostigmine. Other support comes from animal experiments showing that the intravenous administration of acetylcholinesterase from fetal bovine serum or butyrylcholinesterase from human serum allows animals to survive, without toxic effects or neurobehavioral deficits, short-term exposures to a variety of organophosphate nerve agents at levels well above those that are normally lethal (see Wolfe et al., 1992).

It is unknown if individuals who have low levels of serum butyrylcholinesterase or who have 'atypical' butyrylcholinesterase will experience, after acute exposure to pyridostigmine or other nerve agents, delayed neurological impairments that are not experienced by others with normal

1999); and examination of effects of low-level sarin, physical exercise, and pyridostigmine bromide on neurobehavioral, neurobiochemical, and neurophysiological variables in mice (DoD research project #62; RWG, 1999).

levels of typical butyrylcholinesterase. An ongoing exploratory research program at the University of Nebraska Medical Center (DoD research project #60, RWG, 1999) is comparing serum levels and genotypes of butyrylcholinesterase in healthy Gulf War veterans and Gulf War veterans who report chronic symptoms of ill health to determine if there are correlations between butyrylcholinesterase levels or genotype and generic chronic health symptoms associated with Gulf War service. A related ongoing project at the East Orange VA Medical Center is comparing neurobehavioral, physiological and biochemical responses to pyridostigmine, alone or in combination with physically-induced stress, in two strains of rats that differ in inherent serum levels of butyrylcholinesterase (DVA research project #49; RWG, 1999). This project is also examining if the amount of pyridostigmine that reaches the brain is different in the two strains of rats under conditions of repeated physically-induced stress compared with non-stress conditions.

In another ongoing exploratory program (DoD research project #51; RWG, 1999), a group at the Hebrew University of Jerusalem is genetically engineering mice to overexpress various types of cholinesterases in nervous tissue in an effort to understand genetic differences in susceptibility to nerve agents and to identify particular cholinesterase genotypes with the greatest potential to protect against acute toxicity from organophosphate nerve agents. In addition, this group is examining DNA from human subjects who display hypersensitivity to anti-cholinesterase agents, such as pyridostigmine, organophosphate insecticides, and organophosphate warfare nerve agents, in search of particular gene sequences that may correlate with hypersensitivity.

#### *Multiple Chemical Sensitivity in Gulf War Veterans*

Multiple chemical sensitivity is a hard-to-characterize disorder occurring in a subset of the general population in which individuals typically report a wide array of recurrent symptoms of ill health in response to very low concentrations of chemicals in the environment. Symptoms reported include fatigue, depression, headaches, gastrointestinal problems, muscle and joint pain, irritability, and memory and concentration difficulties (Miller, 1994). The biomedical community has not agreed on a case definition for this disorder due to several difficulties including the unreliability of self-reported symptoms linking illness to chemical exposure, the diversity of reported symptoms and their overlap with other illness such as chronic fatigue syndrome, post-traumatic stress disorder, and fibromyalgia, and the lack of a widely agreed upon diagnostic physical finding or test (Sorg et al., 1998; Bell et al., 1998a). The disorder has been proposed to occur following either long-term, low-level exposure or short-term, high-level exposure to chemicals. The underlying physiological basis of the disorder is not known, but several psychological, immunological, and biochemical mechanisms have been proposed (Miller, 1992, 1994; Buchwald and Garrity, 1994; Sorg, 1998; Bell et al., 1998a).

Fiedler et al. (1996) hypothesized that exposure to one or a combination of environmental agents during Gulf War service may be a contributing factor to health complaints in veterans with unexplained illnesses and that there may be a higher than expected prevalence of chronic fatigue syndrome and multiple chemical sensitivities among Gulf War veterans. Leading to this hypothesis was the observation that the most frequently reported symptoms among Gulf War

veterans with unexplained or undiagnosed illnesses in the DoD and DVA clinical programs<sup>41</sup> overlap with several of the required symptoms in the Center For Disease Control and Prevention's definition of chronic fatigue syndrome (fatigue, muscle/joint pain, headaches, and loss of memory; Fukuda et al., 1994), and are common in patients with multiple chemical sensitivities (Buchwald and Garrity, 1994).

A considerable prevalence of self-reported fatiguing illness and chemical sensitivities was found in a preliminary study that administered a questionnaire to a group of 432 Gulf War veterans who registered in the DVA Persian Gulf Health Registry; 203 previously listed fatigue as a medical complaint and 228 did not (Fiedler et al., 1996). Among those who initially reported fatigue and responded to the questionnaire: 89% reported that the fatiguing illness began in 1991 or 1992; 7% reported adopting three or more avoidance behaviors based on chemical sensitivities<sup>42</sup>; and 33% and 20% considered themselves especially sensitive to car exhaust and perfume, respectively. Among respondents who did not initially report fatigue, 63% reported developing fatiguing illness and 30% considered themselves sensitive to certain chemicals with 19% sensitive to car exhaust and 11% to perfume. A more extensive survey of 2800 registrants in the DVA Persian Gulf Health Registry is being conducted by this research group (DVA research project #5A; RWG, 1999). Ongoing analyses of these data (which include self-reported environmental exposures to chemicals) are examining potential associations among symptoms to define one or more case definitions of Gulf War unexplained illnesses and potential associations between environmental risk factors and symptoms.

In a small-scale telephone survey study, a statistically significant increased percentage of subjects who considered themselves especially sensitive to certain chemicals was found in ill Gulf-deployed veterans (12/14 subjects or 86%) compared with healthy Gulf-deployed veterans (3/10 or 30%), but not in ill non-deployed veterans (4/7, or 57%) compared with healthy non-deployed veterans (3/10 or 30%) (Bell et al. 1998b).

Although these studies (Fiedler et al., 1996; Bell et al., 1998b) suggest that chronic fatigue and chemical sensitivities are present among Gulf War veterans, they do not quantify the prevalence of these conditions among all Gulf War veterans because either the studied subjects do not represent a suitably large random sample of U.S. Gulf War veterans (both studies) or a control (non-deployed) group is not included. The importance of a control group to assess whether there is an increased prevalence of chemical sensitivities among Gulf War veterans is emphasized by results of past questionnaire studies of self-reported chemical sensitivity in other groups of people<sup>43</sup>

<sup>41</sup> Fatigue, headache, memory problems, sleep disturbances, skin rash, joint pain, and shortness of breath.

<sup>42</sup> For example, following a special diet, wearing special clothes, taking special precautions in selecting home furnishings because of chemical sensitivities.

<sup>43</sup> Including college students, a rural population, office workers, and elderly WWII veterans.

showing that approximately 30% of subjects responded positively when questioned if they have chemical sensitivity and that only about 4-6% report chemical sensitivities severe enough to prompt drastic changes in their lifestyle (see Beif et al., 1998a,b). Although a larger scale study with a suitable questionnaire given to larger numbers of subjects representing random samples of all Gulf War veterans and non-deployed veterans from the same era may provide better information concerning prevalence of multiple chemical sensitivity, the lack of understanding of the neuropsychological and physiological basis of the condition itself may represent a more important problem to address with more research.

Research efforts to better understand physiological and neuropsychological characteristics in veterans reporting chronic fatigue and chemical sensitivities are ongoing at the East Orange, Tucson, and Boston VA Medical Centers, at Georgetown University (in collaboration with the Washington VA Medical Center), and at the University of Medicine and Dentistry of New Jersey. In general, it is believed that this research may lead to a better basis for proposing new methods of diagnosis and treatment of Gulf War veterans with unexplained chronic symptoms including chemical sensitivity.

At the East Orange Center, healthy veterans and veterans with chronic fatigue and/or chemical sensitivities have received comprehensive medical evaluations<sup>44</sup>, and the results are being compared with civilians with chronic fatigue syndrome and/or chemical sensitivities (DVA research project #5B; RWG, 1999). A related research project is ongoing in which the effects<sup>45</sup> of short-term exposure to 5 ppm diesel exhaust and aerobic exercise are being compared in healthy veterans and veterans with chronic fatigue syndrome and/or chemical sensitivities (DVA research project #5C; RWG, 1998, 1999).

At the Tucson Center, several physiological and neuropsychological variables<sup>46</sup> will be measured in several groups of veterans following repeated exposure to controlled concentrations of jet fuel vapor or air (DVA research project #48; RWG, 1999). Subjects will include groups of ill Gulf War veterans with or without chemical sensitivity, healthy Gulf War veterans without chemical sensitivity, and healthy, non-deployed veterans of the Gulf War era.

At the Boston Center, in-depth neuropsychological evaluations that will diagnose multiple chemical sensitivity, chronic fatigue syndrome, post-traumatic stress disorder, and other related disorders have been given to groups of treatment-seeking Gulf War veterans and

<sup>44</sup> Included were evaluations for viral infections and immune dysfunction, tests of neuropsychological variables, and tests of physiological responses to physical and cognitive challenges.

<sup>45</sup> Endpoints evaluated include self-reported symptoms, physiological responses such as heart rate and blood pressure, and performance in tests of cognitive ability.

<sup>46</sup> Endpoints will include blood pressure, heart rate, eyeblink and performance in tests of cognitive ability.

non-deployed veterans and groups of non-treatment seeking veterans (DoD research project #32; RWG, 1999). Analysis of collected data for over 300 subjects is ongoing and expected to have the potential to reveal differences between treatment-seeking deployed and non-deployed Gulf War-era veterans. A short questionnaire to identify multiple chemical sensitivity also has been developed (DoD research project #52; RWG, 1999). This will be used to compare prevalence of chemical sensitivities in female and male members of a cohort of Gulf War veterans and explore risk factors for the development of this condition.

At Georgetown University (in collaboration with the Washington VA Center), physiologic and biochemical variables<sup>47</sup> have been measured in Gulf War veterans with unexplained chronic symptoms, in civilian patients with chronic fatigue syndrome or fibromyalgia, and in healthy controls (DoD research project #31; RWG, 1999).

At the University of Medicine and Dentistry of New Jersey, the persistence of self-reported symptoms over time will be evaluated in a group of Gulf War veterans (DHHS research project #6; RWG, 1999). In addition, working definitions for multiple symptom illnesses, such as chronic fatigue syndrome and multiple chemical sensitivity, will be compared with alternative definitions as descriptors of unexplained illnesses in Gulf War veterans.

#### *Treatment of Gulf War Veterans with Non-specific Chronic Symptoms of Ill Health*

The DoD's Gulf War Health Center has a *Specialized Care Program* for people with persistent, non-specific symptoms associated with Gulf War service (Engel et al., 1998). This program is a 3-week outpatient treatment program involving three multidisciplinary teams of caregivers: a medical team, a physical team, and a psychosocial team. The program involves medical evaluations, exercise programs, therapy programs (e.g., physical, occupational, and recreational), and counseling. Patients are referred to this program after being evaluated in the DoD's Comprehensive Clinical Evaluation Program. A meta-analysis of studies of these types of programs for patients with chronic pain suggests they are useful in improving pain and mood, facilitating returning to work, and decreasing utilization of health care systems (Flor et al., 1992).

The DVA and DoD have established a 2-year, multiple-site, randomized control trial (starting in 1999 and ending in 2001) to compare treatment methods for U.S. Gulf War veterans who have unexplained chronic symptoms of pain, fatigue, and/or cognitive difficulties (DVA/DoD research project # 1D & 1V; RWG, 1999). Patients will be Gulf War veterans who are chronically experiencing at least two of the following self-reported symptoms: 1) fatigue that limits work, recreational, or social activity; 2) musculoskeletal pain in two or more body regions; and 3)

<sup>47</sup> Variables include qualitative measures of general health symptoms, quantitative measures of pain and muscle motility, heart rate variability, levels of neurohormones in response to stress, and levels of neurotransmitters in cerebral spinal fluid.

difficulties in memory, concentration, or attention. The program will evaluate 339 randomly assigned patients in each of four treatment groups<sup>48</sup>: 1) "usual and customary care" (the control group); 2) cognitive behavioral therapy<sup>49</sup> plus usual and customary care; 3) aerobic exercise plus usual and customary care; and 4) cognitive behavioral therapy, plus aerobic exercise, and usual and customary care. Treatment will be in a group format and will last for 3 months (one hourly session per week for 12 weeks). Patients will be evaluated for physical function before and immediately after the end of treatment and at 6 and 12 months after start of treatment.

Limited research has investigated the possibility that some veterans with non-specific chronic symptoms may be infected with microorganisms that are difficult to detect and that treatment with antibiotics may be useful in alleviating symptoms (Nicolson and Nicolson, 1996; Nicolson et al., 1998; Nicolson, 1998; Hyman, 1996; See Appendix C for study details). Nicolson and Nicolson (1996) reported that mycoplasma gene sequences were detected in blood leukocytes from 14 subjects in a group of 30 Gulf War veterans with chronic symptoms similar to those associated with chronic fatigue syndrome and that 11/14 of these subjects recovered after multiple treatment cycles of antibiotics (doxycycline or ciprofloxacin). Nicolson et al. (1998) also reported that mycoplasma gene sequences were detected in blood leukocytes of 76 subjects in a group of 170 subjects comprised of Gulf War veterans with chronic-fatigue-syndrome-like symptoms and their immediate family members. Among 73 mycoplasma-positive subjects who received two to six 6-week cycles of antibiotic therapy (doxycycline, ciprofloxacin or azithromycin), 58 were reported to have recovered. Hyman (1996) reported detecting streptococcal bacteria remnants in urine of about ten Gulf War veterans who had chronic-fatigue-syndrome/fibromyalgia-like symptoms (and their immediate family members); treatment with antibiotics was reported to improve the health of the subjects initially, but most relapsed. Limitations of these studies include the lack of blind testing of the specimens, the lack of appropriate control groups, and the lack of investigation of a possible placebo effect (i.e., the lack of blinding of the subjects).

Further research is ongoing regarding the antibiotic treatment of Gulf War veterans with non-specific, chronic symptoms such as fatigue, difficulty concentrating, joint and muscle pain, and headache. The DVA has recently established a multiple-site, 30-month, double-blind clinical trial of antibiotic treatment of symptomatic patients with positive findings for mycoplasma infection (DVA research project # 55; RWG, 1999). The trial (to be conducted between 1999 and 2001) will identify 450 Gulf War veterans who are experiencing at least two of three chronic symptoms (fatigue, musculoskeletal pain, and neurocognitive dysfunction) and who are mycoplasma-positive. Subjects will be randomly assigned to 12-month treatments with either 300 mg

<sup>48</sup> A total of 1356 patients.

<sup>49</sup> Cognitive Behavioral Therapy is a set of techniques that are based on psychological principles of behavioral conditioning (e.g., positive and negative reinforcement) and observational learning and are administered, with active patient participation, by a clinician trained in behavioral medicine. These techniques have been used in the treatment of physical problems such as low back pain, headaches, fibromyalgia (muscle pain), chronic fatigue, asthma, and arthritis (RWG, 1999).

doxycycline per day or placebo. Patients will be seen monthly during the medication phase and at 18 months. Physical function will be evaluated before treatment starts, and at 3, 6, 9, 12 and 18 months. Patients will also complete questionnaires designed to provide measures of pain, fatigue, and neurocognitive dysfunction.

Another project, funded by the DoD and conducted by the Louisiana Medical Foundation, involves blinded and placebo-controlled clinical trials of antibiotic treatment of patients who are experiencing chronic non-specific symptoms and who show bacterial remnants in their urine (DoD research project # 67; RWG, 1998; 1999). This trial is expected to be completed in 1999.

## 6. Concluding Remarks

During the upcoming two-and-a-half day conference, participants from various disciplines will meet several times in workgroups with the goal of discussing and recommending research in one of four focus areas related to illnesses among Gulf War veterans:

- Workgroup 1: Pathophysiology, Etiology, and Mechanisms of Action;
- Workgroup 2: Assessment/Diagnosis;
- Workgroup 3: Treatment; and
- Workgroup 4: Prevention.

A central question to be addressed by Workgroup 1 is: What are the most plausible etiological hypotheses concerning 1) diagnosed diseases and 2) unexplained multiple-symptom illnesses noted among Gulf War veterans? Associated questions include: Are ongoing research projects addressing the most plausible of these hypotheses? If not, which additional plausible hypotheses should be addressed? Are there research methods or approaches that need to be developed, or that are available and not being used? The Gulf War experience has created interest in the health effects of particular chemical agents, such as depleted uranium, organophosphate chemical warfare nerve agents, carbamate prophylactic agents against organophosphate nerve agents, vaccines, and organophosphate pesticides. This interest leads to additional questions within the focus of Workgroup 1. Should additional research resources be applied to better understand exposure-response relationships for, mechanisms of actions of, individual susceptibility to, and/or biomarkers of exposure to specific chemical agents or classes of agents associated with the Gulf War experience? Are current research efforts to examine potential interactions among "Gulf War mixtures" of chemicals and other health risk factors of sufficient scope and design? What alternative research approaches could be taken to decrease the uncertainty that will exist in any future attempts to extrapolate results from the animal "mixtures" experiments to expected human exposure scenarios? Should such research efforts be made?

Results from several epidemiological studies concur that Gulf War veterans more frequently report multiple symptoms of ill health than non-deployed veterans of the same era and that there may be an increased frequency of chronic, multi-systemic conditions of ill health among groups of Gulf War veterans. The array of reported symptoms are, in general, difficult to diagnose into a disease category. The most frequently reported chronic symptoms among Gulf War veterans with

unexplained or undiagnosed illnesses in the DoD and DVA clinical programs (fatigue, headache, memory problems, sleep disturbances, skin rash, joint pain, and shortness of breath) and in epidemiology studies appear to overlap with several of the symptoms in other symptom-based disorders including chronic fatigue syndrome, fibromyalgia, and multiple chemical sensitivity. Using factor analysis to examine associations among self-reported symptoms in different sets of Gulf War veterans, one group of investigators proposed that there might be unique disorders among Gulf War veterans (Haley et al., 1997a,b; Haley and Kurt, 1997), whereas other groups concluded that evidence for a unique Gulf War syndrome was not found when control groups were included in the analysis (Fukuda et al., 1998; Ismail et al., 1999). These results are within the focus of Workgroup 2 and lead to several questions related to the goal of recommending research on the assessment and diagnosis of illnesses among Gulf War veterans. Are ongoing efforts to assess the prevalence of these and other illnesses among Gulf War veterans of sufficient scope and design? What are the best or optimal research approaches and methods to apply to the question of whether or not there are unique health conditions among Gulf War veterans? (i.e., are there Gulf War syndromes?) Are ongoing projects using these approaches and methods to address the issues of assessing and diagnosing illnesses among Gulf War veterans? Are there particular clinical and/or research methods or approaches that need further development or validation before they can be used to assess or diagnose illnesses among Gulf War veterans? Which of these methods or approaches hold the greatest promise in increasing the efficiency and accuracy of assessing and diagnosing illnesses among Gulf War veterans or veterans of future wars?

In response to the wide diversity of illnesses and symptoms experienced by Gulf War veterans and the uncertainty of their cause, several reviewers (Engel et al., 1998; Joseph et al., 1998; Lashof and Cassells, 1998) have noted that treatment should proceed on an individual basis and is best addressed when objective clinical measures of distinct illness can be made and that, in the absence of such measures, multidisciplinary treatment of symptoms may be effective. Questions of relevance to the focus of Workgroup 3 include: What are likely to be the most appropriate treatment and/or rehabilitation approaches for 1) veterans with the most frequently diagnosed categories of diseases and 2) veterans with unexplained multiple-symptom illnesses? Are ongoing clinical trials of treatment options (e.g., antibiotic treatment trials and multidisciplinary treatment trials) of appropriate scope, size, and design? Are there other potentially useful treatment approaches or methods that need more basic research before development? Is there a need to educate physicians concerning options in treating Gulf War veterans with illnesses? Are there sufficient health care opportunities for Gulf War veterans?

Joseph et al. (1988) have noted that the DoD has recognized recommendations from various scientific review panels and government agency groups of the need for improved health surveillance programs for military personnel before, during, and after deployment to combat situations, in order to decrease uncertainties regarding chronic, post-deployment health consequences. Components of the surveillance programs include enhancing capabilities of identifying individuals with health risks, conducting standardized health assessments before and after deployment, assessing and documenting exposures to hazardous substances through

environmental monitoring and/or biomonitoring, and monitoring health status of personnel after deployment (Joseph et al., 1988). Questions related to the focus of Workgroup 4, Prevention, include: How can health surveillance programs for U.S. military personnel be improved to decrease uncertainties about post-deployment health consequences? What types of health risk communication and education programs will be useful to prevent or minimize exposure to the most likely chemical and biological health hazards in future conflicts? What techniques or methods of environmental monitoring or biomonitoring are likely to be most useful in helping to prevent or minimize exposure to chemical or biological agents in future conflicts? Which of these require further research and development? What prophylactic methods are available against the most likely chemical and biological health hazards to be encountered in future conflicts? Which of these require further research and development?

Workgroups will meet for discussion and deliberation during four sessions of 2- to 3-hour duration. Final reports and recommendations from each Workgroup will be presented to the conference at large prior to adjournment.

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## Appendix B: Exposure to Chemicals During the Gulf War

### *Chemical Warfare Agents*

At the time of the Gulf War, the Iraqi forces had an experimental chemical weapons program and also had chemical munitions available for use in the field. United Nations Special Commission investigations indicated that chemical agents in the Iraqi chemical weapons program included sulfur mustard (a blistering agent), sarin, and VX (IOM, 1996b). Iraq was also assumed to have available the nerve agents, cyclosarin, soman, and tabun (CIA, 1997). The Iraqi's possession of munitions with nerve agents was well known. For example, in 1992, a U.K. newspaper, the Independent, reported that a United Nations demolition team announced they would destroy 400 sarin-filled, 122 mm rockets that were located at a large Iraqi weapons storage bunker, at Khamisiyah 25 miles north of Basra (Independent, 1992). It was reported that the bunker was damaged due to earlier Allied bombing raids and that it was necessary to blow up the rockets at the site because they were leaking.

In 1994, the U.S. Senate Committee on Banking, Housing, and Urban Affairs issued a report expressing the belief that there was "reliable evidence that U.S. forces were exposed to chemical and possibly biological agents" (U.S. Senate, 1994a). However, the 1994 National Institute of Health Technology Assessment Workshop report indicated that evidence of exposure to chemical warfare agents was controversial and drew no conclusions (NIH, 1994a,b). The Defense Science Board concluded that there was "no scientific or medical evidence" to indicate that U.S. troops in Kuwait or Saudi Arabia were exposed to chemical or biological warfare agents (DSB, 1994). In 1996, the Institute of Medicine (IOM, 1996b) indicated that there was no credible evidence that chemical weapons were used by Iraq in the Gulf War, noted that serious concerns persisted among veterans and some investigators that significant exposure to chemical agents may have occurred in non-combat situations, and pointed out that their committee had not had the opportunity to review evidence that troops may have been exposed to chemical agents during destruction of an Iraqi munitions bunker in March, 1991.

In response to inquiries from the Presidential Advisory Committee on Gulf War Veterans' Illnesses, the DoD announced in June 1996 that: chemical warfare agents had been known to be present at Iraqi weapons-storage sites at Khamisiyah, Iraq; that some of these sites were demolished by U.S. troops in March, 1991; and that troops in the vicinity may have experienced low-level exposure to chemical warfare nerve agents during the demolition events (PAC, 1996b; CIA, 1997; DoD, 1997a). The CIA (1997) acknowledged, based on information from United Nations Special Commission inspectors, that chemical warfare agents (sarin and cyclosarin) were likely present in at least two U.S. demolition events at Iraqi ammunition storage sites in the Khamisiyah area: one (Bunker 73) on March 4, 1991 and the other ("the pit") on March 10, 1991 (DoD, 1997a). DoD (1997a) noted that there was evidence that another demolition event occurred at "the pit" on March 12, 1991. In addition, chemical weapons storage sites at Muhammadiyat, and Al Muthanna, Iraq (northwest of Baghdad) were destroyed by Allied

bombing at the beginning of the Gulf War creating a potential risk of exposure for troops located 400-500 km south of the sites (RWG, 1997).

Because air monitoring data are not available for these events, models were developed, based on the limited amount of data available concerning the amount of nerve agent that may have existed at the Khamisiyah sites, to calculate estimates of ground level concentrations of nerve agents (sarin/cyclosarin) as a function of distance and direction away from detonation sites for the March 4 and 10, 1991 events (PAC, 1996b; CIA and DoD, 1997). Modeling results, as of October, 1996, indicated that exposure levels in the explosion plume within 25 kilometers of the demolition site may have been sufficient to cause runny nose, tightness in the chest and dimness of vision (CIA and DoD, 1997), but the U.S. Army Medical Corps reported to the PAC (1996b) that signs and symptoms characteristic of exposure to nerve agents such as sarin and soman were not seen by medical personnel during the Gulf War (PAC, 1996b), and no reports of distinct acute neurological poisonings during the March 1991 Khamisiyah demolitions were located. Efforts to decrease the uncertainty in the modeling efforts are ongoing (CIA and DoD, 1997). The PAC (1996b) concluded that evidence of chemical warfare agent release at Khamisiyah "is overwhelming" and that "low-level exposure to troops within a 50-km radius should be presumed while efforts to develop more precise measures of exposure and more detailed knowledge of the demolition activities continue."

Beginning in August 1996, DoD notified approximately 20,000 individuals (those expected to have been within a 50-km radius of the Khamisiyah demolition sites) that they could have been exposed to low-levels of chemical warfare agents (DoD, 1997a; PAC, 1997). Surveys were mailed to these individuals concerning health symptoms that they recollected experiencing; the CIA and DoD (1997) reported that 7,400 responses were received and that 99 percent of responses indicated "no physical effects that could be correlated with exposure to sarin". The PAC (1997) recommended that DoD should contact all individuals within a 300-mile radius of the Khamisiyah "pit", notifying them if they are, or are not, expected to have been under the plume of the Khamisiyah demolition events.

The DoD has publicly released case narratives of investigations of numerous events of possible chemical warfare agent exposures during the Gulf War period. These include:

- Czech and French detections of nerve gas and blister agents in January 1991 in the vicinities of Hafar al Batin and King Khalid Military City (DoD, 1998a),
- chemical-agent detections by a Fox vehicle in an ammunition supply point in an orchard southwest of Kuwait City in February 1991 (DoD, 1997b),
- reports of loud-noise, SCUD missile impacts, and "noxious" cloud events in the Al Jubayl, Saudi Arabia region on several dates between January and March, 1991 (DoD, 1997c),
- several instances of suspected chemical warfare use during combat to retake Kuwaiti Air Base in Al Jaber in February, 1991 (DoD, 1997d),
- multiple (18) chemical-alarm alerts reported by the 11<sup>th</sup> Marines over a 42-day period between January 17 and February 27, 1991 (DoD, 1998b),

- reports of chemical weapon (mustard) storage at the Iraqi An Naisiriyah Southwest ammunition storage point, a site at which U.S. carried out demolition operations in March and April 1991 (DoD, 1998c), and
- development of skin burns on a U.S. Army Sergeant after performing reconnaissance in an Iraqi bunker in March, 1991 (DoD, 1997e).

DoD investigators reached conclusions (noted as interim) regarding the possibility of exposure during these events that ranged from "definitely not" (Al Jubayl events; Al Jaber Air Base) to "likely" (Army Sergeant with mustard agent burns). Several events were assigned an "unlikely" assessment (11<sup>th</sup> Marine events; An Naisiriyah ammunition storage point; Fox detections in orchard). No narrative assigned the "definite" category of exposure assessment. The PAC (1997) recommended that an entity other than the DoD should provide oversight of investigations about possible chemical warfare agent exposures. The Presidential Special Oversight Board has been established to accomplish such a role (PSOB, 1998).

The PAC (1996a, 1997) noted that chemical-warfare-agent detectors used by the U.S. during the Gulf War period (e.g., M8A1 chemical agent alarms, Fox vehicles with MM-1 mass spectrometers, and other detectors) could detect nerve gas agents only at concentrations that would cause acute lethal or near-lethal poisonings and not at low levels that might have subclinical health significance. The principal battlefield detector (M8A1) could not detect mustard agent and was so non-specific in its detection that it was often ignored during the war. The PAC (1997) recommended that DoD support the development of new detectors for "low-level, subclinical exposures" to chemical warfare agents.

After review of information, data, and modeling calculations available for Khamisiyah and other sites, as well as DoD's case narratives and information papers on the potential exposure of troops to chemical agents, the Senate's Special Investigation Unit concluded that there was insufficient evidence to prove or disprove that there was an actual low-level exposure of any troops to chemical weapon nerve agents or that any of the health effects some veterans are experiencing were caused by such exposure (U.S. Senate, 1998).

#### *Pyridostigmine Bromide*

Pyridostigmine is an anti-nerve agent (a carbamate molecule) that binds reversibly at sites of the important nerve enzymes (cholinesterases) that are irreversibly bound by organophosphate nerve agents such as sarin. At suitable dosage levels, the binding of carbamates or organophosphates to cholinesterases causes an overstimulation of cholinergic nerves in the peripheral and central nervous systems. Pyridostigmine is expected to provide protection against severe acute organophosphate poisoning when given before exposure to organophosphate agents, based on results from animal experiments showing that pyridostigmine pretreatment coupled with post-exposure treatment with atropine and pralidoxime chloride increased survival after exposure to lethal concentrations of the nerve agent, soman (Harris et al., 1984; Dirnhuber et al., 1979). The reversible binding of pyridostigmine is thought to temporarily protect the enzymes from

permanent damage that can be caused by irreversibly binding organophosphate nerve agents (Glikson et al., 1991; Taylor, 1996).

Prior to the Gulf War, the U.S. Food and Drug Administration (FDA) had approved the use of this drug for the treatment of myasthenia gravis, an autoimmune disease characterized by muscle weakness, but had not approved its repeated use as a pretreatment, protective therapy against organophosphate nerve agents in healthy subjects (U.S. Senate, 1994b). FDA regulations require obtaining an informed consent agreement from any individual who might use such an "investigational new drug". In 1990, the DoD requested that FDA waive its informed consent requirement for pyridostigmine, and, in January 1991, the FDA Commissioner agreed to waive informed consent due to the lack of an alternative satisfactory therapy against organophosphate nerve agents and the infeasibility of obtaining informed consent agreements under combat conditions (Annas, 1992; U.S. Senate, 1994b).

Although results from animal studies indicate that pretreatment with pyridostigmine is effective at decreasing lethality from certain organophosphate nerve agents (Dirnhuber et al., 1979; Harris et al., 1984), excessive doses of pyridostigmine are expected to cause some of the same acute toxic effects that are produced by organophosphate nerve agents due to stimulation of peripheral cholinergic nerves (Taylor, 1996). Studies with rhesus monkeys, however, showed that exposure to pyridostigmine at exposure levels that produced 70-80% inhibition of blood cholinesterase did not significantly affect performance in neurobehavioral tests, whereas exposure to the organophosphate agent, soman, at levels that produced similar blood cholinesterase inhibition, produced severe behavioral toxicity (Blick et al., 1994). These results suggest that the potency of pyridostigmine to affect the central nervous system is much less than the potency of organophosphate nerve agents. Recent results from rodent studies indicate that pyridostigmine pretreatment may not be equally effective at protecting against the lethality of all organophosphate nerve agents. Koplovitz et al. (1992) reported that pretreatment of mice or guinea pigs with pyridostigmine increased the efficacy of treatment with atropine and pralidoxime chloride after exposure to the organophosphate nerve agent, tabun, but with exposure to other organophosphate agents (sarin and VX), the efficacy of atropine and pralidoxime chloride treatment was decreased by pyridostigmine pretreatment.

DoD reported that all U.S. troops were supplied with pyridostigmine bromide pills, and that approximately 250,000 personnel took at least some pyridostigmine during the Gulf War (PAC, 1996b). During the Gulf War, pyridostigmine was to be used at the commanding officer's judgement and was to be self-administered by individuals in 30-mg doses three times daily (U.S. Senate, 1998). At the recommended dosage levels, acute, transient "side effects" from pyridostigmine appear to be mild in most individuals who report experiencing them. Reports from U.S. medical personnel providing care to 41,650 U.S. soldiers who took the recommended dosage for 1 to 7 days in January 1991 indicated that about 50% experienced gastrointestinal symptoms, 5-30% experienced urinary urgency and frequency, <5% experienced headaches, runny nose or tingling of the extremities, 1% (483 soldiers) required clinical visitation, and <1% (28 soldiers) had to discontinue use due to severe acute reactions (Keeler et al., 1991).

There is evidence that stress may enhance the acute adverse effects from pyridostigmine treatment. Symptoms of central nervous system dysfunction (e.g., headaches, insomnia, drowsiness, nervousness, difficulties in focusing attention) were reported by about 24% of 213 soldiers who took pyridostigmine under wartime conditions and were surveyed within 24 hours, whereas in a double-blind, placebo-controlled study under non-stressed conditions, about 8% of subjects given the same dose of pyridostigmine bromide reported similar symptoms (Friedman et al., 1996). Friedman et al. (1996) hypothesized that stress may disrupt the blood-brain barrier in some manner, allowing greater quantities of pyridostigmine to enter the brain compared with quantities that enter under non-stress conditions.

At dosage levels used for organophosphate nerve agent protection, limited testing has suggested that the short-term use of pyridostigmine may not have delayed or chronic neurological effects. As noted above, pyridostigmine has been used widely for decades in the treatment of the autoimmune disease, myasthenia gravis. The muscle weakness and fatigue associated with this disease is due to an autoimmune reaction with the acetyl choline receptor in neuromuscular nerve junctions (Drachman, 1994; Taylor, 1996). In these diseased subjects, the ability of pyridostigmine to reversibly inhibit acetylcholinesterases is thought to sufficiently increase endogenous concentrations of acetyl choline so that the abnormally low numbers of functional acetyl choline receptors are stimulated and muscle function is improved. No reports were found of chronic neurological or psychological effects in myasthenia gravis patients chronically treated with pyridostigmine bromide. Animal studies have reported changes in structure, ultrastructure and electrophysiological properties of neuromuscular synapses after repeated exposures to carbamates similar in structure and activity to pyridostigmine (Engel et al., 1973; Hudson et al., 1978; Tiedt et al., 1978), but a double-blind, placebo-controlled study found no evidence for adverse effects in extensive tests of neuromuscular function in 35 healthy human volunteers who took 30 mg pyridostigmine bromide, three times a day for up to 8 days (Glikson et al., 1991). In a study of 4 human volunteers who took 30 mg pyridostigmine bromide every 8 hours for 3 days, Borland (1985) reported that no drug-induced changes in electrical activity of the brain were detected and that acute reversible changes were noted in tests of visual motor coordination. The motor coordination changes were noted as minimal.

#### *Biological Warfare Agents*

At the time of the Gulf War, the Iraqi forces had experimental biological weapons programs and also had biological munitions available for use in the field. United Nations Special Commission investigations indicated that biological agents in the Iraqi biological weapons program included botulinum toxin, anthrax, aflatoxin, ricin, mycotoxins, hemorrhagic conjunctivitis virus, rotavirus, and wheat cover smut (IOM, 1996b). During the Gulf War, biological warfare agent field detectors were relatively primitive and could not be relied upon to accurately detect exposure in a timely fashion. U.S. Army hospital admission records identified one admission for anthrax, a disease indigenous to the Gulf region (PAC, 1996b; U.S. Senate, 1998).

Recent review panels (U.S. Senate, 1998; PAC, 1996b, 1997) have concluded that biological warfare agents were not likely used during the Gulf War because: there is no evidence to date from intelligence agencies that indicates their use; there were no verified detections of anthrax or botulinum toxin during the war; and examination of Iraqi soil samples and enzyme assays by U.S. laboratories did not find evidence of the presence of biological warfare agents.

As discussed previously, the Presidential Advisory Committee further recommended that, "To ensure credibility and thoroughness, further investigation of possible chemical or biological warfare agent exposures during the Gulf War should be conducted by a group independent of DoD." (PAC, 1996b, 1997). The Presidential Special Oversight Board has been established to accomplish such a role (PSOB, 1998).

#### *Infectious Diseases*

Many infectious diseases are prevalent in southwest Asia including, but not limited to, agents that cause diarrhea, leishmaniasis, sandfly fever, and malaria. DoD medical personnel monitored troops for the preceding diseases as well as for dengue fever, Sindbis, West Nile fever, Rift Valley fever, and Congo-Crimean hemorrhagic fever, and took measures to prevent illness from endemic diseases (Hyams et al., 1995; PAC, 1996b).

During the Gulf War, infectious diseases were not a significant problem; diarrhea was the most commonly reported condition. Occurrence of diarrhea was 4% per week early in the deployment and declined to <0.5% per week after controls on food sources were imposed (Hyams et al., 1995). Although sand fly fever had been a concern, no cases were found during the war (Hyams et al., 1995). Seven individuals with malaria were diagnosed, one individual had West Nile fever, and one death occurred from meningococcal meningitis (Hyams et al., 1995).

A small number of cases of leishmaniasis (a chronic disease transmitted, like sand fly fever, by the bite of the sand fly) has been diagnosed among U.S. Gulf War veterans: 12 cases of viscerotropic leishmaniasis and 19 cases of cutaneous leishmaniasis (PGVCB, 1995). Most of these cases have displayed objective signs of the chronic disease: elevated temperatures, lymphadenopathy, and hepatosplenomegaly (Magill et al., 1993). The PAC (1996b) arrived at the conclusion that it is unlikely that infectious diseases endemic to the Gulf are responsible for long-term health effects most frequently reported by Gulf War veterans.

Infections by mycoplasma species, microsporidia, and streptococcal bacteria have been hypothesized as possible explanations for illnesses noted in some Gulf War veterans. Nicolson and Nicolson (1996) reported that mycoplasma gene sequences were detected in blood leukocytes from 14 subjects in a group of 30 Gulf War veterans with chronic symptoms similar to those associated with chronic fatigue syndrome and that 11/14 of these subjects recovered after multiple treatment cycles of antibiotics (doxycycline or ciprofloxacin). Nicolson et al. (1998) also reported that mycoplasma gene sequences were detected in blood leukocytes of 76 subjects in a group of 170 subjects comprised of Gulf War veterans with chronic-fatigue-syndrome-like symptoms and

their immediate family members. Among 73 mycoplasma-positive subjects who received two to six 6-week cycles of antibiotic therapy (doxycycline, ciprofloxacin or azithromycin), 58 were reported to have recovered. Hyman (1996) reported the detection of streptococcal bacteria remnants in urine of about ten Gulf War veterans who had chronic-fatigue-syndrome/fibromyalgia-like symptoms (and their immediate family members); treatment with antibiotics was reported to improve the health of the subjects initially, but most relapsed. An initial DVA report of finding microsporidia in stool specimens of some Gulf War veterans was not confirmed with subsequent examinations of stool and gastrointestinal biopsy material (PAC, 1996b) or in CDC examinations of stool specimens from Gulf War veterans in Air Force units from Pennsylvania and Florida (Fukuda et al., 1998). In 1996, the PAC (1996b) expressed the belief that it was unlikely that these three infectious agents "are responsible for widespread disease among Gulf war veterans or their families."

#### Immunitizations

Seven vaccines (polio, diphtheria-tetanus, adenovirus 4 and 7, meningococcus A, CYW135, influenza, and measles-rubella) are administered to U.S. Army recruits during basic training, and others are administered upon deployment to high risk areas (hepatitis A and B, yellow fever, Japanese encephalitis, plague, rabies, and cholera) (IOM, 1996b). DoD reported to the PAC (1996b) that approximately 150,000 Gulf deployed personnel received at least one anthrax vaccination and about 8,000 personnel received at least one dose of botulinum toxoid vaccine, but adequate records to document which troops received the anthrax and botulinum toxoid vaccines were not available.

The anthrax vaccine, licensed by FDA since 1970, produces injection site reactions (e.g., swelling, tenderness) in about 6% of recipients (IOM, 1996b). The botulinum toxoid vaccine, which has been assigned an "investigational" status by the FDA and has been used as an investigational vaccine to protect high-risk laboratory workers, consists of five types of toxins (from *Clostridium botulinum*) that are converted to a "toxoid" status by reaction with formalin (IOM, 1996b). Annas (1992) has noted that the use of the vaccine in laboratory workers was discontinued in the mid-1970s before sufficient data on safety and efficacy had been collected for licensing purposes. The experience of the U.S. Army Medical Research Institute of Infectious Diseases with the botulinum toxoid vaccine indicates that transient reactions include pain, redness, and swelling at the injection site in about 10% of recipients, and headache, myalgia, fever, and malaise in about 3% (IOM, 1996b). Given the possibility that Iraq might use botulinum toxin as a biological weapon, the DoD had requested, in 1990, that FDA waive informed consent requirements for the use of a botulinum toxoid vaccine; this request was granted by the FDA in 1991 noting that obtaining informed consent agreements was not feasible under combat conditions (U.S. Senate, 1994b). Annas (1992) reported that the DoD sent a letter to the FDA noting that, during the Gulf War, the military command decided to administer the botulinum toxoid vaccine on a voluntary basis.

#### Depleted Uranium (DU)

DU, a byproduct of uranium refinement, is a very dense material that is used to increase the penetration capability of antitank munitions and as a protective shield on tanks against enemy fire (DoD, 1998d). The major toxicity of acute exposure to DU is from its chemical properties, rather than its radioactive properties, but there is uncertainty regarding toxicity from long-term exposure (IOM, 1996b). DU, which has about half the radioactivity of natural uranium, was first used in combat during the Gulf War, during which U.S. troops fired approximately 285 tons of DU munitions. Many U.S. troops handled munitions containing DU, but significant exposure with handling is not expected since the DU is encased in a protective shell (IOM, 1996b). Radiation exposure from intact DU munitions and armor is minimal and within accepted standards of health safety (GAO, 1993; IOM, 1996b).

During the Gulf War, friendly fire incidents wounded 35 U.S. soldiers of whom 22 were suspected to have retained DU fragments. Thirty-three of these wounded soldiers are undergoing a DVA-sponsored medical surveillance program at the Baltimore VA Medical Center. After 3 years, 15 of the 33 soldiers had detectable shrapnel. To date, the follow-up studies have found no evidence for neurological, renal, genotoxic, or immunological effects, but uranium excretion has been noted to be elevated in those known to have retained shrapnel (Keogh, 1995; Joseph et al., 1998). A report of the findings of this surveillance program is in preparation and will likely be available in 1999 (DVA, 1999).

The PAC (1996b) and the GAO (1993) noted that DoD had appropriate procedures for protecting personnel who worked with DU contaminated vehicles during the Gulf War but, apparently, few U.S. service personnel were adequately trained in these procedures. Activities of the 144<sup>th</sup> Service and Supply Company in fighting fires, recovering vehicles, and cleaning 29 tanks damaged by DU munitions may have led to DU exposure of 27 soldiers. Results of testing 12 of these soldiers were negative and the remaining 15 chose not to be tested (IOM, 1996b). Another two dozen soldiers from the 24<sup>th</sup> Infantry Division have reported that they were unknowingly exposed to DU-contaminated debris in the course of vehicle recovery and maintenance operations (PAC, 1996b). Additionally, troops may have inhaled particles containing DU while working near a fire at the Doha-Kuwait armored vehicle depot, or while climbing onto allied or enemy vehicles that had been hit by munitions containing DU (U.S. Senate, 1998).

DoD (1998d) classified possible DU exposures during the Gulf War into three levels:

- Level I represents immediate and direct exposures of soldiers in or near combat vehicles at the times these vehicles were struck by DU penetrators or who entered vehicles immediately after they were struck by DU munitions. These soldiers could have been struck by DU fragments, inhaled DU aerosols, ingested DU residues, or had DU particles land on open wounds, burns, or other breaks in their skin.
- Level II represents a lower level of exposure for soldiers and a small number of DoD civilian employees who worked in and around wrecked vehicles containing DU fragments and particles. These people may have inhaled DU residues resuspended during their

activities, transferred DU from hand to mouth, or spread contamination on their clothing. This Level includes soldiers who were involved in cleaning up DU residues that remained after a motor pool fire in which DU munitions detonated and burned.

Level III represents people who received short-term and very low exposures and included individuals who entered DU-containing Iraqi equipment, troops downwind from burning Iraqi or U.S. equipment struck by DU rounds, or personnel downwind from burning DU ammunition.

DoD (1998d) identified thirteen exposure events during the Gulf War period - two classified as Level I, seven as Level II, and four as Level III. Health risk assessments are being prepared for all thirteen events. The risk assessments will describe the activities of the participants, specify the sources of potential DU exposure, and estimate the dose from inhalation, ingestion, and wound contamination as appropriate for each exposure (DoD, 1998d).

In 1998, the DoD and DVA expanded a medical follow-up program conducted by the Baltimore VA Medical Center to evaluate the remaining veterans who received the largest DU exposures during the Gulf War, those involved in Level I and II exposure events. The evaluations will include a medical examination, determination of uranium levels in the urine, and completion of a detailed DU exposure questionnaire (Rostker, 1998; DVA, 1998b).

#### *Pesticides*

The DoD reported that pesticides shipped to the Gulf region for use during the war included 45,770 pounds of malathion, 8,410 pounds of chlorpyrifos, 1,858 pounds of D-phenothrin, 903 pounds of methomyl, and 539 pounds of lindane (IOM, 1996b). Pyrethrin, dichlorovos (DDVP), carbaryl, propoxur, and diazinon were also available but in amounts less than 330 pounds each (IOM, 1996b). All pesticides shipped were approved by EPA or FDA for general use in the United States at the time of the war (PAC, 1996b). It is not known how much of this inventory of pesticides was actually used or what troop exposures may have resulted (IOM, 1996b).

The use of pesticides in the Gulf was reported to have followed strict guidelines. They were used only after arthropod surveys that identified individual pests and estimated arthropod prevalence. Distribution of pesticides was prohibited unless approved by the local commander. Distribution or use for other than personal purposes was restricted to trained or certified personnel or contractors (IOM, 1996b).

DoD reported that about 2,2 spray-cans of permethrin and 2 tubes of DEET (33%) for each U.S. service member were shipped to the Gulf (PAC, 1996b). Some troops were reported to have both applied the insect repellents DEET on their skin and permethrin on their clothing between August and October, 1990, the peak occurrence of arthropods (IOM, 1996b). In addition, some service personnel chose to wear animal flea collars for protection from insects, although DoD discouraged this practice (U.S. Senate, 1998).

#### *Smoke from Oil Well Fires*

Near the end of the Gulf War in February, 1991, the Iraqi troops set more than 1,000 Kuwaiti oil wells and refineries on fire (Spektor, 1998). The burning wells were located in eastern Kuwait, with the majority to the south of Kuwait City. Smoke plumes rose and combined in a "superplume" that could be seen for hundreds of kilometers and sometimes even partially blocked out the sun (U.S. Senate, 1998).

Systematic environmental monitoring did not begin until May 1991, so limited exposure data are available for the period when most U.S. troops were in the Gulf area (Spektor, 1998; USAEHA, 1994). The U.S. Army's Environmental Hygiene Agency (USAEHA) carried out the largest monitoring effort, collecting nearly 4,000 ambient air and soil samples between May and December, 1991 (USAEHA, 1994).

Air monitoring data from the USAEHA and other U.S. and international agencies indicated that air levels of nitrogen oxides, carbon monoxide, sulfur dioxide, hydrogen sulfide, other pollutant gases, and polycyclic aromatic hydrocarbons (PAHs) were lower than anticipated and did not exceed levels seen in urban air in a typical U.S. industrial city (USAEHA, 1994; Spektor, 1998). A health risk assessment conducted by the USAEHA (1994) based on the air monitoring data for volatile organic compounds, particulate heavy metals, and PAHs predicted an excess risk for cancer of three cases per million persons exposed. Risks for non-cancer health effects were estimated by a hazard index approach comparing estimated exposure levels during the fires to U.S. EPA reference exposure levels expected to be without adverse health effects (an index greater than 1 indicates increased risk for general populations including sensitive individuals); hazard indices ranged from 0.6 to 2.0 in Saudi Arabia and 2.0 to 5.0 in Kuwait (USAEHA, 1994).

Inhalation of volatile organic chemicals, particularly benzene, contributed to over 99 percent of the non-cancer health risk at all monitoring sites. The USAEHA (1994) noted that the EPA reference exposure levels each have at least 10-fold margins of safety incorporated in their derivation and that hazard indices in the range of 1 to 10 should not present "an unreasonable health risk, particularly for short-term exposures", noting that DoD personnel were exposed to the smoke for a minimum of about a month to a maximum of about 9 months.

Etzel and Ashley (1994) found elevated concentrations of several volatile organic compounds (VOCs) in blood samples collected from 40 American firefighters working in the Kuwait oilfields in October, 1991 compared with blood levels in a random sample of 114 U.S. residents. The measured VOCs (benzene, toluene, xylene, and styrene) are components of smoke from oil well fires; blood levels in firefighters were about two times average levels in the reference group. Concentrations of these VOCs were not elevated, however, in blood collected in May 1991 from 14 U.S. personnel who worked in Kuwait City compared with reference levels.

Analyses of biologic samples from deployed troops, local inhabitants, and autopsy cases have not indicated a risk for health effects from atmospheric pollution caused by the fires (Coombe and Drysdale, 1993; Mullick, 1996). No cases of illness with symptoms resembling the most prevalent

symptoms reported by U.S. Gulf War veterans in the DoD and DVA health registries have been found in a group of 110 oil-well firefighters who worked daily at Kuwait wells in 1991 for 28-day periods without breathing-protection equipment or in other oil-well firefighters with years of experience (Friedman, 1994, 1996).

One study reported an increase in frequency of sister-chromatid exchange in blood cells collected from soldiers who were deployed from Germany to the Persian Gulf to participate in monitoring of the Kuwait oil-well fires between June and September, 1991 (after combat had ceased), but the cause of this apparent increase could not be determined (McDiarmid et al., 1995). Sister chromatid exchanges have been used as an indicator of exposure to a number of environmental mutagenic agents, including polycyclic aromatic hydrocarbons (PAHs). PAHs and other mutagenic agents are present in smoke from oil-well fires and from other fires as well. A further study of a subset of these soldiers measured levels of three biomarkers for exposure to PAHs (two measures of PAH-DNA adducts in blood cells and urinary levels of 1-hydroxypyrene-glucuronide, a metabolite of PAHs) before deployment to the Gulf, during deployment in Kuwait (after 8 weeks of duty), and 4 weeks after returning to Germany (Poirer et al., 1998). Levels of PAH biomarkers were lowest during deployment in Kuwait, suggesting that this group of soldiers were not exposed to elevated levels of PAHs while deployed in Kuwait.

#### *Petroleum Products and Other Chemicals*

The fuel used most widely during the Gulf War for both vehicles and equipment was Jet A-1, a kerosene-based aviation fuel. Of the 1.8 billion gallons of fuel used during the Gulf War, roughly 75 percent was jet fuel (mostly Jet A-1), 24 percent was diesel fuel, and 1 percent was gasoline. The gasoline was commercial leaded gasoline (PAC, 1996b). About 145,000 gallons of gasoline were used per day for eight months starting in August, 1990 (IOM, 1996b). Besides use in vehicles and machine engines, petroleum products were used to burn human waste and trash and as a fuel in stoves (U.S. Senate, 1998). Diesel fuel was used in large amounts to suppress dust, with one reported case involving 30,000 gallons used on roads daily. Troops living in tents near the roads, and particularly truck drivers who carried out the spraying, complained of nausea from breathing the resulting fumes (PAC, 1996b).

When fuels were used for heaters, cooking stoves, and portable generators, the fumes and exhaust produced by these fuels, particularly when used in unventilated tents, would have exposed some service members to benzene, toluene, xylene, ethyl benzene, and combustion products including carbon monoxide, sulfur dioxide, nitrogen dioxide, particulates, lead, and other pollutants (PAC, 1996b; U.S. Senate, 1998; IOM, 1996b). Air and limited blood monitoring found no evidence of elevated exposure to volatile organic compounds (PAC, 1996b). A recent study simulated Gulf War exposures to aerosols from unvented heaters in tents and found elevated concentrations of particulate matter, nitrogen oxides and carbon monoxide (Cheng, 1998). Fuel type, heater type, and air exchange rate were important factors in determining air concentrations in the tent. Cheng (1998) noted that information from this study will be used to calculate respiratory doses that may

have been experienced by troops residing in heated tents during the Gulf War and to calculate estimates of health risks from this type of exposure.

Chemical Agent Resistant Coating (CARC) paint, which releases a compound (toluene diisocyanate) that can adversely affect the lungs, was applied to vehicles and equipment before shipment to the Gulf area or at a port in Dhahran (U.S. Senate, 1998). Accidental exposure to a chemical decontaminant agent containing propylene and ethylene glycols reportedly caused rashes in a group of soldiers (U.S. Senate, 1998).

#### *The Desert Environment*

In the initial months of the deployment, troops were exposed to summer daytime temperatures that reached as high as 130 degrees Fahrenheit. In August and September, the mean high temperatures were approximately 100 degrees Fahrenheit with very intense solar heat and low humidity. Preventive medicine efforts resulted in very few heat casualties (U.S. Senate, 1998; Joseph et al., 1998). In surveillance data on 40,000 Marines, less than three cases of heat injury requiring aid station treatment occurred weekly per 1,000 people (U.S. Senate, 1998). Sand flies were present, as evidenced by a few cases of leishmaniasis (IOM, 1996b).

High levels of airborne particulates were detected at several monitoring sites in the Gulf theater and sample analysis indicated that, frequently, the particulates were predominately sand (USAEHA, 1994). Korenyi-Both et al. (1992, 1997) theorized that acute respiratory problems experienced by U.S. troops in Al Eskan village between January and March, 1991 were caused as a result of immunosuppression from inhalation of airborne fine sand particulates along with organic pathogenic components; it was further theorized that the acute event may have induced a later-developing state of immunodeficiency that may be related to symptoms of ill health reported by Gulf War veterans. Studies to test this hypothesis were not located.

#### *Psychological and Physical Stressors*

The stresses of the Gulf War experience, some of which were unique, included sudden mobilization for military service in a hot, sandy, and foreign desert; exposures to the largest, most dramatic oil well and refinery fires in history, which spilled smoke and oil over a vast area; and potential exposure to chemical and biological warfare agents. Stresses reported by a group of over 2,000 Gulf War veterans as they returned home included nearly 300 events they considered stressful beyond the traditional combat experiences. The reported stress-related events were grouped into the following categories (U.S. Senate, 1998):

- Combat and mission stressors such as actual threat to life from missiles (e.g., friendly fire incidents) or direct exposure to another's death or injury as part of a combat mission.
- Non-combat war-zone stressors such as a unit member seriously injured or killed in a non-mission accident.



- Domestic stressors such as divorce or long separation from or illness of family members and loved ones.
- Anticipation of war/combat activities related to missile attack alerts or fear of attack by chemical or biological agents.
- Physical attributes of the war zone such as severe climate or environmental conditions, long tours of duty, physical limitations and dangers from wearing chemical protective gear in a desert environment, or uncertainty about the war's duration.
- Intra-unit stress related to personal conflicts in a unit, leadership failure or problems, or harassment.

Stress from personal and family concerns likely played a more prominent role in the Gulf War than in other wars, because it involved a greater number of married personnel and parents. In the Vietnam War, 16% of those deployed were married with children, whereas 60% of service members and reservists in the Gulf War were married with dependents, including approximately 32,000 single parents who had to make arrangements for their children during the deployment (U.S. Senate, 1998).

#### General Exposures of Military Service

In the military environment, personnel are required to perform multiple combat and non-combat activities that may involve potentially hazardous exposures, some of which may be similar to those in the civilian workplace. In addition, however, military personnel who participate in combat and combat support operations are exposed to inherent hazards that are associated with the operation of weapons systems and the battlefield environment. Common exposures to risk factors in the combat environment include propellants from ammunition; combustion products from vehicles; solvents; chemical warfare agents; noise, vibration, and non-ionizing radiation from communications and radar tracking equipment and laser target designators; blast impact, acoustical energy, airborne toxicants, extremes in barometric pressure, oxygen deficiency, and whole-body vibration from operation of tanks, aircraft, and submarines; biological hazards; extremes in temperature, humidity, and weather; and psychological stressors related to fear and isolation. Since a large proportion of the Gulf War veterans were members of the reserves or National Guard and also had non-military jobs, their civilian occupational exposures are potential confounders in the evaluation of their health problems (Joseph et al., 1998).

Hyams et al. (1996) noted that the clinical findings for Gulf War veterans are consistent with the experiences of U.S. veterans of previous wars. Reviewing U.S. clinical reports of war-related illnesses associated with the Civil War, World Wars I and II, the Korean Conflict, and the Vietnam War, Hyams recognized two general categories of war-related illnesses that were diagnosed after each of these wars:

1) psychological illnesses, given various names through the years from *nostalgia* in the Civil War, through *shell shock* in WWI, and *battle fatigue* in WWII and Korea, to *post-traumatic stress disorder* after the Vietnam and Gulf Wars; and

2) physiological illnesses, including *Da Costa syndrome* (irritable heart) after the Civil War, *Effort syndrome* during and after WWI and II, *Agent Orange exposure* after Vietnam, and *Gulf War syndrome*.

The physiological illnesses were primarily defined by self-reported, chronic symptoms including fatigue, shortness of breath, headache, sleep disturbances, impaired concentration, and forgetfulness. Hyams noted that these symptoms are non-specific and are frequently found in all adult populations, as well as among persons with illnesses associated with psychological stress, and that, in each of these wars, the onset of these illnesses was preceded by a high frequency of diarrhea. Hyams concluded that "poorly understood war syndromes" have recurred since the U.S. Civil War, that no single disease or underlying cause that is unrelated to psychological stress is apparent from reviewing the available clinical reports, and that the relationships between chronic, non-specific symptoms and physiological and psychological illness need to be better understood.

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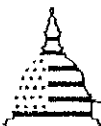
GAO

Report to the Chairman, Subcommittee  
on National Security, Veterans' Affairs  
and International Relations, Committee  
on Governmental Reform, House of  
Representatives

January 2000

## GULF WAR ILLNESSES

### Management Actions Needed to Answer Basic Research Questions



GAO

Accountability • Integrity • Reliability

EOC Meeting May 18, 2000  
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GAO/NSIAD-00-32

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EOC Meeting May 18, 2000  
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United States General Accounting Office  
Washington, D.C. 20548

National Security and  
International Affairs Division

B-282454

January 6, 2000

The Honorable Christopher Shays  
Chairman, Subcommittee on National Security,  
Veterans' Affairs, and International Relations  
Committee on Government Reform  
House of Representatives

Dear Mr. Chairman:

Many of the approximately 700,000 veterans of the Persian Gulf War have complained of illnesses since the war's end in 1991, and over 10 percent have sought and completed health examinations through the Department of Veterans' Affairs or Defense. Some fear they are suffering from chronic disabling conditions because of wartime exposures to one or more agents with known or suspected health effects. In response to these concerns, the government has funded research, investigation, and information activities through agencies such as the Departments of Veterans' Affairs, Defense, and Health and Human Services, which are represented on the Persian Gulf Veterans' Coordinating Board, the body that coordinates the federal response to Gulf War veterans' illnesses.

As requested, we identified expenditures on these efforts and evaluated their results. Specifically, our objectives were to describe

- the amount of money that these three departments spent on research and investigation of Gulf War veterans' illnesses and health concerns in fiscal years 1997 and 1998, including current and projected spending by the Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses;
- the productivity of this research spending, including the extent to which the Coordinating Board has determined that federal research objectives have been satisfied, and the extent to which the research has resulted in peer-reviewed publications and the identification of the causes or successful treatments for Gulf War veterans' illnesses;
- the extent of coordination between the Research Working Group of the Coordinating Board and the Office of the Special Assistant for Gulf War Illnesses; and
- the Office of the Special Assistant for Gulf War Illnesses' contract management.

B-282454

## Results in Brief

During fiscal years 1997-98, the Departments of Defense, Veterans' Affairs and Health and Human Services spent more than \$121 million on research and investigation of Gulf War veterans' illnesses, with DOD spending more than \$112 million of that total. These funds supported a growing catalog of research and investigatory efforts intended to address both veterans' health concerns and their questions about hazards encountered in the conflict. The Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses spent the majority of the federal research and investigatory funds we identified, about \$65.3 million in fiscal years 1997 and 1998, with another \$65.4 million in spending planned for fiscal years 1999 and 2000.

Basic questions about the causes, course of development, and treatments of Gulf War veterans' illnesses remain unanswered. As of November 30, 1999, the Research Working Group of the Persian Gulf Veterans' Coordinating Board had not published an assessment of the extent to which the research program had answered the major questions it identified as research objectives in 1995, and no date had been set to publish such an assessment. By the end of 1998, among the 151 research projects monitored by the Group, 117, or 77 percent, were recorded as ongoing, including 29, or 47 percent, of the 62 that were scheduled for completion by that time. Among those that were not recorded as complete at the end of 1998, about one-third were later completed and the remaining two-thirds had their estimated completion dates extended. Group officials attributed the extensions either to provisions to collect or incorporate additional data or to unanticipated delays, such as difficulty in securing approval to collect data or in locating and recruiting veteran participants. Augmenting the research monitored by the Group, DOD's Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses had received 19 of the 20 reports due from its major research contractors by late 1999, with 6 publicly released and the remainder largely in various stages of interagency review. Fourteen reports had remained in draft or review status for a year or longer.

While federally sponsored studies have resulted in some descriptive information concerning veterans' symptoms, many basic questions (such as the numbers of veterans with unexplained symptoms and the course of their illnesses over time) remain. Answers to more complex questions about the potential cause(s) of veterans' unexplained symptoms have been difficult to derive in part because problems in identifying veterans' specific exposures persist. In addition, no working case definition or set of

definitions of illnesses affecting veterans has been endorsed by the Group. Perhaps because analytic epidemiological research depends heavily upon exposure data and/or case definition, completed epidemiological research, which comprises a large portion of the research portfolio, has been less likely than other types to result in peer-reviewed publications and most of these studies have been descriptive. Although the question of causation is unresolved, in the interest of assisting ill veterans, the Department of Veterans' Affairs has begun recruiting patients for trials of antibiotic and exercise-behavioral treatments for a set of veterans' unexplained symptoms.

Although the Office of the Special Assistant for Gulf War Illnesses expends more than half of the federal funds supporting research and investigation into Gulf War veterans' illnesses, its activities are not effectively coordinated with those of the Research Working Group. According to officials from both organizations, the Office of the Special Assistant's activities involve investigations, rather than research, and therefore are not subject to coordination. However, the Group considered some of the Office's activities to involve research and expressed concern about the lack of an external review process. The weak coordination between the Group and the Office increases the potential to miss opportunities to leverage ongoing and completed work by other agencies, and we found a few examples of such problems.

The Office rapidly developed relationships with various contractors to support its mission. However, two of the largest task orders were awarded improperly, and the Office discouraged competition for another task order by specifying a preferred vendor. Because the Office is likely to continue to spend a significant part of its budget on support contracts, it needs to insure that its contracts fully comply with applicable requirements.

We are making recommendations to improve federal efforts to assess and conduct research, coordination between the Office and the Group, and the Office's arrangements with its support contractors.

## Background

Several federal agencies and offices have generated and coordinated responses to veterans' complaints of illnesses following the Gulf War. These have included the Departments of Defense (DOD), Health and Human Services (HHS), Veterans' Affairs (VA), and Energy, the Central Intelligence Agency, the Environmental Protection Agency, the National Security Council, and the Office of Management and Budget.

The formation of the Persian Gulf Veterans' Coordinating Board (PGVCB) was announced in early 1994 for the purpose of coordinating federal research and other activities in response to illnesses reported by Gulf War veterans. This body, which is co-chaired by the Secretaries of Defense, Veterans' Affairs, and Health and Human Services, comprises working groups on research, clinical issues, and compensation. The PGVCB Research Working Group (RWC), which has no budgetary authority, does not directly manage or distribute research funds. It describes its responsibilities as (1) assessing the state and direction of research and identifying gaps in factual knowledge and conceptual understanding, (2) identifying testable hypotheses and potential research approaches, (3) reviewing research concepts as they are developed, (4) collecting and disseminating scientifically peer-reviewed information, and (5) insuring that appropriate peer review and oversight are applied to research the government has conducted or sponsored.

Within DOD, initial efforts to respond to Gulf War veterans' complaints were managed by the Assistant Secretary of Defense for Health Affairs. In November 1996, following worsening public relations, management of these efforts was transferred to the newly created Office of the Special Assistant for Gulf War Illnesses (OSAGWI), which became responsible for oversight of DOD's efforts regarding illnesses being experienced by Gulf War veterans. OSAGWI reported directly to the Deputy Secretary of Defense. The Assistant Secretary of Defense for Health Affairs continued to be responsible for managing and coordinating related health programs, while DOD's medical research efforts were managed largely by the Undersecretary of Defense for Acquisition and Technology and the Army Medical Research and Materiel Command. DOD established OSAGWI to restore public confidence in DOD's efforts to deal with Gulf War illnesses issues. OSAGWI has focused its efforts on (1) establishing effective two-way communications with veterans and veterans' groups, (2) investigating and reporting on incidents of possible chemical warfare agent exposures, and (3) applying lessons learned from the Gulf War experience to better protect U.S. servicemembers on a contaminated battlefield.

The efforts of the various federal agencies have been met with skepticism on the part of some veterans. This skepticism was fueled by the delay, until 1996, in acknowledging potential exposures to low levels of nerve agent at a munitions dump in Khamsiyah, Iraq, during postwar demolition activities. Additionally, veterans were upset by DOD's and VA's initial emphasis on stress as a potential explanation for their symptoms.



Congressional oversight of DOD's and VA's efforts has identified problems in the agencies' clinical monitoring of veterans' conditions and inaccuracies in agency statements about veterans' potential exposures.

### Spending on Research and Investigation of Veterans' Illnesses Is Concentrated Within DOD

During fiscal years 1997 and 1998, HHS, DOD, and VA reported total expenditures of at least \$121.3 million on research and/or investigation of Gulf War veterans' illnesses.<sup>1</sup> These expenditures included \$112.4 million in DOD funds (\$65.3 million for OSACWI and \$47.1 million for non-OSACWI expenditures), \$7.2 million for VA, and \$1.6 million for HHS.<sup>2</sup> These amounts excluded expenditures on examination and clinical care of ill veterans during this time period.

Because OSACWI managed the majority of DOD's research and investigation expenditures, it was the single largest component of the federal research and investigatory effort to respond to veterans' concerns. The remainder of DOD's spending was attributed to internal and external, DOD-sponsored research efforts catalogued by the RWC.

<sup>1</sup>The RWC records funds expended by VA, HHS, and DOD based on the year in which they were appropriated. Because these appropriations can be spent over 2 years, RWC data for the most recently reported fiscal year (1998) were not necessarily a complete representation of final spending for that fiscal year. For this reason, fiscal year expenditures, which were provided in December 1998, are likely to have increased during fiscal year 1999.

<sup>2</sup>These figures do not add to \$121.3 million because of rounding. The costs for VA studies do not include overhead costs because indirect costs are included under VA's medical care appropriation. Similarly, the majority of HHS' expenditures represent direct costs only. DOD's non-OSACWI spending does not include overhead costs for intramural studies but does for extramural ones. In addition, the numbers reported for OSACWI include overhead costs and some spending on veteran outreach.

OSACWI was established in November 1996, when a staff of 110 and an annual budget of \$11.4 million were projected. The Office later grew to a staff of slightly over 200, spending more than \$65 million across fiscal years 1997 and 1998, and planning expenditures of \$35.9 million in fiscal year 1999 and \$29.5 million in fiscal year 2000.<sup>1</sup>

OSACWI categorizes its spending as research or support. During fiscal years 1997-98, OSACWI spent \$13.3 million, or 20 percent of its expenditures, on instruments it characterized as research contracts and another \$47.1 million, or about 73 percent of its expenditures, on instruments it characterized as support contracts. The remaining funds, about 7 percent of OSACWI spending, covered overhead, travel, conferences, computer equipment, and miscellaneous other expenses. Many of its support costs are difficult to separate from research and investigation expenditures. For example, the objectives of OSACWI's support contracts (\$21 million) with one contractor—BDM International—include obtaining, documenting, and analyzing information potentially related to Gulf War illnesses; documenting the data and analysis in databases and other forms of storage; developing questionnaires and surveys to collect data; rapidly creating data analysis tools to aid in analysis efforts; and developing and producing case studies.

### Basic Questions About Causes, Course, and Treatment of Veterans' Illnesses Remain Unanswered

The RWC has not assessed the extent to which the research agenda has satisfied the objectives it identified in 1995. The majority of federal research projects remain ongoing or in review. Problems identifying valid data on veterans' exposures persist, and basic questions, such as how many veterans have unexplained symptoms and whether those who have received care in VA facilities are getting better or worse, remain unanswered.

<sup>1</sup>Although OSACWI officials are seeking the guidance of the Special Oversight Board on DOD Investigations of Chemical and Biological Incidents to determine what portion of its investigation work should continue and how it should draw down the Office, the Office is incorporated in DOD's budget through fiscal 2005, with twice the number of investigations ongoing as have been completed.

### The Extent to Which Research Objectives Have Been Met Has Not Been Assessed

In April 1999, PGVCB officials told us they had not finished assessing the government's progress in answering the 21 major questions that the RWG had identified in 1995. As detailed in appendix I, these research objectives include questions about the prevalence of various health problems and exposures among the veteran population and the way the prevalence differs between Gulf War veterans and "appropriate control populations." With regard to exposure, the research objectives cover *Leishmania tropica* (a type of parasite), petroleum, petroleum combustion products, specific occupational/environmental hazards, chemical agent, pyridostigmine bromide, and psychophysiological stressors. With regard to veterans' health status, the research objectives cover the prevalence among veterans and appropriate control populations of symptoms, symptom complexes, illnesses, altered immune function or host defense, birth defects, reproductive problems, sexual dysfunction, cancer, pulmonary symptoms, neuropsychological or neurological deficits, psychological symptoms or diagnoses, and mortality. Questions about exposure to low levels of nerve agent were added in 1996, when DOD acknowledged that U.S. troops might have experienced such exposures during postwar demolition activities at Khamisiyah.

The research questions incorporate input from HHS, DOD, and VA but do not formally constrain the research funded by these agencies. Asked to identify which of the 21 research objectives had been satisfied by late 1998, RWG officials wrote, "Answers to some of the research questions contained in the Working Plan have been achieved to a greater degree of satisfaction than others. However, at this time, it is accurate to say that no research question has been answered to the extent that additional research would not be able to shed more light on the question." In late 1998, an RWG official noted that a draft analysis of research results as they relate to these questions was anticipated in late spring or early summer 1999 in preparation for publication of a revised working plan for research on Gulf War Veterans' illnesses, but no deadline had been established for publishing this analysis and no such analysis had been published as of June 1999. While DOD noted that the analysis was in progress, it had not been completed or a deadline established for its publication when DOD and VA submitted their comments on our draft report in August and September 1999, respectively.

### Return on Research Investment Accruing Slowly

Spending on research was spread among various projects catalogued by the PGVCB's Research Working Group and an additional set of projects

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### Research Catalogued by RWG

sponsored by OSAGWI. While findings from this work are beginning to accumulate, most of it is ongoing or in review.

Although the research portfolio monitored by the RWG includes over 50 projects that began in 1994 or earlier, only 34 of the 151 projects, or 23 percent of those catalogued by the RWG, had been reported complete as of December 1998. This was 53 percent of the 62 that were scheduled for completion by that time. Among the 47 percent of this group that were not complete in December 1998, about one-third were later completed and the remaining two-thirds had their estimated completion dates revised (with extensions varying from a few months to 10 years). RWG officials attributed the extensions either to efforts to collect or incorporate additional data or to unanticipated delays, such as difficulties in securing approval to collect data or problems in locating and recruiting veteran participants.<sup>4</sup> The officials identified four instances in which additional funds had been provided. For example, the Centers for Disease Control's health assessment of Persian Gulf War Veterans from Iowa was extended to 2000 to provide for additional follow-up of the survey sample. Similarly, DOD has committed to fund two projects for the Army's Center for Health Promotion and Preventive Medicine until 2003 and 2006.<sup>5</sup>

<sup>4</sup>For example, some projects experienced delays in approval of their plans by institutional review boards while others experienced difficulty in recruiting subjects. Some survey efforts found that it was more difficult than anticipated to track veterans' whereabouts since the war.

<sup>5</sup>Funding is extended through 2006 for the Kuwait Oil Fires Troop Exposure Assessment Model, a project responding to P.L. 102-190 by characterizing the potential carcinogenic and noncarcinogenic health risks to U.S. military personnel exposed to the environment affected by the oil well fires during and after Operation Desert Storm. Funding is extended through 2003 for the Persian Gulf Veterans Health Tracking System, which is intended to characterize exposures (other than airborne contaminants from oil well fires) experienced by U.S. military personnel during Desert Storm and to assess the potential health risks/consequences of those potential exposures.

By June 1999, PCVCB reported only 1 of the 13 primary research areas, leishmaniasis, had a majority of projects complete (four of seven).<sup>6</sup> In one research area—treatment—no projects had yet been finished.

Among the 23 percent of federal research projects into Gulf War veterans' illnesses that were completed by December 1998, about two-thirds (22 of 34) had resulted in at least one article published in a peer-reviewed journal. (We focused on this outcome because publication in a peer-reviewed journal was suggested as a surrogate marker for research quality in early interviews with RWG officials and because publication in this form insures more widespread access to research findings.) Some of the other completed projects have had findings released in the form of technical reports or summarized in an annual report issued by the RWG. Additional peer-reviewed publications have been issued from projects that are still ongoing.

Research Expenditures Managed  
by OSACWI

Five key contractors accounted for about 72 percent of the \$13.3 million that OSACWI attributed to spending on research contracts in fiscal years 1997 and 1998. We reviewed the status of deliverables under their contracts to determine whether they had been received in a timely manner and had been released to the public. We focused on timely provision of deliverables as a basic measure of contractor performance and on release of deliverables as an indicator of effectiveness, since the contracts were often for developing public information and doing so was a major part of OSACWI's mission. As of December 1999, OSACWI (or the responsible element at DOD) had received 19, or 95 percent, of the 20 products due from the 5 research contracts. Among those products received, 6 had been released to the public, with the remainder largely in various stages of interagency review when we ended our work in December 1999. Fourteen products had remained in review or draft status for a year or longer. Appendix II contains detailed information on the research contracts we examined, including the contractor, the contract amount, the titles or topics of deliverables, and the deliverables' status (i.e., whether they were due at the time of our review, had been received, and/or released, what

<sup>6</sup>The RWG cataloged the federal research portfolio by primary research topic in March 1998. At that time, there were 121 (instead of the current 151) federally sponsored research projects. Because 30 research projects that began after March 1998 were not categorized by the RWG into primary research topics, our analysis by primary research topic includes only the 121 that had been categorized. See the RWG's report entitled *Annual Report to Congress: Federally Sponsored Research on Gulf War Veterans' Illnesses for 1997*, March 1998.

form they were in at receipt, what was the date of the earliest known receipt, and whether they had been released).

With respect to other products of OSACWI's spending, including nonresearch spending, by January 1, 1999, OSACWI had issued 13 case narratives (accounts of particular incidents during the war), 2 environmental exposure reports, and 4 information papers.<sup>7</sup> Work on an additional 26 case investigations was ongoing.<sup>8</sup> As of December 3, 1999, 1 additional case narrative and 3 additional information papers had been issued.

<sup>7</sup>Other accomplishments cited by OSACWI officials in hearings before the Senior Oversight Panel on DOD Investigation of Chemical and Biological Incidents (held Nov. 19-20, 1998) included visiting five bases, answering 3,000 hotline calls, and responding to 5,000 e-mail inquiries. Additional veterans were contacted via the Office's programs to notify veterans of potential exposures or survey veterans on particular topics.

<sup>8</sup>For a review of OSACWI's investigatory activities, see *Gulf War Illnesses: Procedural and Reporting Improvements Are Needed in DOD's Investigative Processes* (GAO/NSIAD-99-59, Feb. 26, 1999).

### Problems in Identifying Valid Exposure Data Persist

Absence of agreement or valid data on veterans' wartime exposures has presented formidable obstacles to researchers in developing definitive information about the causes of veterans' illnesses. Although the nearly half of studies that are epidemiological depend to some extent on the use of exposure data, researchers continue to face difficulties in assessing and validating veterans' exposures. These difficulties led us to conclude in our 1997 report that the many epidemiological studies being sponsored would not provide definitive information on the causes of veterans' illnesses.<sup>9</sup> Proceedings of conferences on federally sponsored research also document that researchers are experiencing increasingly difficult problems in soliciting reliable self-reported data on exposures as time from the original events increases.<sup>10</sup> Because of such problems, the likelihood of misclassifying persons who received no exposure as having had some or significant exposure (or vice versa) will increase, reducing the capacity of data analyses to identify associations between exposures and health outcomes. Perhaps as a result, completed research projects classified as epidemiological had a lower rate of publication in peer reviewed journals than other types of federally sponsored research.<sup>11</sup>

To begin to identify the causes of an unexplained illness, epidemiological researchers normally define a set of criteria, known as a case definition, that can be used to separate persons who have the condition from those who do not. This permits researchers to look into differences in their histories to gain insight into what may have caused their illness. However, no such working case definition or set of such definitions that might focus federal research has been endorsed by the Research Working Group. Working case definitions of unexplained illness among veterans that have been proposed by individual researchers have been similar to one another in emphasizing unexplained fatigue, neurocognitive complaints, and

<sup>9</sup>Gulf War Illnesses: Improved Monitoring of Clinical Progress and Reexamination of Research Emphasis Are Needed (GAO/NSIAD-97-163, June 23, 1997).

<sup>10</sup>See the RWG, PGVCB, *Proceedings: Conference on Federally Sponsored Gulf War Veterans' Illnesses Research*, June 17-19, 1998 and June 23-25, 1999.

<sup>11</sup>Of the 22 completed research projects classified as epidemiological, 12, or about 55 percent, had resulted in publication of an article in a peer-reviewed journal. By way of comparison, 83 percent (10 of 12) of the completed nonepidemiological projects had results published in such journals. (We include projects originally classified by the RWG as clinical epidemiology as well as those projects classified as epidemiology in this total; after we recommended a shift from epidemiological research in June 1997, the RWG reclassified studies formerly designated clinical epidemiology as clinical research projects).

musculoskeletal complaints, symptoms reported more commonly by Gulf War veterans than by veterans of the same era who were deployed elsewhere (see app. III).

### Descriptive Information Concerning Veterans' Symptoms Exists, but Many Basic Questions Remain Unanswered

The government has had some success in cataloging data on the illnesses suffered by Gulf War veterans. DOD and VA registries gather such information, and studies have been funded to collect data on veterans' symptoms. However, owing to the data collection formats used in the registry process and the self-selection of registry participants, the registries are not optimal sources of information regarding the prevalence of various symptom clusters among veterans, making it difficult to know which of the various case definitions or symptom groups deserve closer examination. For example, these registries are unlikely to record sufficient data to determine whether a veteran meets criteria for multiple chemical sensitivity or chronic fatigue syndrome, for which recognized case definitions exist, but not standard diagnostic categories, as represented by international disease classification codes. Some federally sponsored research, notably VA's National Health Survey, might be able to clarify this issue, but descriptive data from the survey remained unpublished at the close of our review.

Although some progress has been made in cataloging veterans' illnesses, the results generally describe only what illnesses a veteran was suffering from at a particular point in time. As a result of this and the limitations of the DOD and VA registries, several basic descriptive questions remain unanswered. For example, the Special Investigative Unit of the Senate Veterans' Affairs Committee and others have identified such open questions as the following:

- How many of those veterans who have been examined have unexplained illnesses or symptoms?
- How many of those veterans are also receiving compensation for that condition?
- How many are receiving health care?
- What treatments have they received?
- Are those who have received care in VA facilities getting better or worse?

Some data that might be helpful in answering such questions are being collected, but an analysis of these data was not available at the close of our review. An HHS-sponsored project, which began in 1997, is assessing the

persistence and stability of veterans' symptoms over time. This study is planned to end in 2000. In addition, VA and DOD are recruiting patients for cooperative trials of antibiotic and exercise-behavioral treatments for a broad set of veterans' unexplained symptoms. However, perhaps because there is little understanding of the physical causes underlying veterans' symptoms, VA and DOD officials note that the treatments to be used in these trials are expected only to ameliorate symptoms, not to eliminate them.

### RWG and OSAGWI Activities Not Effectively Coordinated

OSAGWI's activities have not been effectively coordinated with those of the RWG in order to maximize the efficient use of resources. We found conflicting information about the nature of OSAGWI's work and whether it should be coordinated. Specifically, RWG and OSAGWI officials told us that OSAGWI's activities involve investigations, not research, and therefore are not subject to coordination. However, in an August 1997 letter to OSAGWI, the RWG raised questions about the methodologies of three OSAGWI-sponsored studies and expressed concern over the lack of any external review process for these studies and for OSAGWI's research efforts in general. OSAGWI pursued these studies, but it has not published their findings. The lack of effective coordination between the RWG and OSAGWI increases the potential to miss opportunities to leverage ongoing and completed work by other agencies.

Other examples illustrate the need for better coordination. For example, in January 1998, the National Academy of Science's Institute of Medicine presented a proposal to VA, which was funded under a congressional mandate, to pursue studies at a projected cost of \$1.25 million to "comprehensively review, evaluate and summarize the available scientific and medical information regarding the association between exposures during the Persian Gulf War and adverse health effects experienced by Persian Gulf War veterans." However, in 1997, OSAGWI had contracted with RAND at a cost of more than \$1.5 million for "the preparation of literature reviews of key possible causal hypotheses of CWI."<sup>12</sup> The Institute's assessments regarding the links between exposures and health outcomes must be based, at least partly, on the review of relevant literature, and RAND's identification of this literature has required, at least, some assumptions regarding potential exposure scenarios. Thus, it should

<sup>12</sup>OSAGWI eventually authorized RAND work valued at \$3.2 million.

have been possible to use RAND's ongoing work for the Institute study, and better coordination of these two efforts might have saved both time and money. When we interviewed Institute staff in June 1998, they were generally aware of RAND's plan to perform literature reviews, but they were not familiar with the content of RAND's work, noting that none of it had been released. While RAND did seek approval of a list of scientific peer reviewers for its work from Institute officials, in the absence of coordination mechanisms, these two efforts were pursued independently.

Similarly, at least three reviews of the health effects of depleted uranium have been commissioned within a few years - one by each agency represented on PCVCB. HHS' Agency for Toxic Substances and Disease Registry first released a toxicological profile for uranium in 1989 and issued an updated draft toxicological profile on uranium (including depleted uranium) on October 17, 1997. This draft, prepared by the Research Triangle Institute, incorporated a plain-language public health statement and reflected the Agency's assessment of all relevant toxicological testing and information that had been peer-reviewed. In addition, at OSAGWI's request, RAND performed a review of the scientific literature regarding the health effects of depleted uranium. Finally, IOM will conduct such a review as part of its work for VA. The need for the additional review of depleted uranium by RAND, which was submitted in August 1998, after the Agency had issued its draft, is questionable.

### Contracting for OSAGWI Support Services Was Flawed

OSAGWI spent more than \$47 million in fiscal years 1997 and 1998 on its support contracts. We reviewed four support agreements, which made up more than 91 percent of OSAGWI's support spending, and found problems with several of the task orders. Specifically, two of the largest task orders were awarded improperly, and OSAGWI discouraged competition on another by naming a preferred vendor.

### Improper Task Orders

OSAGWI's support arrangements consisted largely of task orders under multiple-award contracts of other agencies and offices. OSAGWI's largest support arrangement was based on two improper task orders awarded to BDM. OSAGWI officials noted that they were directed to establish the Office with all possible speed and explained that they anticipated relying heavily on contractors for support. As part of addressing this need, an initial task order covering a broad range of services was awarded to BDM under a National Guard Bureau (NGB) multiple-award task order contract for information technology services.

The BDM task order describes its objectives as including, but not limited to:

"obtaining, documenting, and analyzing information potentially related to Gulf War illnesses; documenting the data and analysis in databases and other forms of storage; establishing a program to reach-out to veterans; developing questionnaires and surveys to collect data; developing maps and other multimedia presentations; plotting and analyzing troop movements and locations; rapidly creating data analysis tools to aid in analysis efforts; developing and producing case studies; preparing documents for storage on GulfLINK; developing recommendations and long range plans; writing papers; and, providing testimony."

The task order also required BDM to provide facilities, furniture, telecommunications, equipment, and services, as needed.

Orders under multiple-award, task-or-delivery-order contracts are required by law to contain a statement of work that "clearly specifies all tasks to be performed or property to be delivered under the order."<sup>13</sup> In our opinion, this language means that a task order must identify with reasonable specificity the task or tasks that a contractor will be expected to perform, rather than merely list categories of services. The task order awarded to BDM, however, was basically a broad menu of services from which OSAGWI could pick and choose as the occasion arose and lacked the degree of specificity required. While we appreciate the exigent circumstances under which this award was made, we do not believe that the award of this broad task order was proper because it did not clearly specify the tasks to be performed. The DOD Inspector General also cited concerns with OSAGWI's task orders to BDM.<sup>14</sup>

When OSAGWI reached its allotted cost ceiling under the NGB contract and the NGB did not increase the contract ceiling, OSAGWI continued the arrangement with BDM through an order under the General Services Administration's Management, Organizational, Business Improvement Services (MOBIS) schedule contract. The MOBIS schedule states that it is intended to support business, management, and organizational improvement through activities such as quality management, benchmarking, reengineering, surveys, strategic planning, and development of leadership and management skills. The General Services

<sup>13</sup>10 U.S.C. § 2304c(c).

<sup>14</sup>See DOD Inspector General, *DOD Use of Multiple Award Task Order Contracts* - Report No. 99-116, Apr. 2, 1999.

Administration's summary of MOBIS services states that such contracts are not intended for independent management or technical studies.

The task order to BDM was outside the scope of the MOBIS contract. The work identified in the task order supports OSAGWI's operational functions and activities and does not fit properly within the scope of the contract. Specifically, the objective of the task order is to support OSAGWI's research and investigation into potential causes of Gulf War veterans' illnesses; rather than, as OSAGWI contends, to support efforts to improve managerial or organizational processes of the type intended for the MOBIS contract. In this regard, the MOBIS scope of work states that the "performance of operational activities" and database planning are not appropriate for purchase under MOBIS. Given the substantial disparity between the purposes of this contract and the BDM task order, we believe that the task order is outside the scope of the MOBIS contract and should not have been awarded under that contract. OSAGWI officials have informed us that this task order will expire in January 2000, but that the need for the type of support services that BDM is providing will continue for an indefinite period.

#### Competition for Task Order Discouraged

Under multiple award task order contracts, all of the multiple award contractors are to be given a fair opportunity to be considered for the award of any particular task order, typically by submitting proposals in response to agency announcements. Competition is one of the means by which agencies insure they obtain the best value from their contractors. OSAGWI's solicitation for one task order opportunity, however, discouraged competition among the multiple award contractors by naming Systems Research and Applications Corporation (SRA) as the preferred contractor.

We have testified and reported that naming preferred contractors in task order announcements discourages competition, frequently resulting in just one proposal being received.<sup>15</sup> SRA was the only multiple award contractor that responded to the announcement.<sup>16</sup> OSAGWI has not argued that SRA was uniquely qualified to perform the required work.

## Conclusions

During fiscal years 1997-98, the government expended considerable funds on research and investigation into Gulf War veterans' illnesses—about \$121 million. More than half of this total was spent by the Office of the Special Assistant for Gulf War Illnesses.

Even though significant funding has been spent on research and investigation of Gulf War veterans' illnesses, most of the research is ongoing and the Research Working Group has not completed an assessment of the extent to which federal research objectives identified in 1995 have been satisfied. While about two-thirds of the 34 completed projects had resulted in peer-reviewed publications, researchers face increasingly difficult problems in identifying valid data on veterans' exposures. Moreover, little is known about how veterans' conditions have changed over time, no working case definitions have been endorsed in order to focus research efforts, and research on treatments has begun only recently. As a result, little knowledge exists concerning the causes, courses, or successful treatments for Gulf War veterans' illnesses. In addition, although the Office of the Special Assistant for Gulf War Illnesses has received most of the material requested of its research contractors, the review process established by the Office can be slow.

Coordination of planned efforts is key to maximizing the government's investment into research on Gulf War veterans' illnesses. However,

<sup>15</sup> *Defense Acquisition: Improved Program Outcomes Are Possible* (GAO/NSIAD-98-123, Mar. 18, 1998), and *Acquisition Reform: Multiple Award Contracting at Six Federal Organizations* (GAO/NSIAD-98-215, Sept. 30, 1998). In response to our testimony, the Office of Management and Budget directed that the Federal Acquisition Regulation be revised to prohibit the naming of preferred contractors in task order announcements. The federal acquisitions regulation was revised to prohibit the designation of preferred awardees effective August 16, 1999.

<sup>16</sup> After the initial award was made to the preferred vendor identified in the announcement, succeeding awards were directed to the same vendor under an exception to the fair opportunity requirement for work that is a "logical follow-on" from prior work. Thus, the anticompetitive effect of directing the initial award was magnified in subsequent awards.

disagreement regarding which activities should be subject to coordination exists. As a result, the Office of the Special Assistant for Gulf War Illnesses, which spends more than half of the federal funds supporting research and investigation, has not effectively coordinated its activities with the Research Working Group.

DOD established the Office of the Special Assistant for Gulf War Illnesses to restore public confidence in DOD's efforts to deal with Gulf War illnesses issues. While officials of the Office of the Special Assistant for Gulf War Illnesses noted that they intended to seek advice on drawing down the office, they planned expenditures of \$65.4 million across fiscal years 1999 and 2000, and the Office remains in DOD's budget through fiscal year 2005. Because the Office spends a high percentage of its budget on support contracts, it is important that its contracting procedures comply fully with applicable laws and regulations.

## Recommendations

With respect to the health research efforts coordinated by the Research Working Group of the Persian Gulf Veterans' Coordinating Board, we recommend that the Secretaries of Veterans' Affairs, Defense, and Health and Human Services direct the executive director of the Research Working Group to:

- establish and achieve a target date within fiscal 2000 for publishing its assessment of progress toward addressing the research objectives it identified in 1995;
- compile data on the number of Gulf War veterans with unexplained illnesses, the progression of their illnesses, the treatments they are receiving, and the success of these treatments (recognizing that application of some working case definitions or categorization scheme may be useful for purposes of such an accounting); and
- effectively coordinate the efforts of the Office of the Special Assistant for Gulf War Illnesses with related activities of DOD, VA, and HHS to prevent duplication and improve the efficiency of resource use.

We also recommend that the Secretary of Defense direct the Office of the Special Assistant for Gulf War Illnesses to replace the task order issued under the MOBIS contract with a proper contracting arrangement as soon as practicable. In addition, the Secretary should direct the Office of the Special Assistant for Gulf War Illnesses that all future support contracts should comply fully with applicable laws and regulations.

## Agency Comments and Our Evaluation

In written comments on a draft of our report, DOD and VA agreed with some of our findings and recommendations but disagreed with others, and CDC generally concurred with our findings and recommendations. DOD provided additional technical comments, which we incorporated as appropriate. Also, CDC requested that we incorporate additional information on two of its sponsored studies, which we did. (App. IV, V, and VI contain the written comments of DOD, VA, and CDC, respectively, and our evaluation of them.)

DOD commented that our report paints a pessimistic picture of the research on Gulf War veterans' health. The Department cited studies that compared the hospitalization in military facilities, the birth outcomes in military facilities, and the mortality of active duty Gulf War veterans to large groups of nondeployed veterans as support for a more optimistic perspective on veterans' health. However, DOD did not cite the most consistent finding of the health research to date; that is, Gulf War veterans seem to exhibit more of some symptoms, such as fatigue, difficulty concentrating, and muscle and joint pain, than do nondeployed veterans.<sup>17</sup> DOD believes that the failure to identify a "unique syndrome" is an optimistic sign of veterans' health overall. We disagree. Even if the symptoms reported more often by Gulf War veterans are not confined to those veterans, DOD needs to explain why Gulf War veterans report these symptoms more frequently. Furthermore, none of the studies DOD cited examined the possible existence of significant differences in the health of Gulf War veterans based on specific exposures to hazardous materials during military service.<sup>18</sup>

<sup>17</sup> Institute of Medicine, *Gulf War Veterans: Measuring Health* (Washington, D.C.: National Academy Press, 1999), p. 2; Iowa Persian Gulf Study Group, "Self-Reported Illness and Health Status Among Gulf War Veterans: A Population-Based Study," *Journal of the American Medical Association*, 277 (3), (1997), pp. 238-245; and K. Fukuda, et al., "Chronic Multisymptom Illness Affecting Air Force Veterans of the Gulf War," *Journal of the American Medical Association*, 280 (11), (1998), pp. 981-88.

<sup>18</sup> One study argued that the Gulf War veterans may have been more fit than those not deployed; thus, the finding of no difference between the two groups might suggest a significant decline in the post-war health of the Gulf War veterans. R. Haley, "Point: Bias From the 'Health Warrior Effect' and Unequal Follow-up in Three Government Studies of Health Effects of the Gulf War," *American Journal of Epidemiology*, 148 (4), (1998), pp. 315-23.

DOD also said that we were incorrect in stating that little is known about how veterans' conditions have changed over time. However, our report is consistent with a September 1999 report of the Institute of Medicine. The report notes that there has been no systematic evaluation of whether or how veterans' health status is changing.<sup>19</sup> Also, in a 1998 report to Congress, the Research Working Group stated that no government research is specifically directed toward understanding the progress of Gulf War veterans' illnesses over time and that research should determine the long-term health of these veterans.<sup>20</sup>

DOD further stated that the effectiveness of government research has been demonstrated in a variety of ways. We agree that the research to date has added to what was known about Gulf War veterans' health shortly after the war. Nevertheless, little information is available on the extent or course of the development of veterans' undiagnosed illnesses, basic information on the prevalence of veterans' symptoms is unavailable, and no research on the treatment of such illnesses has been completed. Although joint commands have revised joint policy on record-keeping, and operational changes have been made to improve environmental monitoring, these changes do not serve as proof of research effectiveness. Rather, they address problems that have challenged Gulf War researchers in interpreting data on veterans' illnesses because they lack accurate and precise information (i.e., duration and doses) on veterans' exposures to hazardous materials.

Both DOD and VA concurred with our recommendation that the Research Working Group set a date in fiscal year 2000 for reporting its progress in addressing the research objectives it identified in 1995. DOD confirmed, as we noted in our draft report, that this report is in progress, but neither agency provided a specific date for its publication.

Regarding our recommendation that steps be completed to compile data on the number of Gulf War veterans with unexplained illnesses, the treatments they were receiving, and the success of these treatments, DOD partially concurred and VA did not concur. Neither agency opposed the collection of information on the number and health status of Gulf War veterans with

<sup>19</sup> Institute of Medicine, *Gulf War Veterans: Measuring Health* (Washington, D.C.: National Academy Press, Sept. 1999), p. 3, 35.

<sup>20</sup> Persian Gulf Veterans' Coordinating Board - Research Working Group, *Annual Report to Congress - 1998* (Washington, D.C.: PGVCB RWG, June 1999), p. 53.



unexplained illnesses. However, VA stated that it could not implement the recommendation as worded without specific case definitions (that is, criteria to identify distinct illnesses). We agree that some categorization scheme or set of working case definitions would be useful in counting the numbers of veterans that have unexplained illnesses of some type, and we revised our recommendation accordingly.

Although DOD concurred with our recommendation that the Research Working Group coordinate with the Office of the Special Assistant for Gulf War Illnesses on activities related to Gulf War veterans' illnesses, DOD disagreed that its current coordination was weak. It stated that coordination was already occurring and that coordination on Office-sponsored reviews of scientific literature was unnecessary because the reviews were not research. VA did not concur with the recommendation because most of the work of the Office of the Special Assistant involves investigations of specific wartime incidents rather than research.

Regardless of whether the work of the Office is considered research or not, it describes the extent and nature of veterans' possible exposures to hazardous materials. These descriptions are important to researchers trying to identify the health consequences of such exposure. Moreover, the law does not limit the Working Group's coordination efforts to activities that constitute research, however defined. Accordingly, we are now recommending that the Research Work Group effectively coordinate the activities of the Office of the Special Assistant with related activities of DOD, VA, and the Department of Health and Human Services to prevent duplication of effort and optimize the use of resources. We are making this recommendation to prompt these organizations to work more closely on behalf of ill veterans. We believe that greater cooperation, exchange of information, and coordination will help expedite the process and help find solutions the veterans need.

Finally, DOD did not concur with our recommendation to replace an improperly awarded task order as soon as practicable and to comply fully with applicable laws and regulations in future contracting activities. DOD noted that because its Gulf War Illnesses office does not have contracting officers, it relies on the professional judgment of contracting professionals outside that office, who did not object to the office's contract actions. DOD contends that the office complied with all legal requirements in effect at the time.

We note that DOD did not disagree with our conclusion that the task order was improperly awarded. The task order was for support of office operations in developing information related to Gulf War illnesses, even though the underlying contract prohibited its use for the performance of operational activities. The task order was therefore improper and should be terminated, if practicable, as we recommended.

We recognize that the Office of the Special Assistant relies on contracting professionals outside that office to execute its support contracts. Nevertheless, the office is, at a minimum, responsible for determining its requirements for support, a process that in one instance resulted in naming a preferred vendor and in another led to an overly broad statement of work. The effect of these practices is to discourage competition. It is important, therefore, that both requiring agencies, such as the Gulf War Illnesses office, as well as agencies that execute contracts, adhere to the statutes and regulations designed to maximize competition.

## Scope and Methodology

To determine how much DOD, HHS, and VA have spent on research and investigation of Gulf War veterans' illnesses and health concerns in fiscal years 1997 and 1998, we reviewed budget documents, contracts, and other relevant documents. We also interviewed RWG members, as well as DOD, HHS, and VA officials managing the respective agencies' budgeting for research, investigation, and clinical care. During our interviews, we inquired about spending levels and the distribution of funds across activities.

The expenditure estimates included in this report are limited to DOD, VA, and HHS. Because we targeted key entities within these agencies on the basis of the public profile of their research and investigatory efforts, the expenditures we identified may exclude related spending by entities that have not been prominently identified with the federal effort. We did not independently assess the estimates provided us by the various agencies and offices apart from determining that they were basically consistent with the contract documents examined.

To determine the status of research efforts and identify research products, we reviewed research and investigatory objectives, reports to Congress, agency documents, and articles appearing in peer-reviewed journals. In addition, we interviewed researchers, PGVCB officials, and officials at the sponsoring agencies. We did not independently assess the appropriateness

of federal research objectives, nor did we determine how well federally sponsored research had addressed them.

To investigate the extent of coordination between OSAGWI and the RWG, we interviewed members of OSAGWI; the RWG; representatives from DOD, HHS, and VA; and researchers about the process. We reviewed agency documents and the minutes of PGVCB and other meetings and examined research protocols, contracts, and documentation of reviews conducted by sponsoring agencies into research and investigatory activities.

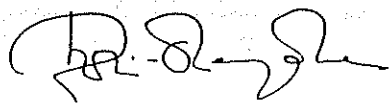
To determine the expenditures and resources OSAGWI had directed toward veterans' health concerns and the way it managed its contracts, we interviewed OSAGWI officials and contracting officers and reviewed contracts, task orders, statements of work, copies of deliverables, and requested any assessments of contractor performance. For efficiency, we limited the review to four support and five research contracts, which accounted for 91 percent and 72 percent of OSAGWI's expenditures in the respective areas.

Our work was conducted from May 1998 through December 1999 in accordance with generally accepted government auditing standards.

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from its issue date. At that time, we will send copies of this report to other interested congressional committees and members.

If you have any questions or would like additional information, please contact those listed in appendix VII.

Sincerely yours,



Kwai-Cheung Chan  
Director, Special Studies and Evaluations

## Appendix I

## Research Objectives Identified by the Research Working Group of the Persian Gulf Veterans' Coordinating Board

1. What is the prevalence of symptoms/illnesses in the Persian Gulf veteran population? How does this prevalence compare to that in an appropriate control group?
2. What was the overall exposure risk of troops to *Leishmania tropica*?
3. What were the exposure concentrations to various petroleum products, and their combustion products, in typical usage during the Persian Gulf conflict?
4. What was the extent of exposure to specific occupational/environmental hazards known to be common in the Persian Gulf veteran's experience? Was this exposure different from that of an appropriate control group?
5. What were the potential exposures of troops to organophosphate nerve agent and/or sulfur mustard as a result of allied bombing at Muhammadiyah and Al Muthanna, or the demolition of a weapons bunker at Khamisiyah?
6. What was the extent of exposure to chemical agent, other than at Khamisiyah, Iraq, in the Persian Gulf as a function of space and time?
7. What was the prevalence of PB use among Persian Gulf troops?
8. What was the prevalence of various psychophysiological stressors among Persian Gulf veterans? Is the prevalence different from that of an appropriate comparison population?
9. Are Persian Gulf veterans more likely than an appropriate comparison group to experience non-specific symptoms and symptom complexes?
10. Do Persian Gulf veterans have a greater prevalence of altered immune function or host defense when compared with an appropriate control group?
11. Is there a greater prevalence of birth defects in the offspring of Persian Gulf veterans than in an appropriate control population?
12. Have Persian Gulf veterans experienced lower reproductive success than an appropriate control population?
13. Is the prevalence of sexual dysfunction greater among Persian Gulf veterans than among an appropriate comparison population?

Appendix I  
Research Objectives Identified by the  
Research Working Group of the Persian Gulf  
Veterans' Coordinating Board

14. Do Persian Gulf veterans report more pulmonary symptoms or diagnoses than persons in appropriate control populations?

15. Do Persian Gulf veterans have a smaller baseline lung function in comparison to an appropriate control group? Do Persian Gulf veterans have a greater degree of non-specific airway reactivity in comparison to an appropriate control group?

16. Is there a greater prevalence of organic neuropsychological and neurological deficits in Persian Gulf veterans compared to appropriate control populations?

17. Can short-term, low-level exposures to pyridostigmine bromide, the insect repellent DEET, and the insecticide permethrin, alone or in combination, cause short-term and/or long-term neurological effects?

18. Do Persian Gulf veterans have a significantly higher prevalence of psychological symptoms and/or diagnoses than do members of an appropriate control group?

19. What is the prevalence of leishmaniasis or other infectious diseases in the Persian Gulf veteran population?

20. Do Persian Gulf veterans have a greater risk of developing cancers of any type when compared with an appropriate control population?

21. Are Persian Gulf veterans experiencing a mortality rate that is greater than that of an appropriate control population? Are specific causes of death related to service in the Persian Gulf?

Appendix II

## Reports Received and Released by the Office of the Special Assistant Under Research Contracts Examined by GAO

Contractor	Contract amount	Topics/Titles	Due	Received	Form and date of earliest known receipt	Released (as of 12/15/99)
Mitre Corporation*	\$3,185,000	Iraqi Chemical Warfare Study	Yes	Yes	Classified draft report (4/4/97)*	Partial (9/5/97)*
RAND	\$3,200,000	Oil Fires: A Review of the Scientific Literature as It Pertains to Illnesses of Gulf War Veterans	Yes*	Yes	Partial draft (12/97). Draft for agency review (4/16/98).	Yes* (11/5/98)
		A Review of Scientific Literature as It Pertains to Gulf War Illnesses, Volume V: Depleted Uranium	Yes*	Yes	Draft for agency review (8/4/98).	Yes (4/16/99)
		A Review of the Scientific Literature as It Pertains to Gulf War Illnesses, Volume VI: Chemical and Biological Warfare Agents	Yes*	Yes	Draft for agency review (9/1/98).	No
		A Review of the Scientific Literature as It Pertains to Gulf War Illnesses: Volume III: Pyridostigmine Bromide	Yes*	Yes	Draft for agency review (6/10/98).	Yes (10/19/99)
		Stress: A Review of the Scientific Literature as It Pertains to Health Problems of Gulf War Veterans	Yes*	Yes	Draft for agency review (4/23/98).	Yes (5/19/99)
		Infectious Disease	Yes*	Yes*	Draft for agency review (2/11/98).	No
		Immunizations	Yes*	Yes	Draft for agency review (4/22/98).	No
		Military Uses of Drugs Not Yet Approved by FDA for BW/CW Defense: Lessons from the Gulf War	Yes*	Yes	Draft for agency review (4/24/98).	Yes (4/16/99)
		Assessing the Health Effects of Military Deployments: DOD's Activities Following the Gulf War	Yes*	Yes	Draft for agency review (9/15/98).	No
Institute for Defense Analyses	\$389,000	Notes on the history of stress	Yes*	No	Not received as of 12/20/99.	No
		Pesticides	Yes*	Yes	Draft for agency review (11/3/98).	No
		Full Dimensional Protection: Military Records and Reports Dimension	Yes	Yes	Draft for agency review (12/10/97) Revised draft (7/28/98).	No

(Continued)

Appendix II  
Reports Received and Released by the Office  
of the Special Assistant Under Research  
Contracts Examined by GAO

Contractor	Contract amount	Topics/Titles	Due	Received	Form and date of earliest known receipt	Released (as of 12/15/99)
		Safe and Timely Disposal in Wartime of Large Quantities of Captured Chemical and Biological Munitions	Yes	Yes	Draft for agency review (11/8/97).	No <sup>a</sup>
		Protecting Against the Uncertain Risks of Exposure to Vary Low Concentrations of Chemical Warfare Nerve Agents	Yes	Yes	Draft received 9/99.	No
		[A paper describing planned and possible alternative approaches for improving DOD capabilities to detect chemical agents on the battlefield and archive such data]	Yes	Yes	Report delivered 6/16/97.	No
National Academy of Sciences	\$2,703,809 <sup>b</sup>	Force Protection: Lessons Learned from the Gulf War	No <sup>c</sup>	No <sup>d</sup>	No final report due before 3/31/00.	
Birch & Davis Associates	\$176,500 <sup>e</sup>	Birth Defects Among Children of Gulf War Veterans and Potential Nerve Agent Exposure	Yes	Yes	Draft for agency review (8/21/98).	No <sup>f</sup>
		Comprehensive Clinical Evaluation Program Gulf War Studies and Analyses: Report on Findings from a Telephone Survey of Persian Gulf War Veterans Assigned to Demolition Units	Yes	Yes	Draft for agency review (12/1/97).	No
		Toxicity Assessment and Risk Evaluation for Exposure of U.S. Troops to Chemical Agents at Khamisiyah	Yes	Yes	Draft for agency review (5/22/98).	No
		Admissions to Field Hospitals During the Gulf War and Potential Nerve Agent Exposures	Yes	Yes	Draft for agency review (7/16/98).	No
	\$9,654,309		20	19		6

(Continued from Previous Page)

Appendix II  
Reports Received and Released by the Office  
of the Special Assistant Under Research  
Contracts Examined by GAO

<sup>a</sup>Mitre contracted with the Assistant to the Secretary of Defense for Intelligence Oversight, but the Office of the Special Assistant for Gulf War Illnesses (OSAGWI) was directed to provide \$3,185,000 to support Mitre's work on the study. Although OSAGWI does not have direct oversight of the effort, the status of the study is shown here in the interest of tracking the products associated with funds provided to OSAGWI.

<sup>b</sup>The Office of the Assistant Secretary of Defense for Intelligence Oversight reported that no final report was available as of July 27, 1998.

<sup>c</sup>A declassified version of chapter 11 of this report was released by OSAGWI on September 5, 1997, in response to a request from the Presidential Advisory Committee on Gulf War Veterans' Illnesses. An official of the Office of the Assistant Secretary of Defense for Intelligence Oversight indicated on December 15, 1999 that he expected the report to be transmitted to the Secretary on or before December 25, 1999 accompanied by a recommendation for release of a substantial portion in unclassified form.

<sup>d</sup>Products of the RAND contract were originally due in September 1997. A December 1997 modification to RAND's agreement with the Department of Defense (DOD) reestablished due dates between December 1997 and January 1998.

<sup>e</sup>In many instances, the deadlines on these products were extended or the Office was slow to provide the official comment necessary for the contractor to issue a final product. OSAGWI also instituted a review process that incorporated comments from various government agencies. This process has required months to apply, and some deliverables spent a year or longer in unclassified or draft form. OSAGWI officials indicated that they initiated the external review process at the urging of the Research Working Group (RWG), but Group officials said that they encouraged an external, university-based review process, not the extensive interagency review OSAGWI adopted.

<sup>f</sup>OSAGWI officials told us that this document was finalized in August 1999 and distributed to the Office of the Secretary in October 1999, but has not been publicly released.

<sup>g</sup>OSAGWI officials told us that this document was finalized in October 1999 and distributed to the Office of the Secretary in November 1999, but has not been publicly released.

<sup>h</sup>The total cost of this contract over the anticipated period of performance, including option years, is expected to be \$5,922,305.

<sup>i</sup>None of the report deliverables for this contract, apart from progress and status reports, was due before March 29, 1999, when a draft panel report was expected. A final interim report is due on March 29, 2000, and a final consensus report on September 29, 2000.

<sup>j</sup>Subsidiary products from this contract have been provided and released. The National Academy Press has released the following documents in 1999 as part of a series on Strategies to Protect the Health of Deployed U.S. Forces: (1) *Medical Surveillance, Record Keeping and Risk Reduction*; (2) *Analytical Framework for Assessing Risks (and Workshop Proceedings: Strategies to Protect the Health of Deployed U.S. Forces: Assessing Health Risks to Deployed U.S. Forces)*; and (3) *Strategies to Protect Deployed U.S. Forces: Force Protection and Contamination*.

<sup>k</sup>The total amount of funds OSAGWI reported as supporting its research contract with Birch & Davis in fiscal years 1997 and 1998. The total cost of delivery order 46 for contract number DASW01-95-D-0028 was \$1,684,773, but this order also covered substantial work for DOD/Health Affairs and its Deployment/Surveillance Team to validate and analyze data from the Comprehensive Clinical Evaluation Program and other surveillance activities. Cost information is not available by product.

<sup>l</sup>An April 9, 1997, request by Birch & Davis Associates for approval to disseminate and/or publish articles based on analyses conducted under delivery order 46 was formally rescinded by an April 15, 1997, letter that cited a conversation on the subject that led the contractor to understand "that any request to disseminate and/or publish articles under the referenced contract must be done on a 'case by case' basis and must be accompanied by a definite publication plan." In explanation of non-release of one or more of this contractor's products, OSAGWI staff cited dissatisfaction with the deliverables as presented by the contractor in July 1998. However, they provided no written performance reviews for the contractor, explaining that the products were developed under a task order that was part of a contract with the Office of the Assistant Secretary of Defense for Health Affairs, which was presumably responsible for evaluating the contractor's performance.

Appendix III

# Sample Working Case Definitions Describing Symptoms Experienced by Gulf War Veterans

Origin	Date	Inclusion criteria	Exclusion criteria
Sanford*	1994	(1) In theater of operations between 8/8/90 and late July 1991 (2) New onset of a symptom complex with the occurrence of at least five of eight minor criteria: fatigue, arthralgia, headache, diarrhea, neuropsychiatric complaints, difficulty sleeping, low-grade fever, and/or weight loss.	Other clinical conditions with similar symptomologies based on thorough evaluation, including history, physical exam and appropriate lab studies.
Haley*	1997	The three primary syndromes are impaired cognition (symptoms include distractibility, difficulty remembering, depression, middle and terminal insomnia, fatigue, slurring of speech, confused thought process, and migraine-like headaches); confusion-ataxia (symptoms include problems with thinking and reasoning processes, getting confused, getting disoriented, problems keeping their balance, posttraumatic stress disorder, depression, liver disease, and sexual impotence); and arthro-myo-neuropathy (symptoms include generalized joint and muscle pains, increased difficulty lifting heavy objects, muscle exhaustion after exertion, and tingling or numbness of the hands, arms, feet, and legs).	
CDC*	1998	One or more chronic symptoms (present for more than 6 months) from at least two of the following three categories: fatigue, mood and cognition (feeling depressed, difficulty remembering or concentrating, feeling moody, feeling anxious, trouble finding words or difficulty sleeping), and/or musculoskeletal (joint pain, stiffness, or muscle pain).	Other clinical conditions with similar symptomologies based on thorough evaluation, including history, physical exam and appropriate lab studies.
National Health Survey Team*	1999	Combination of blurred vision, loss of balance/dizziness, tremors/shaking, and speech difficulty (reported by 277, or 2.4 percent, of surveyed Gulf-deployed veterans in contrast to 43 or 0.5 percent of surveyed nondeployed veterans).	

\*Memorandum from Jay P. Sanford, M.D. to MG Ronald Blanck, MC USA, re: Gulf War Syndrome: Proposed Provisional Case Definition, Jan. 27, 1994.

\*Robert W. Haley et al., "Is There a Gulf War Syndrome? Searching for Syndromes by Factor Analysis of Symptoms," *Journal of the American Medical Association*, vol. 277 (Jan. 15, 1997), pp. 215-222.

\*Keiji Fukuda et al., "Chronic Multisymptom Illness Affecting Air Force Veterans of the Gulf War," *Journal of the American Medical Association*, vol. 280 (Sep. 18, 1998), pp. 981-988.

\*National Health Survey Research Team, "Unique Cluster of Symptoms Among Gulf Veterans." In *The Research Working Group [of the Persian Gulf Veterans Coordinating Board, Conference on Federally Sponsored Gulf War Veterans' Illnesses Research: Program and Abstract Book, 1999, p. 39.*

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Appendix IV

# Comments From the Department of Defense

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



OFFICE OF THE SECRETARY OF DEFENSE  
1000 DEFENSE PENTAGON  
WASHINGTON, DC 20301-1000

AUG 19 1999

Mr. Kwai-Cheung Chan  
Director, Special Studies and Evaluations  
National Security and International Affairs Division  
General Accounting Office  
Washington, D.C. 20548

Dear Mr. Chan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "GULF WAR ILLNESSES: Management Actions Needed to Answer Basic Research Questions", dated July 16, 1999 (GAO Code: 713038/OSD Case 1865).

Federal Gulf War veterans' illnesses research encompasses a wide variety of research approaches (basic research through applied research) spanning a broad spectrum of technical disciplines. The effectiveness of this research has been demonstrated through the refinement of future research direction, progress in the development of clinical treatment efforts, changes in health care operations policy and doctrine to emphasize military force health protection, publications in the technical literature, and the outcomes of peer review. Still, the full impact of Federal Gulf War veterans' illnesses research will not be realized for years.

The GAO paints a pessimistic picture and incorrectly states that "little is known about how veterans conditions have changed over time." Although further research is in progress, a more optimistic perspective on veterans' health has been provided by an extensive descriptive and analytic epidemiological research effort based on clinical evaluations and medical records. Systematic clinical examinations have not identified a unique syndrome or a characteristic organic abnormality among over 100,000 U.S., British, and Canadian Gulf War veterans. Additionally, the mortality rate of Gulf War veterans has been less than half that of the civilian population, and overall deaths due to medical causes have not increased. Moreover, there has been no overall increase in hospitalizations among Gulf war veterans or birth defects among their children.

Significantly, the GAO fails to understand that the Office of the Special Assistant for Gulf War Illnesses (OSAGWI) is not responsible for either DoD's medical programs or medical research. OSAGWI's unique charge is to investigate and explain what occurred. OSAGWI's sponsorship of the RAND

- See comment 1.
- See comment 2.
- See comment 3.
- See comment 4.
- See comment 5.
- See comment 6.
- See comment 7.
- See comment 8.
- See comment 9.



Literature reviews were meant to inform, not to conduct research. Since the literature reviews are not research, they do not fall under the Research Working Group (RWG). Consequently, DoD disagrees with GAO's assertion that coordination between the RWG and OSAGWI is weak. The Draft Report does not state exactly what "weak coordination" means, and also does not mention that an OSAGWI representative is a formal member of the RWG and provides input.

See comment 9.

DoD agrees with the GAO recommendation that the RWG should publish a more formal assessment of progress toward addressing the research objectives identified in 1995. However, the GAO omits that this update is a work in progress and was ongoing at the time of the GAO audit. The GAO also fails to note the extensive research management, ongoing assessment, and oversight provided by the RWG since identifying research objectives in 1995. It is important to note that the annual reports published by the RWG analyze the Federal Government's portfolio of research on Gulf War veterans' illnesses, highlighting significant research and research-related events and milestones, discussing the management of federal Gulf War veterans' illnesses research programs (including research oversight, peer-review and coordination), and articulating priorities for future research. The GAO also omits the DoD-specific review of the research program by the Armed Services Biomedical Research Board of Experts during the Technology Assessment Review (TAR). Both these forums have provided oversight and guidance to the DoD biomedical research efforts to date on illnesses among Gulf War veterans. Program management, oversight, and assessment is continuous.

See comment 10.

The GAO apparently did not consider ongoing work by the Departments of Defense, Veterans Affairs, and Health and Human Services when making the recommendation to "ensure that steps are completed to compile data on the number of veterans with Gulf War illnesses, the progression of their illnesses, the treatments they are receiving, and the success of their treatments." Gulf War veterans have experienced a wide variety of diagnosed and undiagnosed medical conditions, which span the entire range of medical experience. DoD reiterates the consensus of the scientific community, including prior findings of the Institute of Medicine, that Gulf War veterans' illnesses appear to be a heterogeneous group of disorders, exhibiting widely varying manifestations and not amenable to a single unifying case definition. Therapeutic approaches have been tailored appropriately to each individual veteran's needs. However, the methodology for evaluating health outcomes and treatment efficacy in such a complex situation has not been developed. The task of designing a protocol for acquiring and analyzing longitudinal information to provide an accurate assessment of the health outcomes and treatment results in Gulf War veterans poses a significant challenge. Consequently, last year the Department of Defense and Veterans Affairs requested that the National Academy of Sciences establish a committee to consider these methodological questions. The final report from the Academy is expected later this month.

See comment 11.

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DoD also disagrees with GAO's criticism of OSAGWI's contracting practices. OSAGWI does not have its own independent contracting officers, but relies upon the professional judgment of government contracting professionals. Contracting officers at GSA FEDSIM, National Guard Bureau, Defense Supply Service - Washington, GSA Kansas City and the National Institute of Health agreed with various OSAGWI contract actions, and raised no objections to them.

See comment 12.

Lastly, DoD strongly objects to the wording of Recommendation 3 because it implies that OSAGWI did not obey the law when contracting. As previously stated, federal contracting personnel reviewed the EDM and SRA task orders and raised no objections. OSAGWI's contracts complied with all applicable laws and regulations.

DoD's summary and detailed comments on the Draft Report are set forth in the enclosures.

Sincerely yours,

Bernard Roatler

Enclosures

"GULF WAR ILLNESSES: Management Actions  
Needed to Answer Basic Research Questions,"  
Dated July 16, 1999  
(GAO Code 713038/OSC Case 1865)

DEPARTMENT OF DEFENSE COMMENTS  
TO THE GAO RECOMMENDATIONS

**RECOMMENDATION 1:** The GAO recommended that the Secretaries of Veterans' Affairs, Defense, and Health and Human Services direct the Executive Director of the Persian Gulf Veterans Coordinating Board's Research Working Group (RWG) to ensure that:

- The RWG establishes a date within fiscal 1999 or 2000 for publishing its assessment of progress toward addressing the research objectives it identified in 1995;
- Steps are completed to compile data on the number of veterans with Gulf War illnesses, the progression of their illnesses, the treatments they are receiving, and the success of these treatments;
- The RWG defines research activities and takes necessary steps to ensure any efforts meeting this definition by the Office of the Special Assistant for Gulf War Illnesses (OSAGWI) are subject to coordination. (pp. 16-17/GAO Draft Report)

**DOD RESPONSE:**

Part 1, Concur: DoD agrees that the RWG publish a more formal assessment of progress towards addressing the research objectives identified in 1995. In fact, this update is a work in progress and was ongoing at the time of the GAO audit. The Department has also performed extensive research management, ongoing assessment, and oversight through the RWG since identifying research objectives in 1995. The annual reports published by the RWG analyze the Federal Government's portfolio of research on Gulf War veterans' illnesses, highlighting significant research and research-related events and milestones, discussing the management of federal Gulf War veterans' illnesses research programs (including research oversight, peer-review and coordination), and articulating priorities for future research.

Part 2, Partially Concur: While the Department is pursuing the compilation of data, this task is not as basic as the Draft Report implies. The Departments of Defense, Veterans Affairs, and Health and Human Services are currently working together to "ensure that steps are completed to compile data on the number of veterans with Gulf War illnesses, the progression of their illnesses, the treatments they are receiving, and the success of their treatments." However, Gulf War veterans have experienced a wide variety of diagnosed and undiagnosed medical conditions, which span the entire range of medical experience. DoD concurs with the consensus of the scientific community, including prior findings of the Institute of Medicine, that Gulf War veterans' illnesses appear to be a heterogeneous group of disorders, exhibiting widely varying manifestations and not amenable to a single unifying case definition.

See comment 10.

See comment 11.

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Therapeutic approaches have been tailored appropriately to each individual veteran's needs. To date, the methodology for evaluating health outcomes and treatment efficacy in such a complex situation has not been developed. Consequently, the task of designing a protocol for acquiring and analyzing longitudinal information to provide an accurate assessment of the health outcomes and treatment results in Gulf War veterans poses a significant challenge. Consequently, last year the Departments of Defense and Veterans Affairs requested that the National Academy of Sciences establish a committee to consider these methodological questions. The final report from the Academy is expected later this month.

Part 3, Concur: While the Department agrees that there should be a close coordination between the two entities on research activities, we believe this is already occurring. It appears that the GAO has misinterpreted OSAGWI's mission, since OSAGWI is not responsible for either DoD's medical programs or medical research. OSAGWI's unique charge is to investigate and explain what occurred. Therefore, OSAGWI's sponsorship of the RAND literature reviews was meant to inform, not to conduct research. Since the literature reviews are not research, they do not fall under the RWG. Consequently, DoD disagrees with GAO's assertion that coordination between the RWG and OSAGWI is weak. The Draft Report does not state exactly what "weak coordination" means, and also does not mention that OSAGWI is a formal active member of the RWG.

**RECOMMENDATION 2:** The GAO also recommended that the Secretary of Defense direct the OSAGWI to replace the task order issued under the General Service Administration's Management, Organizational, Business Improvement Services (MOBIS) schedule contract with a proper contracting arrangement as soon as it is practical to do so. (P.17/GAO Draft Report)

**DOD RESPONSE:**

Not Concur: DoD disagrees with GAO's criticism of OSAGWI's contracting practices. OSAGWI does not have its own independent contracting officers, but relies upon the professional judgment of government contracting professionals. Contracting officers at GSA FEDSIM, National Guard Bureau, Defense Supply Service - Washington, GSA Kansas City and the National Institute of Health agreed with various OSAGWI contract actions, and raised no objections to them.

**RECOMMENDATION 3:** The GAO further recommended that the Secretary of Defense direct OSAGWI to ensure that all future support contracts comply fully with applicable laws and regulations. (p. 17/GAO Draft Report)

**DOD RESPONSE:**

Not Concur: DoD strongly disagrees with the wording of this recommendation because it implies that OSAGWI did not obey the law when contracting. OSAGWI's contracting actions complied with the laws and regulations in effect at the time of award. Moreover, numerous federal contracting officials reviewed OSAGWI's various task orders and did not raise any objections.

See comment 11.

See comment 9.

See comment 12.

## GAO Comments

The following is GAO's response to the Department of Defense's (DOD) comments dated August 19, 1999.

1. With respect to the refinement of future research direction, it is important to note that a National Institutes of Health working group assembled in 1994 noted the desirability of identifying one or more case definitions or an evolving case definition to focus research efforts. Our report notes that the Research Working Group had not endorsed one or more case definitions that might focus future research efforts on veterans' unexplained illnesses and that problems with exposure data persist.
2. Our report notes that 8 years after the war, the Department of Veterans' Affairs has just begun to recruit subjects for clinical trials and no treatment research has yet been completed. We have not evaluated the quality of these trials or the selection of treatments to be evaluated.
3. Longitudinal follow-up of mortality, cancer rates, and health status will require many years. However, without accurate and precise exposure data (i.e., duration and dose), the interpretation of morbidity and mortality data from these studies will remain challenging.

4. The facts and observations in this report are consistent with those of the Institute of Medicine (IOM). The Institute noted in a report issued in mid-September 1999, the month after DOD provided its formal comments, that no one has systematically evaluated whether the health of Gulf War veterans is changing and, if so, how. Similarly, it noted that no one had determined the number of veterans who have symptoms of illnesses that they attribute to service in the Gulf War, or whether the health of these veterans is better than, worse than, or the same as that of veterans who were not deployed to the Gulf War, although some studies have found higher levels of reported symptoms among Gulf War veterans.<sup>1</sup> In addition, RWG, in its annual report to Congress for 1998 stated that, "although several individual research projects... have longitudinal components built into them, no research is specifically directed toward understanding the progress of Gulf War veterans' illnesses over time. The RWG has concluded that to the extent feasible, research approaches need to be applied to determine the long-term health of Gulf War veterans in contrast to the several cross-sectional epidemiological research projects recently completed or still ongoing."<sup>2</sup>

<sup>1</sup>Institute of Medicine, *Gulf War Veterans: Measuring Health*.

<sup>2</sup>Persian Gulf Veterans' Coordinating Board - Research Working Group, *Annual Report to Congress - 1998*.



5. It has been difficult for researchers to progress from descriptive to analytical epidemiology due partly to the absence of accurate and precise data on the factors to which veterans were exposed. None of the research DOD cited compared veterans on the basis of their specific exposure history. Instead, results generally describe the experience of persons who were on active duty in the Gulf War theater (that is, the Persian Gulf, Kuwait, Iraq, Saudi Arabia, the Red Sea, the Gulf of Oman, the Gulf of Aden, the northern portion of the Arabian Sea, Oman, Bahrain, Qatar, or the United Arab Emirates) between August 2, 1990, and June 13, 1991, as compared to those who were on active duty elsewhere during this time frame. As we noted in 1997, one might not find differences between these large and diverse groups even if some veterans have illnesses that are significantly related to specific military exposures. Nonetheless, researchers have documented that these two groups differ in their frequency of reporting various symptoms and, even with poorly defined exposures, some investigators have reported associations between certain exposures and indicators of veterans' post-war health.<sup>3</sup>

<sup>3</sup>See, for example, S. P. Proctor et al., "Health Status of Persian Gulf War Veterans: Self-reported Symptoms, Environmental Exposures, and the Effect of Stress," *International Journal of Epidemiology*, 27 (6), 1000-10. Unwin, C. et al. (1999.) Health of U.K. Servicemen Who Served in Persian Gulf War. *Lancet*, 353, 169-178. Haley, R. W., & Kurt, T. L. (1997). Is There a Gulf War Syndrome? *Journal of the American Medical Association*, 277 (3), 215-22 and related articles at 223-37.

6. DOD's comments do not embrace the most consistent finding of the health research to date. As IOM concluded, "There does seem to be a higher prevalence of some symptoms among veterans who served in the Gulf War as compared to nondeployed veterans. The primary symptoms include fatigue, difficulty concentrating, memory loss, skin rash, headache, and muscle and joint pain."<sup>4</sup> Several studies support this conclusion. For example, a study funded by the Centers for Disease Control conducted telephone interviews of a stratified random sample of 3,695 of 29,000 Gulf War-era military personnel listing Iowa as their home of record and found that those deployed to the Gulf War were more likely than those who served elsewhere during the war to report symptoms suggestive of cognitive dysfunction, depression, chronic fatigue, post-traumatic stress disorder, and respiratory illness (asthma and bronchitis).<sup>5</sup> These symptoms appeared to affect the functional activity and daily lives of the Gulf War veterans. Similarly, a CDC study of Air Force personnel found that a multisymptom case definition developed after clinical examination of 158 veterans was, in its severe form, reported several times more frequently by sampled Gulf War veterans than by nondeployed personnel.<sup>6</sup> Mild-to-moderate cases, while more evenly spread, were still well over twice as common in the Gulf War group. Gulf War veterans classified as having mild-to-moderate and severe illness had a significant decrease in functioning and well-being compared with Gulf War veterans who did not fit the criteria for the multisymptom illness. Similar findings were reported in a study of 3000 veterans from New England, a study of 525 women veterans, and a study of 8,000 veterans from the United Kingdom.<sup>7</sup> Moreover, a survey of Canadian veterans found significantly higher rates of self-reported chronic conditions and symptoms of a variety of conditions among Gulf-deployed veterans compared to those serving elsewhere during the Gulf conflict.<sup>8</sup> The conditions reported more frequently by Gulf War

<sup>4</sup>Institute of Medicine (1999). *Gulf War Veterans: Measuring Health*, Washington, D.C.: National Academy Press, p. 2.

<sup>5</sup>Iowa Persian Gulf Study Group. (1997). Self-reported Illness and Health Status Among Gulf War Veterans: A Population-Based Study. *Journal of the American Medical Association*, 277 (3), 238-245.

<sup>6</sup>See Fukuda, K. et al. (1998.) Chronic Multisymptom Illness Affecting Air Force Veterans of the Gulf War. *Journal of the American Medical Association*, 280, 981-88. They report that 6.0% of 1155 Gulf War veterans they surveyed reported symptoms that fit their working definition of a severe case of multisymptom illness, while only 0.7% of the 2520 surveyed non-deployed personnel did so. The investigators reported that the univariate association between Gulf War veteran status and fitting the severe case criteria was statistically significant (odds ratio =12.7 with 95% confidence limits between 7.5 and 21.5).

veterans included problems with bones and joints, allergies, and limitations in activity due to health.

It is common throughout the epidemiological literature to accept a statistically significant difference in the risk of an illness as evidence of association. Even if the symptoms disproportionately reported by Gulf War veterans are not confined to these veterans, their increased frequency among Gulf War veterans needs to be explained. IOM has similarly concluded that, "It appears that veterans who served in the Gulf are more likely than their nondeployed comrades or civilians to experience a set of symptoms that include cognitive, musculoskeletal and energy/fatigue elements. In some cases, the symptoms are severe enough to be totally debilitating. Not all veterans experience the same cluster of symptoms; therefore, assuming a single underlying pathology or single cause for the complaints would not be appropriate."<sup>9</sup>

<sup>9</sup>Wolfe, J. et al. (1998.) Health Symptoms Reported by Persian Gulf War Veterans Two Years After Return. *American Journal of Industrial Medicine*, 33, 104-113. Unwin, C. et al. (1999.) Health of U.K. Servicemen Who Served in Persian Gulf War. *Lancet*, 353, 169-178. Pierce, P. (1997.) Physical and Emotional Health of Gulf War Veteran Women. *Aviation, Space and Environmental Medicine*, 68, 317-21.

<sup>10</sup>Goss Citroy, Inc. (1998.) *Health Study of Canadian Forces Personnel Involved in the 1991 Conflict in the Persian Gulf*, vol. 1. Ottawa: Goss Citroy.

<sup>11</sup>Institute of Medicine (1999). *Gulf War Veterans: Measuring Health*. Washington, D.C.: National Academy Press, p. 33.

7. Veterans of the Gulf War differ from the general civilian population with respect to fitness profile and other factors, so it is not surprising that their mortality rate would also differ from the rate for the general civilian population. Research found the mortality rate of Gulf War veterans through September 1993 to be slightly higher than that of veterans of the same era who served elsewhere, with the difference explained largely by greater mortality in motor vehicle accidents.<sup>10</sup> In the published report of the mortality study, the authors speculate that increased mortality in automobile accidents might be attributed to increased risk-taking among war veterans in general, but they note that the reasons for the excess of deaths due to external causes among war veterans are not well understood. The finding was replicated in a follow-up study extending the observation period through December 1997.<sup>11</sup>

<sup>10</sup>The odds ratio for this difference was 1.09 with 95% confidence limits between 1.01 and 1.16. See Kang, H.K. & Bullman, T. A. (1996.) Mortality Among U.S. Veterans of the Gulf War. *New England Journal of Medicine*, 335, 1498-1504. See also Haley, R. W., (1998.) "Commentaries: Point: Bias from the 'Healthy Warrior Effect' and Unequal Follow-up in Three Government Studies of Health Effects of the Gulf War." *American Journal of Epidemiology*, 148 (4), pp. 315-338.

<sup>11</sup>The follow-up study found that the excess in deaths attributable to motor vehicle accidents persisted among Gulf War veterans observed through December 1997 (crude rate ratio = 1.32; confidence interval 1.23-1.41), while the risk of disease related deaths did not increase or decrease over time. See Kang, H.A. & Bullman, T. A. (1999). Mortality Among U.S. Veterans of the Gulf War: Update Through December 1997. *Conference on Federally Sponsored Gulf War Veterans' Illnesses Research: Program and Abstract Book*, (June 23-25, 1999). Washington, D.C.: The Research Working Group of the Persian Gulf Veterans' Coordinating Board, p. 28.

8. DOD does not note the methodological limitations of these studies as their authors do in the respective published reports. As noted by IOM, the studies of hospitalization (Gray et al., 1996; Knoke and Gray, 1998) and adverse birth outcomes (Araneta et al., 1997; Cowen et al., 1997) have been limited to personnel remaining on active duty and to events occurring in military hospitals. Conceivably, those suffering from Gulf War-related symptoms might leave active duty voluntarily or take a medical discharge. Hospitalizations for that group would appear in VA or private sector databases but not in the DOD database. The health or characteristics of active duty personnel could differ from those of personnel who have left active duty or who have been treated in nonmilitary hospitals. Moreover, economic and other non-health related factors are likely to affect use of nonmilitary hospitals and health care services.<sup>12</sup> However, through 1993, studies did not observe an increase in hospitalization among deployed versus nondeployed veterans in the active duty military. Knoke and Gray, analyzing the same database, observed slightly more admissions for symptoms, signs and ill-defined conditions among Gulf-deployed veterans than among veterans deployed elsewhere during the same timeframe. They attributed the difference to admissions for evaluation purposes under the Comprehensive Clinical Evaluation Program, which offered examination and diagnostic services to Gulf War veterans.

9. Whether OSACWI performs medical research is not relevant to determining whether the Research Working Group should coordinate its activities. We see nothing in the law that would limit the Group's coordinating efforts to activities that constitute research, however defined.

DOD also contends that OSACWI does not need to coordinate with RWC and that it has coordination mechanisms. However, DOD's assertion that close coordination is already occurring is difficult to reconcile with our finding that duplication has occurred. Federal agencies have commissioned at least three reviews of the health effects of depleted uranium in the last few years, one each by the agencies represented on RWC. In addition, two major efforts to review the health effects of Gulf War veterans' exposures have been pursued more or less independently – one by RAND, under contract to DOD, and another by the National Academy of Sciences, under contract to VA.

<sup>12</sup>Institute of Medicine (1999). *Gulf War Veterans: Measuring Health*, Washington, D.C.: National Academy Press, p. 36.

Minutes of RWC meetings from April 1997 forward indicate that they have been attended by a succession of OSACWI professional staff, as participants or observers, and we have revised the report to reflect this. Nonetheless, the working relationship between these organizations appears far from seamless. For example, RWC felt it necessary to write to OSACWI to request a briefing on the literature reviews the office had tasked RAND to conduct. Similarly, in a letter to OSACWI in April 1997, a VA RWC official expressed concerns about the lack of external review for several of OSACWI's proposed research efforts.

We understand that OSACWI is not responsible for DOD's medical research programs. As noted in our report, we deliberately adopted a broad scope, to include both research and investigation of exposure scenarios, to comprehensively examine relevant efforts. In any event, some of OSACWI's projects (listed in app. II) constitute research not only by the dictionary definition that DOD cites but also by DOD's more restrictive criteria.

Whether these undertakings are regarded as research or some other type of endeavor, our interest was in assessing their productivity. Thus, the key point is that most of the contracted projects are completed, but only a handful had been released.

10. While DOD and others have published various assessments of the research program, none of them have directly addressed the status of the research objectives identified in 1995. We requested this information from RWC officials, orally and in writing, and did not receive it. DOD contends that the effectiveness of these research efforts is not yet fully measurable. However, what is needed is not a final judgment but a simple accounting of where federal efforts stand with respect to answering the basic questions identified in 1995.

11. We have not called for an identification of a single unifying case definition or a summary judgment of treatment efficacy for heterogeneous conditions. However, it would seem reasonable to expect an accounting of the status of veterans' health over time and a description of the types of treatments they have received. DOD suggests that it would be unreasonably difficult to provide such information. We note in the text that some basic questions about veterans' health may be addressed by VA's national health survey. However, at this writing, data from the survey have not yet been published. In mid-September 1999, the National Academy of Sciences Institute of Medicine Committee that VA commissioned to study methodological problems issued a report that describes a method of health

assessment. The law requires that VA continue this process by reviewing the methods suggested by IOM and pursuing, to the extent feasible, the collection of appropriate data.

12. With respect to the task order issued under the Management, Organizational, Business Improvement Schedule (MOBIS) contract, OSAGWI does not take issue with our conclusion that the order is outside the scope of the contract. For the reasons stated in the report, we continue to believe that the task order was improper. Therefore, the order should be terminated, if practicable, as we recommended and the office should ensure that any subsequent support contract is properly awarded.

We recognize that OSAGWI relies on contracting professionals outside that office to execute its support contracts. However, that does not absolve the office of all responsibility concerning how its contract support is acquired. At a minimum, OSAGWI is responsible for determining and articulating its requirements, a process that in one instance resulted in the naming of a preferred vendor and in another instance led to an overly broad statement of work. The effect of these practices was to discourage competition for over \$20 million in awards and therefore to risk inefficient use of funds. It is important that both entities that initiate requests for goods and services (for example, OSAGWI) as well as agencies that execute contracts for these goods and services ensure adherence to the statutes and regulations designed to maximize competition.

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Attachment K, Page K-64

Appendix V

# Comments From the Department of Veterans' Affairs

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



DEPARTMENT OF VETERANS AFFAIRS  
ASSISTANT SECRETARY FOR PLANNING AND ANALYSIS  
WASHINGTON DC 20420

SEP 9 1999

Mr. Kwai-Cheung Chan  
Director, Special Studies and Evaluation  
National Security and International Affairs Division  
U. S. General Accounting Office  
441 G Street, NW  
Washington, DC 20548

Dear Mr. Chan:

This is in response to your draft report, *GULF WAR ILLNESSES: Management Actions Needed to Answer Basic Research Questions* (GAO/NSIAD-99-103). Although we agree with much of the report, we have several concerns regarding portions of GAO's findings, conclusions and recommendations. These concerns preclude us from concurring with recommendations two and three.

The GAO report notes (pages 6 and 10) that many questions about Gulf War veterans remain unanswered, including the prevalence of diagnosed and undiagnosed illnesses, what treatments have been received, and whether Gulf War veterans who have received care in VA facilities are getting better or worse. While complete answers to these questions are not yet available, the Veterans Health Administration (VHA) has taken considerable effort to address these issues. As we have previously reported, VHA has carried out several activities that provide longitudinal information on the health status of Gulf War veterans. This is, however, a highly complex question, and the answers provided are, admittedly, incomplete. The methodology to obtain valid, definitive answers to the questions GAO poses is not insignificant. To obtain advice on the optimal methods to assess the health status of Gulf War veterans, we contracted with the National Academy of Sciences, Institute of Medicine (IOM). The IOM committee established for this project sponsored a workshop in Washington, D.C. on May 7, 1998, and released its Workshop Summary on August 31, 1998. This summary did not contain any conclusions or recommendations. The committee will publish its final report and recommendations in September 1999.

In order to acquire more detailed information about veterans' perceptions of their care, we conducted a detailed Gulf War veteran customer satisfaction survey during the past fiscal year. We intend that this will become a longitudinal feedback mechanism to assess current levels of customer satisfaction with VA care, to measure functional health status, and to assess improvements in these areas. In addition to this survey, VHA's Office of Quality and Performance also conducted Gulf War veteran focus groups to assess further the special needs and concerns of these individuals.

See comment 1.

See comment 2.

2. Mr. Kwai-Cheung Chan

In further pursuit of identifying the most effective treatment modalities and clinical settings, VA has initiated five clinical demonstration projects at seven VAMCs for case management and multidisciplinary specialized Gulf War clinics. The demonstration projects, which are funded as two-year studies, will support this important effort by using objective outcome measures to assess whether health care and patient satisfaction for Gulf War veterans are improved by multidisciplinary specialized Gulf War clinics or by case management approaches.

See comment 2.

GAO states, "because of the way data on symptoms are recorded in VA and the Department of Defense (DoD) registries, the registries are not good sources of information regarding the prevalence of various symptom clusters among veterans groups." This statement is incorrect. The Registry's inability to determine incidence and prevalence of Gulf War veterans' health problems is unrelated to the manner in which the data are recorded in the database. The Gulf War Health Registries are not adequate for determining the prevalence of symptoms or diagnoses in the Gulf War population because of the self-selected nature of this voluntary health examination program. Although VA's registry is severely limited as a research tool, it has served the purpose for which it was established.

See comment 3.

GAO is critical of the coordination between the Persian Gulf Veterans' Coordinating Board's (PGVCB) Research Working Group (RWG) and the Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses (OSAGWI). We take issue with this conclusion for a number of reasons. First, it is important to note that the role of the PGVCB is one of communication and coordination of its member agencies' activities; it does not control these activities. Second, OSAGWI is represented on the RWG's parent organization, the PGVCB, along with the Department of Defense Office of Biomedical Research and Office of Health Affairs. Third, the overwhelming majority of OSAGWI's work has been focused on determination of facts concerning specific incidents of the Gulf War as opposed to research. This work would not be subject to overview by the PGVCB.

Comments 4-5.

Comment 4.

Comment 5.

Comment 6.

Comments 7-9.

Comment 7.

Comment 8.

Additionally, GAO inappropriately illustrates the lack of communication and coordination between the RWG and OSAGWI through two contracts. The OSAGWI contract with the RAND Corporation is for literature reviews on various Gulf War topics; VA's contract with the IOM is for an analysis of the scientific literature to determine whether associations exist between Gulf War exposures and health effects. This example is inappropriate for a number of reasons. First, the published RAND reports are made available to the IOM. In fact the IOM has a copy of the RAND report on depleted uranium and the Department of Health and Human Services (HHS) Agency for Toxic Substances and Disease Registry (ATSDR) report on uranium and will review these documents as appropriate. Second, the RAND reports and the IOM committee's study use different

3. Mr. Kwai-Cheung Chan

methods, have different goals, and are not duplicative. The Presidential Advisory Committee was aware of the RAND work and still recommended that VA contract with the IOM for its study. An IOM committee will provide a comprehensive review, evaluation, and summary of available scientific/medical information regarding the association between exposure during the Gulf War and adverse health effects experienced by Gulf War veterans. This review will include an assessment of biologic plausibility that exposures, or synergistic effects of combinations of exposures, are associated with illnesses Gulf War veterans experienced. The NAS will make recommendations for additional scientific studies to resolve areas of continued scientific uncertainty related to health consequences. Finally, the IOM study is being carried out under legislative mandates provided in both Public Law 105-368 and Public Law 105-277.

See comment 8.

See comment 9.

See comment 10.

See comment 11.

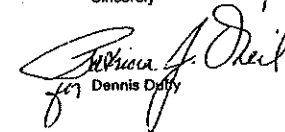
See comment 12.

While we agree that many questions about Gulf War veterans' symptoms remain unanswered, there is still no evidence that the symptoms reported by veterans constitute a unique disease entity. Consequently, no single case definition is appropriate.

We concur with recommendation one, that the RWG establish a date in FY 1999 or FY 2000 for publishing its assessment of progress toward addressing the research objectives it identified in 1995. As worded in the draft report, we cannot concur with recommendation two, to complete steps to compile data on the number of veterans with Gulf War illnesses, the progression of their illnesses, the treatments they are receiving, and the success of these treatments. Without clear case definitions the recommendation cannot be implemented as currently worded. GAO should consider revising the recommendation to read, "... the number of veterans with unexplained Gulf War illnesses. ..." This would remove the implied causality associated with the current wording of the recommendation. Finally, we do not concur with recommendation three. As discussed above, the RWG has already provided sufficient information on the scope of activities that it has and continues to coordinate among VA, DoD and HHS.

Thank you for the opportunity to comment on your draft report.

Sincerely

  
for Dennis Duffy

## GAO Comments

The following is GAO's response to the Department of Veterans' Affairs comments dated September 9, 1999.

1. VA acknowledges that complete answers remain unavailable to the basic questions we identified in this report and in an earlier report (for example, how many veterans have unexplained illnesses and whether ill veterans examined by VA and DOD are better or worse than when they were first seen).<sup>1</sup> A basically satisfactory answer to the question of whether those ill veterans who have registered with VA or DOD are in better or worse health than when first examined involves only a periodic reassessment of their health, which is part of routine medical care.<sup>2</sup> As we stated when we first made such a recommendation 2 years ago, augmenting the data on the progress of ill Gulf War veterans with comparative data would add valuable information. However, at a minimum, it seems desirable to collect descriptive information on how Gulf War veterans' conditions have improved or worsened. In mid-September 1999, IOM issued its report, which recommended a methodology to VA for measuring veterans' health status (a longitudinal follow-up of a cluster sample of Gulf War veterans with several comparison groups). This approach is consistent with our recommendation that VA and DOD select a strategy for answering this question and compile the appropriate data.

2. Many of the efforts VA cites appear worthwhile, but VA does not assert that any of these have answered or would answer the basic questions we have identified about the prevalence of diagnosed and undiagnosed conditions in Gulf War veterans, the treatments they have received, and the course of any unexplained illnesses. The Veterans' Health Administration's (VHA) intention to collect longitudinal data on these veterans' satisfaction with VHA services may provide a useful monitor of veterans' perceptions. Early findings from this work suggest that Gulf War veterans, as a group,

<sup>1</sup>See *Gulf War Illnesses: Improved Monitoring of Clinical Progress and Reexamination of Research Emphasis Are Needed* (GAO/NSIAD-97-163), June 23, 1997.

<sup>2</sup>For example, such an effort has been pursued by one of the VA's Integrated Service Networks. Using a standardized assessment of health-related functioning, the SF-36 from the RAND medical outcomes study, researchers found that the presenting Gulf War veterans scored lower than U.S. norms on all dimensions of health status and that baseline scores were significantly different from 6 month follow-up. See Powell-Cope, G. M. & Roswell, R. (1999). Health Status of Gulf War Veterans in VISN 8. The Research Working Group, Persian Gulf Veterans Coordinating Board, *Conference on Federally Sponsored Gulf War Veterans' Illnesses Research*, Washington, D.C.: PGVCB/RWG, p. 32.

were somewhat less satisfied with VHA services than other veteran groups. VHA's efforts to clarify the reasons for this through the use of focus groups are also appropriate. Similarly, the health services research efforts that VA identifies may help improve service delivery but do not appear suited to developing much longitudinal information because the projects are funded for only 2 years.

3. Among the conclusions the NIH Working Group reached in 1994 was that, "It is important that a more accurate estimate of the symptom prevalence be established." In support of our finding that basic information on the prevalence of various symptom clusters remains unavailable, we note that VA and DOD registries of examined Gulf War veterans also do not provide sufficient data for determining which of various symptom clusters deserve the closest attention. We agree that the registries may be valuable for other purposes and that there are additional reasons that they might be imperfect research tools. While the VA's national health survey has collected much of the symptom data sought by the NIH group, its results remained unpublished at the close of our review.

4. In support of its objection to our criticism of the coordination between the PGVCB RWG and the Office of the Special Assistant, VA notes that the role of the PGVCB is one of communication and coordination of its member agencies' activities; it does not control these activities. For this reason, our draft report noted that PGVCB has no budgetary authority. Nonetheless, part of the function of communication and coordination is to reach agreement on a plan of action to optimize resources while meeting sometimes varied needs for information. We observed that some projects sponsored by agency members of the RWG are duplicative (see our comment 9 in app. IV.)

5. In support of its objection to our criticism of the coordination between the PGVCB's RWG and the Office of the Special Assistant, VA notes that OSAGWI is represented on the RWG's parent organization, the Coordinating Board, along with other DOD elements. We have revised the report to reflect that professional staff from OSAGWI did attend RWG meetings, as participants or observers, beginning in April 1997. We have not asserted that a coordination mechanism is missing; our criticism is related to the effectiveness of this mechanism in eliminating duplicative expenditures and ensuring uniformly high confidence across agencies in the research activities undertaken.

6. While most of OSAGWI's expenditures appear to be focused on the investigation of specific incidents for the potential exposures that might have resulted, which would be germane to epidemiological researchers, OSAGWI officials identified \$13.3 million, a substantial amount of the office's expenditures, as being devoted to research. It is worth noting that this amount, while it represents a minority of OSAGWI's budget, exceeds the total of VA and CDC Gulf War research expenditures over the period we examined.

7. First, appendix II of the draft report noted that only four of the nine RAND reports submitted for interagency review had actually reached publication by mid-1999 and that publication had, in some instances, occurred over a year following submission. After receiving DOD's comments on our report, RAND's report on pyridostigmine bromide was released 16 months after its submission to interagency review in June 1998. Similarly, RAND's report on stress was published approximately a year after submission for review, and its report on chemical and biological warfare agents was submitted for interagency review 15 months ago. Thus, delaying the release of these documents to IOM until publication occurs does not seem an effective means of coordinating two such closely linked tasks.

Second, it is important to note that the Agency for Toxic Substances and Disease Registry's report on uranium (including depleted uranium) was made available for public comment on October 17, 1997 (the public comment period ended on Feb. 17, 1998, and revision was begun based on comments received). Thus, the need for an additional review of depleted uranium by RAND in 1997 was questionable. The RAND review was not submitted until August of 1998, after the Agency review had been issued in draft form.<sup>3</sup> We have added a discussion of this matter to our report.

8. VA asserts that the goals and methods of these two studies are different but does not explain how they are different. Because IOM will not be conducting original research to make its determinations, it will also rely on existing literature. Material distributed by IOM in connection with a recent meeting of its Committee on Health Effects Associated with Exposures During the Gulf War indicates that, "The purpose of this project would be to conduct a review of the scientific and medical literature regarding adverse

<sup>3</sup>See Agency for Toxic Substances and Disease Registry (Sept. 1997). Draft Toxicological Profile for Uranium. Atlanta, GA:U.S. Dept. of Health and Human Services, PHS/ATSDR.

health effects associated with exposures experienced during the Persian Gulf War." Similarly, the preface to one of RAND's literature reviews notes, "The reviews are intended principally to summarize the scientific literature on the known health effects of given exposures to these risk factors." Accordingly, we find little distinction between these two activities in terms of purpose or basic methodology.

9. The issue we are raising is not whether IOM's work ought to have been initiated but that its work has not benefited from coordination with RAND's to save time and money in accomplishing a goal that is widely regarded as important. Similarly, RAND's work was not coordinated with that of CDC's Agency for Toxic Substances and Disease Registry.

10. Even if the symptoms reported by Gulf War veterans are not confined to these veterans, their increased frequency among Gulf War veterans needs to be explained. Our report does not suggest that a single case definition is appropriate; we note simply that RWG has not endorsed one or more case definitions that might focus research on veterans' undiagnosed symptoms.

11. This recommendation has been reworded to refer to "the number of Gulf War veterans with unexplained illnesses." We understand that, in implementing the recommendation, it may be appropriate to characterize unexplained illnesses using some groupings or working case definitions for the purposes of counting.

12. We made this recommendation to prompt organizations to work more closely on behalf of veterans suffering from these illnesses. We believe that greater cooperation, exchange of information, and coordination will help expedite the process and help find solutions the veterans need. While VA indicates that RWG has provided sufficient information on the scope of activities it continues to coordinate among DOD, VA, and HHS, we found substantially similar activities that fell outside this scope. In addition, we find nothing in the law that would limit the Group's coordinating efforts to this scope of activities.

# Comments From the Centers for Disease Control and Prevention

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service  
Centers for Disease Control  
and Prevention (CDC)  
Atlanta, GA 30333

AUG 11 1998

Mr. Kwai-Chung Chan  
Director, Special Studies and Evaluation  
U.S. General Accounting Office  
Washington, D.C. 20548

Dear Mr. Chan:

Thank you for the opportunity to review the GAO draft report, "Gulf War Illnesses: Management Actions Needed to Answer Basic Research Questions." The Centers for Disease Control and Prevention generally concur with the report. For your consideration, the following are comments on the sections that deal directly with activities related to the Department of Health and Human Services.

See comment 1.

1. In discussing the success of the federal government in documenting the symptoms of Gulf War veterans, the report does not acknowledge the information learned from two important CDC-funded studies, the Health Assessment of Gulf War Veterans From Iowa and the CDC Air Force study. The Iowa study was the first population-based epidemiologic study to evaluate the health of Gulf War veterans. It was completed in 1994 and included 10,000 military personnel and their family members. The subjects in this study were specifically selected to represent individuals from all four branches of the military, and include both regular military personnel and National Guard and reserve. The interviews for the study were conducted by telephone. This resulted in a high rate of participation. Seventy-six percent of the study subjects were interviewed. The study included a carefully selected comparison group of military personnel who were not deployed to the Persian Gulf but who served during the time of the Gulf War. The Iowa study found that the Gulf War military personnel were more likely than those who did not serve in the Gulf War to report symptoms suggestive of cognitive dysfunction, and more likely to report symptoms suggestive of respiratory illness (asthma and bronchitis). The study also identified other disorders, and respiratory illness (asthma and bronchitis) were more likely to be reported by Gulf War veterans. Among Gulf War veterans, minimal differences were observed between the National Guard or reserve troops and the regular military personnel.

Page 2 - Kwai-Chung Chan

Likewise, the CDC Air Force study has significantly contributed to our understanding of the health consequences of the Gulf War. This study organized symptoms reported by Air Force Gulf War veterans into a case definition, characterized clinical features, and evaluated risk factors. The Symptomatic Questionnaire was sent to 3723 currently active-duty members from four Air Force populations. Clinical evaluations were performed on 134 Gulf War veterans from one unit, irrespective of health status. A case was defined as having one or more chronic symptoms from at least 2 of 3 categories (fatigue, mood-cognition and musculoskeletal) and was further characterized as mild-to-moderate or severe depending on the severity of the symptoms. The prevalence of mild-to-moderate and severe cases were 39% and 6%, respectively, among 1155 Gulf War veterans versus 14% and 0.7% among 2520 non-deployed veterans. Fifty-nine (7%) clinically evaluated Gulf War veterans were noncases, 86 (54%) were mild-to-moderate cases and 13 (8%) were severe cases. The key observation of the study was that Air Force Gulf War veterans were significantly more likely to meet criteria for severe and mild-to-moderate illness than were non-deployed personnel. There was no association between the chronic multisystem illness and risk factors specific to combat in the Gulf War (month of season of deployment, duration of deployment, duties in the Gulf War, direct participation in combat, or locality of Gulf War service). The finding that 13% of non-deployed veterans also met illness criteria was equally important and suggest that the multisystem illness observed in this population is not unique to Gulf War service. The clinical evaluation component of the study found that neither mild-to-moderate nor severe cases were associated with clinically significant physical examination or routine laboratory test abnormalities. However, Gulf War veterans classified as having mild-to-moderate and severe illness had a significant decrease in functioning and well-being compared with noncases.

2. Page 5, para. 1: The draft report states that 47% of Gulf War research projects cataloged by the Research Working Group were overdue in December 1994. The report cites CDC's Health Assessment of Gulf War Veterans from Iowa as an example of a project that is overdue due to the estimated completion date being extended. It should be noted that the original telephone component of the study was completed and the study published within the project's time frame. After the original telephone study was completed, a decision was made to add on a follow-up component in order to validate the self-report data. The time required to obtain OMB clearance and collect and analyze the data for this follow-up component required that the completion date for the Iowa study be extended.

If you have any questions concerning these comments, please contact Carolyn Russell, Director, Management Analysis and Services, (404) 639-4002.

James D. Sedgiman  
Acting Director, Office of Program Support



## GAO Comments

The following is GAO's response to the Centers for Disease Control and Prevention's comments dated August 20, 1999.

1. CDC's Air Force study was cited in appendix III of our draft report along with the case definition it developed as one of a set of overlapping working case definitions that have been advanced since 1994. We have added information about these studies and their findings to the final report and have discussed them more fully in our response to agency comments and also in our more detailed response to DOD's comments (see comment 6 in app. IV).

2. Our draft report noted that the extensions discussed were partially attributed to efforts to incorporate additional data. We have added the word "additional" before "follow-up" to specifically clarify that the extension of the Iowa project was to provide for work not initially anticipated, not to allow additional time for work already planned.

EOC Meeting May 18, 2000  
Attachment K, Page K-69

## GAO Contacts and Staff Acknowledgments

### GAO Contacts

Sushil K. Sharma (202) 512-3460  
Betty Ward-Zukerman (202) 512-2732

### Acknowledgments

In addition to those named above, Margaret Best, John Carter, Howard Deshong, and William Woods made key contributions to this report.

## Related GAO Products

*Gulf War Illnesses: Procedural and Reporting Improvements Are Needed in DOD's Investigative Processes (GAO/NSIAD-99-59, Feb. 26, 1999).*

*Acquisition Reform: Multiple-Award Contracting at Six Federal Organizations (GAO/NSIAD-98-215, Sept. 30, 1998).*

*VA Health Care: Better Integration of Services Could Improve Gulf War Veterans' Care (GAO/HEHS-98-197, Aug. 19, 1998).*

*Role of the Persian Gulf Veterans' Coordinating Board in Scientific Evaluation of Research Proposals and the Funding Recommendations Made by Its Research Working Group (GAO/NSIAD-98-170R, Aug. 10, 1998).*

*Gulf War Veterans: Limitations of Available Data for Accurately Determining the Incidence of Tumors (GAO/T-NSIAD-98-186, May 14, 1998).*

*VA Health Care: Persian Gulf Dependents' Medical Exam Program Ineffectively Carried Out (GAO/HEHS-98-108, Mar. 31, 1998).*

*Gulf War Veterans: Incidence of Tumors Cannot Be Reliably Determined From Available Data (GAO/NSIAD-98-89, Mar. 3, 1998).*

*Gulf War Illnesses: Federal Research Strategy Needs Reexamination (GAO/NSIAD-98-104, Feb. 24, 1998).*

*Gulf War Illnesses: Research, Clinical Monitoring, and Medical Surveillance (GAO/T-NSIAD-98-88, Feb. 5, 1998).*

*Veterans' Benefits: Improvements Made to Persian Gulf Claims Processing (GAO/HEHS-98-89, Feb. 5, 1998).*

*Gulf War Illnesses: Public and Private Efforts Relating to Exposures of U.S. Personnel to Chemical Agents (GAO/NSIAD-98-27, Oct. 15, 1997).*

*Gulf War Illnesses: Reexamination of Research Emphasis and Improved Monitoring of Clinical Progress Needed (GAO/T-NSIAD-97-191, June 25, 1997).*

*Gulf War Illnesses: Enhanced Monitoring of Clinical Progress and of Research Priorities Needed (GAO/T-NSIAD-97-190, June 24, 1997).*

Related CAO Products

*Gulf War Illnesses: Improved Monitoring of Clinical Progress and Reexamination of Research Emphasis Are Needed (GAO/NSIAD-97-163, June 23, 1997).*

*VA Health Care: Observations on Medical Care Provided to Persian Gulf Veterans (GAO/HEHS-97-158, June 19, 1997).*

*Chemical and Biological Defense: Protection of Critical Overseas Ports and Airfields Remains Largely Unaddressed (GAO/NSIAD-97-9, June 13, 1997).*

*Operation Desert Storm: Evaluation of the Air Campaign (GAO/NSIAD-97-134, June 12, 1997).*

*Defense Health Care: Medical Surveillance Has Improved Since the Gulf War, but Results in Bosnia Are Mixed (GAO/NSIAD-97-136, May 13, 1997).*

*Veterans' Compensation: Evidence Considered in Persian Gulf War Undiagnosed Illness Claims (HEHS-96-112, May 28, 1996).*

*Chemical and Biological Defense: Emphasis Remains Insufficient to Resolve Continuing Problems (GAO/NSIAD-96-103, Mar. 29, 1996).*

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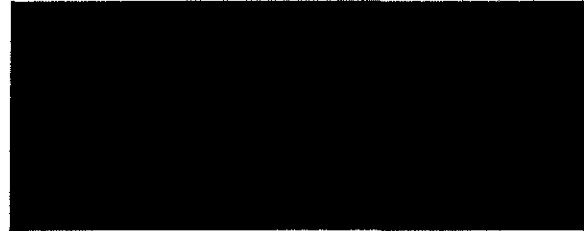
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## Can We Destroy Chemical Weapons Safely?

# Letter to the Utah Citizens Advisory Commission

Centers for Disease Control and Prevention  
Letter to the Utah Citizens Advisory Commission

M/G John L. Matthews (Ret.) Chairman  
Utah Citizens Advisory Commission  
on Chemical Weapons Demilitarization/ State of Utah  
Governor's Office of Planning and Budget  
116 State Capitol, Salt Lake City, Utah 84114

### Dear General Matthews:

You recently requested that the Centers for Disease Control and Prevention (CDC) provide the Utah Citizens Advisory Commission (CAC) with CDC's findings regarding the potential public health risk associated with the emissions from the chemical weapons incinerator at the Deseret Chemical Activity site in Tooele County, Utah.

In reviewing the emissions from the exhaust stacks at the Tooele Facility, CDC asks two fundamental questions: 1) Is a harmful level of chemical agent being emitted? and 2) Is there anything else coming out of the stack that could be harmful to the public's health?

To determine whether a harmful level of chemical agent is being emitted, CDC starts with the "general population limit" (or GPL) for each chemical agent. The GPL is defined as the concentration of agent in air that the general population could be exposed to continuously without any adverse health effect. In 1988, CDC helped to establish the GPL's for the various stockpiled agents with the input of an independent expert working group.

Starting with the GPL for each agent as a maximum safe exposure level, we then calculate (through mathematical air dispersion models) the maximum concentration of the agent that could be emitted from the incinerator exhaust stack under the most adverse weather (air dispersion) conditions. We refer to this as the maximum allowable stack concentration (or ASC). After establishing ASCs for each of the chemical agents, we then evaluate the agent-monitoring system within the exhaust stack to ensure that it is sensitive enough and dependable enough to detect the presence of any chemical agent down to or below its ASC. CDC reviews all agent monitoring data, including the associated quality assurance data biweekly and has found that agent monitors are both sensitive and dependable.

The term "allowable stack concentration" does not mean that agent is routinely emitted during the incineration process. In fact, the agent stack monitors can detect down to as little as one-fifth the allowable stack concentration for any agent. It is army operating policy that if any agent is detected in an exhaust stack, the mechanism that feeds agent into the incinerator is automatically stopped and the incinerator cannot resume operation until the reason for the agent detection is found and the problem corrected. This operating policy provides an extra margin of safety by allowing for corrective action to begin before agent levels approach any level of concern. Under actual combustion conditions, agent has never been found in the stack even at one-fifth of the allowable stack concentration.

To determine whether other potentially harmful substances are emitted from the incineration system

stack, CDC reviews the results of the regulatory trial burn data to see what chemicals/compounds were identified, what amounts are being emitted, and what the maximum ground level concentrations could be. We do this for inorganic substances, such as hydrogen chloride and metals, and for organic substances, such as chlorinated dioxins and furans. We then compare the highest anticipated ground substances, such as chlorinated dioxins and furans. We then compare the highest anticipated ground level concentrations of the various compounds with toxicity screening levels such as those used by the U.S. Environmental Protection Agency and the Agency for Toxic Substance and Disease Registry, among others. We also compare the maximum ground level concentrations of the stack emissions with levels occurring in ambient air, where such data is available. Because the new incineration system at Tooele has not yet undergone a wide array of trial burns, much of our review has been of data generated during trial burns at Johnston Island, where similar incineration technology is being used. As trial burn data from the Tooele facility becomes available, both we and the Utah Department of Environmental Quality (DEQ) review it for public health safety concerns.

To date our review of this information has led us to conclude that the stack emissions of the Tooele incineration system will not pose a threat to Tooele employees or to people living near the facility. We base this upon the following observations:

1. **Stack emission of potentially harmful compounds, including chlorinated dioxins, metals, and other compounds are below levels that would be considered to have any adverse health impact on people. (See National Environmental Health Association article for additional detail.)**
2. **Continuous agent and emissions monitoring systems are interlocked with the incineration system so that agent feed is automatically stopped if any emissions begin to go above preset limits. This design feature, required by the Tooele facility operating permit, ensures that the incinerators will not be allowed to continue to process waste chemicals under sub optimal combustion conditions.**
3. **Health risk assessments done in accordance with accepted, conservative EPA methods have shown the incineration systems at the Tooele facility to be acceptable. These assessments consider all potential pathways by which the community could possibly be exposed to stack emissions.**
4. **The Utah DEQ maintains an on-going and visible presence at the Tooele facility. We regularly contact DEQ personnel to see if they have any public health concerns regarding Tooele operations or stack emissions.**
5. **The CDC receives and evaluates all agent monitoring data from Tooele on a biweekly basis. On the basis of this evaluation, we are confident that potential agent releases, including stack releases, would be detected in a timely and dependable manner.**
6. **Other independent parties, such as the National Research Council and the State Occupational Safety and Health Administration, periodically visit and evaluate operations at Tooele.**

Finally, in our examination of Tooele stack emissions, we review the relative magnitude of mass emissions of potentially harmful compounds in comparison with other area sources of such materials to see if they would be expected to result in a noticeable increase in area air pollution levels. Although available data are somewhat limited, we found Tooele facility to be a relatively minor contributor of pollutants to the air basin for Tooele and Salt Lake Counties. In summary, we believe that the Tooele stack emissions are safe and will not adversely affect the health of people in communities located near the facility.

In your letter to CDC, you also asked us to address the current concern of some people that the stack emissions from the incinerator could lead to health effects similar to those associated with "Gulf War Syndrome." We, too, have seen this concern raised in the popular media. However, on the basis of the information available, we do not feel that this concern is well founded. Our reasons follow:

1. The symptoms described by the Gulf War veterans are diverse and often vague. They are not specific

for symptoms associated with acute exposure to the chemical agents contained at the stockpile sites.

2. The Johnston Atoll incinerator (which is similar to the Tooele incinerator) has been operating for approximately seven years. We are unaware of any information that shows any similarities between health problems reported on the island and the symptoms associated with Gulf War Syndrome.
3. The cause of Gulf War Syndrome is still subject to considerable debate and many hypotheses. Research is underway to investigate these issues and CDC will monitor the developments in this research.

If new information is produced to better support the hypothesis that Gulf War Syndrome is caused by exposure to chemical agent, we will examine it closely and let the Utah CAC, and others, know of our findings. However, in the absence of such information, we feel that it is prudent to reduce the existing stockpile storage risk by continuing to pursue the baseline recommended destruction technology, incineration, in a safe and deliberate manner.

We hope that this letter helps the CAC better understand how CDC reviews the health implications of the Tooele stack emissions and the basis for our conclusion that these emissions pose no health risk to workers or to residents of the surrounding communities. We take this oversight responsibility very seriously, and would review any technology used in the Army's demilitarization program in a similarly rigorous manner. If you have any questions or additional concerns, please feel free to bring them to our attention.

Sincerely,  
Henry Falk, M.D.  
Director  
Division of Environmental Hazardous and Health Effects (F 28)  
National Center for Environmental Health

U.S. Department of Health and Human Services (DHHS) - Centers for Disease Control and Prevention (CDC) -  
National Center for Environmental Health (NCEH) - CDC's Role in the Demilitarization of Chemical Weapons Home  
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98-0655



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STATE OF OREGON  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
RECEIVED

September 11, 1998

Sue Oliver  
Oregon Department of Environmental Quality  
256 E. Hurlburt, Suite 117  
Hermiston, Oregon 97838

HERMISTON OFFICE

Re: Review of "Review of Acute Human-Toxicity Estimates for Selected Chemical Warfare Agents"

Dear Sue:

E&E has completed a review of the document "Review of Acute Human-Toxicity Estimates for Selected Chemical Warfare Agents" (National Research Council, 1997). The purpose of E&E's review was to determine if the toxicity estimates presented in this document are applicable to the Pre-Trial Burn Risk Assessment for the Umatilla Chemical Demilitarization Facility, and if so, to determine what impacts use of the new values would have on the risk estimates and conclusions presented in the risk assessment. Also, the toxicity estimates were reviewed to determine if use of the values would be appropriate for the planned acute risk assessment.

The conclusion of E&E's review is that the toxicity values presented in the NRC document are not applicable for use in a risk assessment for the general population. As stated on page 2, "the proposed human-toxicity estimates are only for healthy male military personnel. They must *not* be used for civilians." The purpose for development of the toxicity values in the NRC document is to determine exposure levels for protection of soldiers exposed to agent in a military conflict. Consequently, these values are much less conservative than toxicity values used in the Umatilla risk assessment, which are designed to be exposure levels to which the entire population (including sensitive subgroups such as children) may be exposed without any adverse effects, with an adequate margin of safety.

Because of the differences in purpose of these toxicity values, the existing General Population Limits for agent used in the Pre-Trial Burn Risk Assessment are still the most appropriate values for use in the risk assessment. These values were derived by the Centers for Disease Control specifically for use in estimating adverse effects associated with exposures to agents by the general public.

It is also worth noting that the toxicity values developed for the NRC document do not indicate that the agents are more toxic than was previously believed. Although the estimates of the LD<sub>50</sub> (the dose that would be lethal to 50% of population) for the agents are significantly lower than previously existing LD<sub>50</sub>s, this difference is due to a difference in the purpose and methodology used to derive these values rather than any new toxicity data. The earlier toxicity estimates developed by the Army were designed for "offensive purposes"; i.e., these were developed to identify minimum exposure levels that would produce an effect (such as death) in a hypothetical

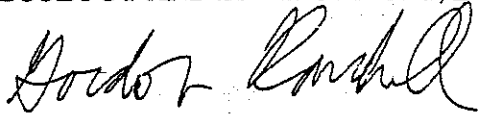
Sue Oliver  
September 11, 1998  
Page 2

enemy force that was as resistant to effects as possible. Therefore, the earlier levels are much less conservative than the "defensive levels" presented in this document, which are designed for protection of friendly soldiers exposed to a chemical attack. As a result, the new lower toxicity values represent a better estimate of agent lethality under typical combat situations, rather than an indication that the agents are inherently more toxic than was shown by earlier data.

If you have any questions regarding this information, please call me at 206-624-9537.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.



Gordon Randall

cc: Project File OH6  
Julie Wroble, E & E



DEPARTMENT OF THE ARMY  
PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION  
ABERDEEN PROVING GROUND, MARYLAND 21010-5401

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Program Manager for  
Chemical Demilitarization

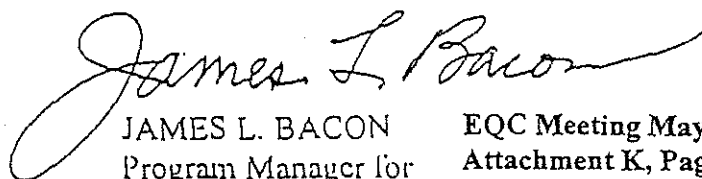
Ms. Linda Anderson  
Chief, Special Programs Group  
Centers for Disease Control and Prevention  
4770 Buford Highway, Bldg 25/Mail Stop F16  
Atlanta, Georgia 30341

Dear Ms. Anderson:

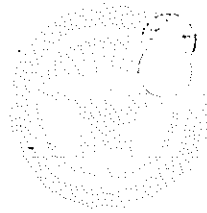
A recent report issued by the National Research Council (NRC), Subcommittee on Toxicity Values for Selected Nerve Agent and Vesicant Agents, entitled: "Review of Acute Human-Toxicity Estimates for Selected Chemical-Warfare Agents," concluded that the Army's original toxicity estimates were understated and therefore inappropriate for protecting soldiers. Although the report emphasized that only acute exposures and acute effects for healthy adult male soldiers were considered, their conclusions have inappropriately been reported by the media as having potential chronic effects on the local communities surrounding chemical stockpile storage sites.

The findings of this report have engendered numerous questions and concerns from the State regulatory agencies and local communities surrounding our operating and planned chemical disposal facilities. We recognize that the issues raised in this report will require further analysis and evaluation by the entire Army community. However, my primary focus at this point is to ensure full protection of the chemical stockpile disposal workforce and the local community. Because of the oversight exercised by your office to ensure the efficacy and accuracy of our current monitoring programs at these facilities, I would like to request that your office review the subject NRC report to assess the adequacy of protection to the workforce and local community afforded by our monitoring capabilities and systems.

Your continued oversight and support to this program are greatly appreciated. My point of contact for this effort is Robert Perry, chief of our Risk Management and Quality Assurance Office. Please feel free to call him if you have questions.

  
JAMES L. BACON  
Program Manager for  
Chemical Demilitarization

EQC Meeting May 18, 2000  
Attachment K, Page K-79



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DEPARTMENT OF HEALTH &amp; HUMAN SERVICES

Public Health Service

Centers for Disease Control  
and Prevention (CDC)  
Atlanta GA 30341-3724

October 7, 1998

Mr. James L. Bacon  
Program Manager for Chemical Demilitarization (SFAE-CD-Z)  
Aberdeen Proving Ground, Maryland 21010-5401

Dear Mr. Bacon:

The Centers for Disease Control and Prevention (CDC) was asked to evaluate the applicability of the recently published National Research Council (NRC) report, "Review of Acute Human-Toxicity Estimates for Selected Chemical-Warfare Agents" to the occupational and general population level (GPL) exposure limits. In 1988, CDC issued the still current occupational and GPL exposure limits in the "Final Recommendations for Protecting Human Health and Safety Against Potential Adverse Effects of Long-term Exposure to Low Doses of Agents GA, GB, VX, Mustard Agent (H, HD, T) and Lewisite(L)." CDC evaluated the NRC report in consultation with Dr. Loren D. Koller, Chairman of the NRC Subcommittee on Toxicity Values for Selected Nerve and Vesicant Agents.

The exposure limits mentioned in the NRC report were developed by the Army to define exposure limits to protect soldiers from an incapacitating or lethal chemical weapon exposure during a military attack. The Army asked the NRC to independently review these exposure limits to determine their scientific validity. The NRC reviewed the quality of the data presented to them, the methodology in analyzing the data, and the assumptions used in deriving the exposure estimates. During this review, they evaluated various routes of exposure such as inhalation and skin exposures to vapor and liquid. The toxicity effects studied included mild, severe, and lethal effects. On page 2 and page 18, the report plainly states that these toxicity estimates are to be used only for healthy male military personnel and not for civilians or the general population.

In formulating the occupational and GPL exposure limits for nerve agent GB, CDC reviewed the existing exposure limits for these agents from published and unpublished reports and had input from a panel of expert consultants from academia, industry, and government, as well as comments from the public. These limits were based on data from animal studies and acute human exposures to GB at the "no effects" level ( $0.5 \text{ mg-min/m}^3$ ). At this level less than one percent of the people exposed to an acute dose would develop miosis (decrease in pupil size) or

Page 2 - Mr. James L. Bacon

other mild symptoms like rhinorrhea (runny nose) or chest tightness. These symptoms are some of the earliest signs of nerve agent exposure. In addition, this "no effects" level was further reduced by the application of safety factors to account for variations in people's susceptibility to chemical agents and duration of exposure. This resulted in an occupational exposure limit of  $0.0001 \text{ mg/m}^3$  and a GPL of  $0.000003 \text{ mg/m}^3$ . At this occupational exposure limit, a worker could be exposed to this concentration for eight hours per workday and a 40-hour workweek without adverse effects. The occupational and GPL exposure levels were developed to protect the workers and civilians around the chemical stockpile and demilitarization sites and CDC continues to believe that these limits are still valid and protective of human health and safety.

Sincerely yours,

*Paul Joe*

Paul Joe, DO, MPH  
Special Programs Group  
National Center for  
Environmental Health

*Loren D. Koller*

Loren D. Koller, DVM, PhD

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**FILE**

98-0882



**DEPARTMENT OF THE ARMY**  
PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION  
ABERDEEN PROVING GROUND, BERTLAND 21019-8101

October 16, 1998

Project Manager for Chemical Stockpile Disposal

SUBJECT: Hazardous Waste Facility Permit No. AL3-210-020-027

STATE OF OREGON  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
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NOV 05 1998

Mr. John A. Poole, Jr.  
Chief, Land Division  
Alabama Department of Environmental Management  
1751 Cong. W.E. Dickinson Drive  
Montgomery, Alabama 36109

HERMISTON OFFICE

Dear Mr. Poole:

The Program Manager for Chemical Demilitarization (PMCD) hereby confirms that on September 22, 1998, PMCD provided to the Alabama Department of Environmental Management (ADEM) a report from the National Resource Council (NRC) entitled *Review of Acute Human Toxicity Estimates for Selected Chemical-Warfare Agents* (NRC Report). This report constitutes an independent review of a classified 1994 report prepared by the U.S. Army Chemical Defense Equipment Process Action Team (CDEPAT) entitled *Review of Existing Toxicity Data and Human Estimates for Selected Chemical Agents and Recommended Human Toxicity Estimates Appropriate for Defending the Soldier* (CDEPAT Report). We do not believe that either of these reports constitutes new and relevant facts as described in Permit Condition LE.19. Nevertheless, Petitioners challenging the above-referenced permit before the Environmental Management Commission have filed a new motion on September 30, 1998, entitled *Petitioners' Motion for Relief from Prejudice Caused by the U.S. Department of the Army's Failure to Submit Toxicity Value Information*. In light of this new motion, we would like to take this opportunity to provide ADEM information concerning the background of these two reports and to inform ADEM of the actions we are taking as a result.

1. The CDEPAT Report.

When the Army originally prepared human toxicity estimates for chemical warfare agents, these estimates were used to predict the number of casualties that would result from the offensive use of chemical weapons (i.e. how many enemy soldiers would be killed or incapacitated by our use of chemical agent). Historically, these estimates established the point at which 50% of the least sensitive (most resistant) enemy soldiers would be killed or incapacitated. In light of the possibility that an enemy force could also use chemical weapons against U.S. soldiers, the U.S. Army Office of the Surgeon General (OTSG) initiated the CDEPAT Report. The purpose of this report was to review existing toxicity data to determine toxicity estimates for defensive purposes (i.e. how chemical agent would affect U.S. soldiers).

Because the report was concerned with force protection, it evaluated the existing data to estimate the effects of chemical agent on U.S. soldiers with average sensitivity. In addition, the report evaluated the data considering not only death and incapacitation, but other less severe effects as well. In other words, it was a broader estimate designed to err on the side of greater effects of chemical agents on U.S. soldiers in combat.

The CDEPAT Report indicated that the previous estimates of human toxicity for some chemical agents were too high for force protection purposes. The report proposed some new acute exposure estimates to be used for healthy male soldiers. The proposed estimates were not designed to be applicable to chronic, long term exposure of the civilian population. The CDEPAT Report is classified SECRET. As you are no doubt aware, distribution of classified material is somewhat limited. If anyone on behalf of the Army had attempted to provide this classified document to the state of Alabama, they would have risked violating federal criminal law.

## 2. The 1997 NRC Report.

Even if the Army had been able to release the CDEPAT Report, it would have been premature for them to do so at the time it was prepared. The proposed toxicity estimates in that report were validly recommended by one group of scientists after a review and interpretation of existing toxicity data. Before the OTSG takes the significant step of adopting new human toxicity estimates, they requested that the National Research Council conduct an independent review of the CDEPAT Report. It is common practice to request such an independent review under these circumstances. Specifically, the NRC was to review the toxicity data that had been reviewed in the CDEPAT Report, review the methods used to derive the toxicity estimates, and to determine the adequacy of the toxicity estimates proposed in the report. The NRC Report did not consider or review any new toxicity data, but rather provided an assessment of the adequacy of the CDEPAT Report's review of the existing toxicity data.

The NRC Report concluded that some of the CDEPAT Report's estimates were valid, some estimates need to be lowered, a few estimates needed to be raised, and still other estimates were adequate until further research can be conducted. The report considered acute exposures and acute effects appropriate for healthy male soldiers.

Although the NRC Report indicates it was prepared in 1997, it was not released to the public until 1998. This delay in the release of the report was due to the need to declassify some of the information that had been in the CDEPAT Report so that it could be included.

It is important to recognize that the OTSG is still reviewing the NRC Report and the 1994 CDEPAT Report and has not yet adopted new toxicity estimates to be used by Army agencies. If the OTSG does modify existing toxicity estimates, the Department of the Army Staff will then issue guidance to all agencies and programs, including PMCD, indicating how current practices and procedures should be changed.



### 3. Permittees' Activities Based on the NRC Report.

Should the OTSG adopt new toxicity values, these new values could result in new Quantitative Risk Assessment (QRA) data. Although the QRA is technically not part of the permit application, we are aware that any change in the QRA has the potential to affect current emergency preparedness plans at all of the stockpile sites, including Anniston. Such new data also has the potential to affect QRA accident scenarios involving the ANCDF. Until such time as new toxicity values are adopted, new guidance issued, and new analyses conducted, there is no new relevant evidence to provide to ADEM. Should any future analyses result in new information relevant to the Permit, we will of course provide such information as required in Permit Condition L.E. 19.

Shortly after the release of the NRC Report, the Program Manager for Chemical Demilitarization, Mr. James Bacon, wrote a letter to the Centers for Disease Control (CDC) requesting that they review the NRC Report on FMCD's behalf. In 1988, the CDC had issued occupational ~~and~~ general population level exposure limits for chemical agents. These limits are the ones currently in use. In his letter (enclosed), Mr. Bacon asks CDC to assess the adequacy of current monitoring programs to protect the workforce and local communities at the stockpile sites in light of the NRC Report. We have received CDC's assessment for the agent GB. This assessment, also enclosed with this letter, indicates that the occupational and GPL exposure levels for GB originally established by the CDC are still valid and protective of human health and safety.

U.S. Army health professionals are currently analyzing the CDEPAT Report and the NRC Report to determine what effect, if any, the toxicity values in those reports would have on the Health Risk Assessment prepared for the ANCDF. It is important to remember, however, that the toxicity values expressed in those reports were developed for healthy male soldiers involved in military operations. The chemical agent toxicity values used in the Health Risk Assessment were developed as exposure values to which the civilian population (including sensitive subgroups) could be exposed to without any adverse health effects. The U.S. Army is currently in the process of reevaluating existing airborne exposure limits for chemical agents used to protect civilian workers and the general population. These evaluations, referred to as "Health Criteria Documents," are expected to be completed for all chemical agents by September, 1999. At this time, however, the Health Criteria Document for the agent GB has been completed. This reevaluation concluded that the general population limit and the occupational limit used in the Anniston Health Risk Assessment did not require adjustment. Should these Health Criteria Documents conclude that different airborne exposure limits should be used in our Health Risk Assessments, we will of course inform the state of this new and relevant information.

As you are aware, the permit is designed to allow consideration and incorporation of new, relevant information. Under Permit Condition L.K. 4, the Permittee is required to submit a revised Screening Health Risk Assessment Protocol 180 calendar days prior to the shakedown period for the initial trial burn. This protocol will reflect the most current EPA guidance at the

time of submittal, and is subject to ADEM's approval. In addition, Permit Condition ILN.1 requires the Permittees to submit a risk assessment addendum after each trial burn following the protocol provided for in Condition LK.4. This addendum will compare the results of each trial burn to the data used in the preliminary risk assessment with respect to emission estimate, stack parameters, and toxicity values. Most importantly, Permit Condition ILN.2.iii specifically requires the Permittee to submit a post-trial burn risk assessment if the toxicity values of the substances of potential concern (including chemical agents) have changed to the degree that an unacceptable risk would result. We fully intend to comply with this and all other permit conditions in order to insure the protection of human health and the environment.

By the time these determinations are made, the tentative conclusions in the NRC Report will have been subjected to a great deal of review. Through the permit mechanism, the most up-to-date information will be included in each health risk assessment. Seen in this perspective, the NRC Report is not a cause for alarm.

Respectfully submitted,

*Stephen C. DePew*

Stephen C. DePew,  
ANCDF Site Project Manager  
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Enclosures

Copy Furnished:

Colonel Gregory F. Potts, Commander, Anniston Army Depot  
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EQC Meeting May 18, 2000  
Attachment K, Page K-86

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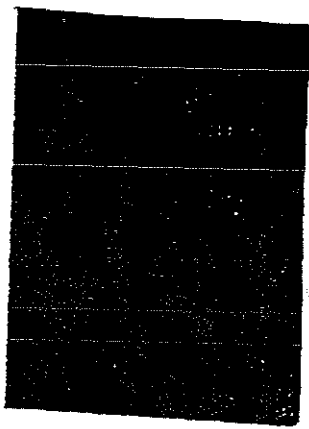
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STATE OF OREGON  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
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### Media Advisory

A recent report by the National Research Council concluded that the Army's original estimates for toxicity of chemical warfare agents were understated and therefore inappropriate for protecting soldiers in the battlefield. The report, entitled "Review of Acute Human-Toxicity Estimates for Selected Chemical-Warfare Agents", emphasized that only acute exposures and acute effects for healthy adult males were considered. The NRC's Committee on Toxicology stated that their figures "must not be used for civilians."

PERMISSION OFFICE

The reports conclusions have inappropriately been reported by some members of the public and the media as having potential chronic effects on the local communities surrounding chemical stockpile storage sites. The Army's chemical agent disposal facilities are monitoring agent levels at much lower and safer levels than suggested by the NRC report.

"This report does not have any effect on our operations which have been and will continue to be done as safely as possible," said Col. Edward Fisher, Project Manager for Chemical Stockpile Disposal. "Our chemical agent monitors are state-of-the-art and operate continuously. They are designed to monitor for extremely low levels, well below levels considered by regulators to be safe for the community. As an added precaution, monitoring data from our operations is constantly reviewed by state regulators and the U.S. Centers for Disease Control and Prevention to ensure that we meet their standards of quality and safety."

The Program Manager for Chemical Demilitarization has asked the CDC to review the NRC report and assess the adequacy of protection to the workforce and local communities afforded by the disposal facilities' monitoring capabilities and systems. The CDC has oversight over the chemical stockpile disposal program to ensure the efficacy and accuracy of PMCD's current monitoring system. It works closely with the Army on all facets of the agent monitoring programs to ensure that the Army meets their data quality objectives.

The CDC concluded that in formulating the occupational and general population level exposure limits to chemical warfare agents, a worker could be exposed to for eight hours per workday and a 40-hour workday without adverse effects.

"The exposure levels were developed to protect the workers and civilians around the chemical stockpiles sites and the CDC continues to believe that these limits are still valid and protective of human health and safety."

The study does serve as a reminder that the greatest risk to the public is continued storage of America's aging, obsolete and deteriorating chemical munition stockpiles. That is why the NRC recommended in 1994 that the Army destroy the stockpile safely and expeditiously and with the technology that will minimize the cumulative risk to the public - incineration.

"The best thing we can do is to destroy the chemical stockpile as soon and as safely as possible so that we can eliminate the storage risk to the communities," said Fisher.

**FILE**

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98-0879

*Review of Acute Human-Toxicity Estimates for Selected  
Chemical-Warfare Agents  
Questions and Answers*

**Who is the National Research Council (NRC)?**

The NRC was organized in 1916 to serve as the working arm of the National Academy of Sciences and the National Academy of Engineering, carrying out most of the studies conducted in their names.

Most requests for studies come from governmental agencies or Congress. About 85 percent of NRC funding comes from the federal government and 15 percent comes from state governments, private foundations, industrial organizations, and funds provided by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

**How can I get a copy of the NRC report?**

The report is available from the National Academy Press for \$20.50 plus \$4 shipping and handling. The National Academy Press can be reached at 800-624-6242. The report can also be ordered via the Internet at a 20% discount. The National Academy Press web site can be accessed at [www.nap.edu](http://www.nap.edu). The report will also be posted on the National Academy Press web site for free viewing or downloading in the near future.

**Who funded this report?**

The Department of Defense requested and funded the NRC report. The federal government accounts for 85 percent of funding to the National Academy of Sciences.

**What is the purpose and scope of the NRC report?**

The NRC report is an independent assessment a 1994 Army report, entitled *Review of Existing Toxicity Data and Human Estimates for Selected Chemical Agents and Human Toxicity Estimates Appropriate for Defending the Soldier*. The original report was developed by the Army's Chemical Defense Equipment Process Action Team and establishes a set of proposed exposure limits that would be useful in protecting soldiers from toxic exposures to those agents.

Before making a decision on acceptance of proposed estimates found in the 1994 report, the Army sought the independent council of the NRC and requested the assessment. The scope of the NRC report included the following objectives:

1. Review the scientific protocols and quality of the toxicity data used in revising the human-toxicity estimates for acute exposures, as found in the 1994 report.
2. Review the toxicity estimates for mild and nonsevere effects and for severe and lethal effects.
3. Review the methods used in deriving the original estimates.
4. Evaluate the assumptions made in deriving original 1994 estimates.

The NRC report does not recommend new toxicity estimates (NRC report, pg. 2).

**What were the major conclusions drawn from the report?**

Major conclusions from the report address the original toxicity estimates found in the 1994 report. Some estimates were judged to be valid; some estimates were judged as adequate until

further research can be conducted; some estimates need to be lowered; and some estimates should be raised (NRC report, pg. 3).

**Is the original 1994 report upon which the NRC report is based available to the public?**  
The original report is classified as secret and not available to the public. It can be obtained only with the permission of the Director of the Army's Edgewood Research, Engineering and Development Center.

**Why does the report focus on effects to healthy male soldiers rather than civilians?**  
The NRC report applies only to soldiers because the original 1994 report focused only on soldiers. The whole intention of the original report was to aid in protecting soldiers in the event of an attack using chemical agent. Until that point, the Army had researched the effects of chemical agent in a more offensive manner. This means that they investigated what levels of exposure would be fatal to enemy forces. In order to protect our American troops, there was a need to more accurately determine exposure levels at which a soldier would experience toxic effects, not necessarily death. As such, the 1994 report assumed a one-time exposure to chemical agent that was massive and short-term.

**Is the Army able to monitor to the levels suggested in the NRC report?**  
The Army, under the strict oversight of state regulatory agencies and other independent organization such as the Centers for Disease Control and Prevention, monitors for the presence of chemical agent at levels that are well below those identified in the NRC report.

**What immediate impacts will this report have on ongoing chemical demilitarization efforts?**  
The NRC report will have no impact on current chemical demilitarization operations or safety standards. Current monitoring levels are well below those established in the report, and are strictly monitored by state regulatory agencies and other oversight organizations. We are operating at extremely safe levels and are working hard to get the job done safely and as quickly as possible. The Army will continue to eliminate the risk that this agent poses through the safest and most proven technology — incineration.

**Will these new levels of toxicity require the Army to recalculate Health Risk Assessments, Quantitative Risk Assessments, emission limits and other levels of protection currently in place?**

The NRC report will have no impact on current chemical demilitarization operations or safety standards. Current monitoring levels are well below those established in the report, and are strictly monitored by state regulatory agencies and other oversight organizations. We are operating at extremely safe levels and are working hard to get the job done safely and as quickly as possible. The Army will continue to eliminate the risk that this agent poses through the safest and most proven technology — incineration.

At this point, it is unclear as to whether the new toxicity levels will impact any risk assessments that have already been conducted. As stated in the report, the estimates are to be used only for healthy male military personnel and not for civilians or the general population. The new estimates will not change the ratio between continued storage and disposal. Continued storage still poses more risk than disposing of these chemical munitions.

**If the Army already monitors to lower levels than the NRC report suggests, what is the significance of this report for chemical demilitarization?**

There is no impact. The report is aimed at protecting soldiers, and as stated in the report has no applicability toward civilians. Bottom line, our monitors are set much lower than levels identified

in the report. The Army will continue to run a safe operation under the stringent oversight of organizations such as the NRC, state regulatory agencies and the Centers for Disease Control and Prevention. In fact, after reviewing the NRC report, the Centers for Disease Control and Prevention still believe that current limits are still valid and protective of human health and safety.

The only potential impact, should the Army choose to endorse the new estimates, would be changes to the Quantitative Risk Assessment. In any case, continued storage still poses more risk than disposing of these chemical munitions.

**Will the Army adopt the new "safe" exposure levels?**

No decisions have been made regarding any measures the Army will take based on recommendations in the report. The NRC report findings will be reviewed by the Army Surgeon General. If the Army Surgeon General does not see any need to change current estimates, nothing will happen. If the Army Surgeon General does find it necessary to adopt the new estimates, Army staff will have to develop implementing guidance and standards for the CSDP to implement new values.

**Are workers involved with chemical warfare materiel storage and demilitarization efforts at risk?**

Protection of our workers and our communities is the Army's top priority. The Army will do nothing to jeopardize this. Current monitoring levels are well below those established in the report, and are strictly monitored by state regulatory agencies and other oversight organizations. We are operating at extremely safe levels and are working hard to get the job done safely and as quickly as possible. The Army will continue to eliminate the risk that this agent poses through the safest and most proven technology — incineration.

**A recent report from the General Accounting Office asserts that the Department of Defense lacks a strategy and research program to address low-level chemical warfare agent exposures. Has enough research been done on the long-term health effects of low-level exposure to nerve agents to be able to say chemical demilitarization operations are safe? What is PMCD's position on this report?**

The GAO does not have an impact on the chemical demilitarization operations.

**Based on the fact that the chemical agents currently stored across the country are almost twice as toxic as previously thought, doesn't it make sense that the Army expeditiously destroy all of its chemical weapons and bulk chemical agent stockpile?**

Absolutely. This report serves as a reminder that the greatest risk these munitions pose to our communities is their continued storage. It also strengthens our commitment to getting rid of them as quickly as possible using the only safe and proven technology that has been demonstrated to do the job — incineration.

**Do incinerators release chemical agent out of the stack?**

The Army and its many oversight agencies impose the highest standards of safety to all of its chemical demilitarization operations, including emissions that exit the facility. Monitors are set at levels far below those recommended in the NRC report. No chemical agent has ever been detected in the incinerator stack at the Tooele Chemical Agent Disposal Facility.

**Is it true that the Army was trying to hide the existence of this report?**

No. There was no "cover up" of the report by the Army. The 1994 study was classified secret for matters of national security and because the report was aimed at better protecting soldiers in

the battlefield from exposure to chemical agent. The report was not classified as secret because it had any information regarding the safety of chemical demilitarization operations. It should be clear that assessing the chemical demilitarization program was not within the scope of this report.

Even if what you say is true about no emissions from the incinerator stack, the public is more and more concerned about the safety aspects of transporting chemical weapons. It seems as though there is a great risk in that and that this risk has been understated. What is PMCD's response to this?

First, federal law prohibits the interstate transport of chemical warfare materiel. In general, the only time chemical agent is transported is when it is being brought from storage to the disposal plant, if a munition is found to be leaking, or if it is transported for research purposes.

Transportation is within the responsibilities of the Chemical and Biological Defense Command. During transport, stringent precautionary measures are taken to prevent any leaks or exposure of chemical agent. For example, On-Site Containers are specially designed transport vehicles, design specifically for the transport of chemical agent.

The report recommends that an expert panel be convened to develop a research strategy for deriving more sound data for chemical agent exposure limits. Does the Army have plans to convene such a group, and will the public be part of this process?  
No decision has been made at this time.

Since the human toxicity estimates cited in the NRC report only apply to young healthy male soldiers, what applies to the general public?

There is no impact, as current monitoring levels are well below those established in the report, and are strictly monitored by state regulatory agencies and other oversight organizations. We are operating at extremely safe levels and are working hard to get the job done safely and as quickly as possible. The Army will continue to eliminate the risk that this agent poses through the safest and most proven technology — incineration.

What is the likely impact, if any, on monitoring/analytical programs within and external to the chemical agent disposal facilities (CDFs)?

The only impact for CDF operations is lowering the immediately dangerous to life and health (IDLH) monitoring level for the nerve agents GB and VX. The blister agent, mustard, is not affected because its IDLH is equivalent to the time weighted average (TWA). The TWA and the general population limit (GPL) and the allowable stack concentration (ASC) are not affected by the proposed toxicological values in the NRC report. This is due to the fact the TWA and GPL toxicological values are based on chronic biological markers such as miosis and cholinesterase depression. The ASC is a source emission limit that is modeled against the GPL. Other programs that use acute toxicological values in their risk assessments or monitoring program may be affected by the proposed toxicological values.

What is the likely impact, if any, on monitoring/analytical requirements on the Umatilla CDF's Comprehensive Monitoring Workplan (CMP), the Sampling Analysis Plan and its Quality Assurance Plan?

The purpose of the CMP is to confirm the projections of the pretrial burn risk assessment. The risk assessment model, established and conducted by the state of Oregon Department of Environmental Quality, used the ASC and the GPL to model deposition of agent under worst case conditions. For the same reasons stated in the questions above, the CMP is not affected by the proposed toxicological values in the NRC report. Since the SAP and QAP are required to

implement the guidance in the CMP, these documents are not affected by the proposed toxicological values.

**What is the likely impact, if any, on certifying process-derived hazardous waste as being agent free?**

Process-derived hazardous waste is screened by head-space analysis to contain agent at less than one TWA. The hazardous waste is then certified to be agent free at less than the waste control limit (WCL). The WCL is 20 parts per billion (ppb) for GB and VX and 200 ppb for HD. Due to lack of Department of Army (DA) guidance on monitoring levels for liquid and solid hazardous waste, the Program Manager for Chemical Demilitarization used the DA's drinking water standards for its WCL. Since the TWA and WCL are both monitoring levels for chronic exposure to agents, process derived hazardous waste is not affected by the proposed values in the NRC report.

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ATTACHMENT L

**TABLE OF COMMENTS AND EXHIBITS**  
***"Documents related to Human Health Risk Assessments"***

**AND**

***Human Health Risk Assessment Protocol for  
Hazardous Waste Combustion Facilities  
Environmental Protection Agency, July, 1998***

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# ATTACHMENT L

## Documents related to Human Health Risk Assessments

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
27	Affidavit of Thomas Bodley Stibolt Jr. and Lisa (Elizabeth) P. Brenner	8/19/98	Thomas Bodley Stibolt Jr. & Lisa P. Brenner	No record number assigned	<p>The Affidavit of Thomas B. Stibolt, Jr. (Senior Physician with Norwest Permanente and a Clinical Associate Professor of Medicine at Oregon Health Sciences University) and Lisa P. Brenner (Staff Scientist and President of Oregon Clearinghouse for Pollution Reduction). Drs. Stibolt and Brenner reviewed the Pre-Trial Burn Risk Assessment<sup>2</sup> for UMCDF and state that DEQ did not follow “appropriate scientific steps” in the Health Risk Assessment and that there were “important unanswered questions.”</p> <p>Item No. 98-1275 (p. 39, line 24 and p. 61, line 1) refers to this Affidavit and its attachments to support the Petitioner’s contention that the UMCDF Health Risk Assessment fails to consider “impacts of low level agent exposure; impacts on a fetus, infant, and sensitive populations; impacts that may be particular to Native Americans...”</p> <p>Also cited in Item No. 98-1247 (p. 4); 99-0704 (p. 7); and in 99-2201 (p. 33).</p>

<sup>1</sup> The DEQ Chemical Demilitarization Program maintains a database of documents related to the Umatilla Chemical Agent Disposal Facility. Most documents are assigned a record number for tracking purposes. Individual “Exhibits” submitted during the course of G.A.S.P., et al., v. EQC, et al., (Case No. 9708-06159, Oregon Circuit Court) were not assigned record numbers at the time of submittal—only the document the Exhibit was attached to was assigned a number. Some Exhibits do have Administrative Record Numbers because the document had been previously received.

<sup>2</sup> No. 98-1247: “Request for Contested Case Hearing and Other Relief,” letter dated December 14, 1998 (Included as Attachment A)  
 No. 98-1275: “Petitioners’ Memorandum Supporting Cross Motion for Summary Judgment,” August 20, 1998 (Case No. 9708-06159)  
 No. 99-0704: “Petitioners’ Opposition to Respondents’ Supplemental Motion for Summary Judgment,” April 12, 1999 (Case No. 9708-06159)  
 No. 99-2201: “Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF],” December 17, 1999 (Included in Attachment E)

**ATTACHMENT L**  
**Documents related to Human Health Risk Assessments**

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
27.1	Review of the inhalation modeling compounds and standards used in the RA for human health effects	8/17/98	Lisa Brenner & Tom Stibolt	No record number assigned	This is "Attachment A" to Exhibit 27. The authors present the results of their analysis of the 1996 UMCDF Health Risk Assessment (HRA). Issues of concern to the authors include the restriction of the UMCDF HRA's analysis to only those compounds included in the EPA guidance; the level of "acceptable" risk; the lack of consideration of "non-cancer" effects and the failure of the Department to perform an "acute risk assessment."
27.2	A Listing of the Compounds that PRC claims should be included in the modeling analysis	8/16/98	Lisa Brenner and Tom Stibolt	No record number assigned	This is Attachment B to Exhibit 27., and are the tables referenced in Attachment A (Exhibit 27.1). The tables are titled:  "Carcinogenic Effects Via Inhalation: Presentation and Additions"  "Non-Carcinogenic Effects: Additions and Qualitative Comparisons"  "A Listing of the Compounds that PRC claims should be included in the modeling analysis"
27.3	Table 1 - Comparison of Potential PICS, Recommended PICS, and Proposed Emission Rates	11/5/96	PRC Environmental Management	1977	This is Attachment "C" to Exhibit 27. It is a table from a report prepared by PRC Environmental Management. The full report is titled "Air Quality Dispersion and deposition Review and Evaluation of the Draft Pre-Trial Burn Risk Assessment of Combustion By-Products for the Proposed Umatilla Chemical Demilitarization Facility."  Item No. 98-1275 (p. 57, line 10) cites a statement from PRC that "it will take a full 2 minutes for a high level response (e.g. waste feed shut off) to occur after a toxic emission is detected."

## ATTACHMENT L

### Documents related to Human Health Risk Assessments

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
27.4	Fundamentals of Risk Analysis and Risk Management	1/1/97	Vlasta Molak, editor	No record number assigned	This is Attachment "D" to Exhibit 27. The portion of the two-page excerpt highlighted here is a sentence that states "The U.S. EPA defines negligible risk of cancer as that smaller than 1:1,000,000."
27.5	Umåtilla Chemical Agent Disposal Facility Phase 1 Quantitative Risk Assessment	9/1/96	Science Applications International Corporation	1830	This is Attachment "E" to Exhibit 27. It is an excerpt of the "Quantitative Risk Assessment" discussing which exposure pathways are modeled in the QRA, and the dose-response equations that are used. (This document was reviewed and extensively discussed during the development and approval of the original UMCDF HW Permit.)
27.6	Technical Aspects of the Model and the Air Quality Impact Analysis	8/17/98	Thomas Stibolt and Lisa Brenner	No record number assigned	This is the second Attachment "E" to Exhibit 27. This document was prepared by the Authors and discusses the meteorological data that were used in the 1996 UMCDF HRA.
28	Trygve P. Steen's Affidavit	8/20/98	Trygve P. Steen	No record number assigned	<p>Dr. Steen's Affidavit affirms his support for the work of Lisa Brenner and Tom Stibolt. There are two attachments to this Exhibit. See Exhibits 28.1 and 28.2.</p> <p>Item No. 98-1275 (p. 40, line 0 and p. 61, line 1) refers to this Affidavit and its attachments to support the Petitioner's contention that the UMCDF Health Risk Assessment fails to consider "impacts of low level agent exposure; impacts on a fetus, infant, and sensitive populations; impacts that may be particular to Native Americans..."</p> <p>Also cited in Item No. 98-1247 (p. 4); 99-0704 (p. 7); and in 99-2201 (p. 33).</p>

**ATTACHMENT L**  
**Documents related to Human Health Risk Assessments**

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
28.1	Thinking of Biology - Science, environmental risk assessment, and the frame problem	9/1/94	Kristin S. Shrader-Frechette	No record number assigned	This is Attachment "A" to Exhibit 28. It is an article from "BioScience" (Volume 44, No. 9, September, 1994) that discusses the use of a "two-value frame" vs. a "three-value frame" when making risk assessment decisions.
28.2	Curriculum Vitae of Trygve P. Steen	6/1/98	Trygve P. Steen	No record number assigned	This is Attachment "B" to Exhibit 28.
37.1	1997 Declaration of the Environmental Leaders of the Eight on Children's Environmental Health	7/27/98	Office of Children's Protection	No record number assigned	(See also Exhibit 37.2). Item No. 98-1275 (p. 42, lines 20-25) cites Exhibit 37 to support the statement that "Children and infants are more susceptible to air pollutants and toxic chemicals than adults."
37.2	Executive Order: Protection of Children From Environmental Health Risks and Safety Risks	4/21/97	The White House	No record number assigned	This is President Clinton's Executive Order governing the establishment of a Task Force on "Environmental Health Risks and Safety Risks to Children" and directing federal agencies to ensure that they have addressed environmental health risks and safety risks that might disproportionately affect children.

United States  
Environmental Protection  
Agency

Solid Waste and Emergency  
Response  
(5305W)

EPA530-D-98-001A  
July 1998  
[www.epa.gov/osw](http://www.epa.gov/osw)



# Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities,

## Volume One

Peer Review Draft

*Printed on paper that contains at least 20 percent postconsumer fiber*

EPA 530-D-98-001A  
July 1998

## Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities,

### Volume One

U.S. EPA, OFFICE OF SOLID WASTE

U.S. ENVIRONMENTAL PROTECTION AGENCY

EOC Meeting May 18, 2000  
Attachment L, Page L-6

#### DISCLAIMER

This document provides guidance to U.S. EPA Regions and States on how best to implement RCRA and U.S. EPA's regulations to facilitate permitting decisions for hazardous waste combustion facilities. It also provides guidance to the public and to the regulated community on how U.S. EPA intends to exercise its discretion in implementing its regulations. The document does not substitute for U.S. EPA's regulations, nor is it a regulation itself. Thus, it cannot impose legally-binding requirements on U.S. EPA, States, or the regulated community. It may not apply to a particular situation based upon the circumstances. U.S. EPA may change this guidance in the future, as appropriate.



## ACKNOWLEDGMENTS

Jeff Yurk (U.S. EPA Region 6) and David Weeks (formerly of U.S. EPA Region 6), the primary authors/editors of this document, would like to acknowledge that the development of this document could not have been accomplished without the support, input, and work of a multitude of U.S. EPA and support contractor personnel. The foundation for the procedures and methodologies outlined in this document were first developed by the Office of Research and Development (ORD) and the Office of Solid Waste (OSW) in previous versions of combustion risk assessment guidance. The State of North Carolina's combustion risk assessment methodology was also evaluated in preparation of this document. This version of the guidance was originally initiated in response to the desire of the Region 6 Multimedia Planning and Permitting Division to implement an up-to-date and technically sound hazardous waste combustion permitting program. The decision to incorporate guidance on a full range of national combustion risk assessment issues into the document was encouraged and supported by the Director of the Office of Solid Waste.

The development of this document was significantly enhanced by a number of capable organizations and personnel within U.S. EPA. Karen Pollard, Alexander McBride and David Layland of the Economic Methods and Risk Analysis Division in conjunction with Rosemary Workman of the Permits and State Programs Division and Karen Kraus of the Office of General Council provided overall policy, technical and legal comment on this document. David Reisman, Glenn Rice, Eletha Brady Roberts and Matthew Lorber of the National Center for Environmental Assessment (NCEA), Office of Research and Development and Dr. Dorothy Canter, Science Advisor to the Assistant Administrator for the Office of Solid Waste and Emergency Response, provided key input on breaking scientific developments in the areas of mercury speciation, the dioxin reassessment, endocrine disruptors, toxicity factors, sulfur and brominated dioxin analogs, as well as technical comment on the overall methodologies presented in the document.

Contributions by Dr. Larry Johnson of the National Exposure Research Laboratory of ORD and Jeff Ryan of the National Risk Management Research Laboratory of ORD were significant in providing methodologies for conducting TO analysis and defining appropriate detection limits to be used in the risk assessment. Donna Schwede of the National Exposure Research Laboratory of ORD and Jawad Touma of the Office of Air Quality Planning and Standards provided technical review comments to strengthen the air modeling section of the document. Review and comment on the soil and water fate and transport models was provided by Robert Ambrose of EPA's Environmental Research Laboratory in Athens, GA.

All U.S. EPA Regional Offices contributed valuable comments which have significantly improved the usability of this document. In particular, Region 4 aided in making sure guidance for conducting trial burns was consistent with this document, and Region 10 provided significant input on the subject of acute risk assessment and PCB analysis. The authors would be remiss if they did not acknowledge significant contributions from the Texas Natural Resource and Conservation Commission through both comments and discussions of real-world applications of risk assessment methodologies. Additionally, useful comments were received from the States of Colorado, Utah, and Alabama. The Region 6 Superfund Division is to be commended for its valuable review of the early document. Region 6 apologizes and bears full responsibility for any mistakes made in the incorporation of comment and input from all reviewers into the document.

Finally, this work could not have been completed without the tireless efforts of support contractor personnel. Tetra Tech EM Inc. (Tetra Tech), performed the bulk of the background research. The Air Group, under subcontract to Tetra Tech, helped develop the chapter on air dispersion modeling. The work

of these contractors was performed under the technical direction of staff from the Region 6 Center for Combustion Science and Engineering, as well as key Agency project and contracting officers.

Region 6 looks forward to the insight and input yet to be provided by industry and other interested parties during the full external peer review of the document.

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LIST OF ACRONYMS

#g	Microgram
µm	Micrometer
ACGIH	American Conference of Governmental Industrial Hygienists
ADD	Average daily dose
AEFA	Average Emission Factor Approach
Ah	Aryl hydrocarbon
AHH	Aryl hydrocarbon hydroxylase
AIEC	Acute inhalation exposure criteria
AIHA	American Industrial Hygiene Association
APCS	Air pollution control system
ASTM	American Society for Testing and Materials
atm	Atmosphere
ATSDR	Agency for Toxic Substances and Disease Registry
AWFCO	Automatic waste feed cutoff
BaP	Benzo(a)pyrene
BAF	Bioaccumulation factor
BBS	Bulletin board service
BCF	Bioconcentration factor
BEHP	Bis(2-ethylhexyl) phthalate
BIF	Boiler and industrial furnace
BPIP	Building profile input program check
BSAF	Sediment bioaccumulation factor
Btu	British thermal unit
BW	Body weight
CAA	Clean Air Act
CARB	California Air Resources Board
CAS	Chemical Abstracts Service
CFR	Code of Federal Regulations
CKD	Cement kiln dust
CLP	Contract Laboratory Program
cm	Centimeters
COPC	Compound of potential concern
CRQL	Contract required quantitation limit
CSV	Unspeciated chromatographical semivolatiles
CWA	Clean Water Act
DEHP	Diethylhexylphthalate
dL	Decaliter
DNA	Dioxyribonucleic acid
DNOP	Di(n)octyl phthalate
DOE	Department of Energy
DRE	Destruction and removal efficiency

LIST OF ACRONYMS (Continued)

DW	Dry weight of soil or plant/animal tissue
EPACA	U.S. Environmental Protection Agency Correlation Approach
EQL	Estimated quantitation limit
ESP	Electrostatic precipitator
ExInter	Expert Interface Version 1.0
FW	Fresh weight (or whole/wet weight) of plant or animal tissue
g	Grams
GC	Gas chromatography
GEP	Good engineering practice
GRAV	Unspeciated gravimetric compounds
HEAST	Health Effects Assessment Summary Tables
HI	Hazard index
HQ	Hazard quotient
IARC	International Agency for Research on Cancer
IDL	Instrument detection limit
IEU/BK	Integrated exposure uptake/biokinetic
IPM	Insoluble polystyrene microspheres
IRIS	Integrated Risk Information System
ISCSTDFT	Industrial Source Complex Short Term Draft
ISCST3	Industrial Source Complex Short Term 3
K	Kelvin
kg	Kilogram
LADD	Lifetime average daily dose
L	Liter
lb	Pound
LCD	Local climatological data annual summary with comparative data
m	Meters
MACT	Maximum achievable control technology
MDL	Method detection limit
MEHP	Monoethylhexyl phthalate
mg	Milligram
Mg	Megagram
MIR	Maximum individual risk
MJ	Megajoule
mL	Milliliter
MPRM	Meteorological processor for regulatory models



LIST OF ACRONYMS (Continued)

MPTEP	Air quality model for multiple point source gaussian dispersion algorithm with terrain adjustments
MRL	Minimum risk level
NCDC	National Climatic Data Center
NC DEHNR	North Carolina Department of Environment, Health, and Natural Resources
NCEA	National Center for Environmental Assessment
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NRC	Nuclear Regulatory Commission
NTP	National Toxicology Program
NWS	National Weather Service
OAQPS	Office of Air Quality Planning and Standards
ORD	Office of Research and Development
OSHA	U.S. Occupational Safety and Health Administration
OSW	Office of Solid Waste
OSWER	Office of Solid Waste and Emergency Response
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCDD	Polychlorinated dibenzo(p)dioxin
PCDF	Polychlorinated dibenzofuran
PCRAMMET	Personal computer version of the meteorological preprocessor for the old RAM program
PDF	Probability density function
pg	Picogram
PIC	Product of incomplete combustion
PM	Particulate matter
PMD	Portable monitoring device
PM10	Particulate matter less than 10 micrometers in diameter
POHC	Principal organic hazardous constituent
ppb	Parts per billion
ppm	Parts per million
ppmv	Parts per million by volume
ppt	Parts per trillion
PQL	Practicle quantitation limit
PU	Polyurethane
QA	Quality assurance
QAPjP	Quality assurance project plan
QC	Quality control
RCRA	Resource Conservation and Recovery Act
RfC	Reference concentration
RfD	Reference dose

LIST OF ACRONYMS (Continued)

RME	Reasonable maximum exposure
RPF	Relative potency factor
RTDM	Rough terrain diffusion model
RTDMDEP	Rough terrain diffusion model deposition
s	Second
SAMSON	Solar and Meteorological Surface Observational Network
SCRAM	Support Center for Regulatory Air Models
SF	Slope factor
SLERA	Screening level ecological risk assessment
SOCMI	Synthetic Organic Chemical Manufacturing Industries
SQL	Sample quantitation limit
SRA	Screening ranges approach
SVOC	Semivolatile organic compound
SW-846	U.S. Environmental Protection Agency Test Methods for Evaluating Solid Waste
TCDD	Tetrachlorodibenzo(p)dioxin
TDA	Toluenediamine
TDI	Toluene diisocyanate
TEF	Toxicity equivalent factor
TEQ	Toxicity equivalent quotient
TG	Terrain grid
TIC	Tentatively identified compound
TLV	Threshold limit value
TOC	Total organic carbon
TSD	Treatment, storage, and disposal
TTN	Technology transfer network
TWA	Time-weighted average
U/BK	Uptake/biokinetic
USCA	Unit-Specific Correlation Approach
USDA	U.S. Department of Agriculture
U.S. EPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
USLE	Universal soil loss equation
UTM	Universal transverse mercator
VOC	Volatile organic compound

LIST OF VARIABLES

$\beta_0, \beta_1$	=	Regression constants (unitless)
$\gamma$	=	Empirical constant (unitless)
$\lambda_z$	=	Dimensionless viscous sublayer thickness (unitless)
$\mu_a$	=	Viscosity of air (g/cm-s)
$\mu_w$	=	Viscosity of water corresponding to water temperature (g/cm-s)
$\rho_a$	=	Density of air (g/cm <sup>3</sup> or g/m <sup>3</sup> )
$\rho_{forage}$	=	Density of forage (g/cm <sup>3</sup> )
$\rho_s$	=	Bed sediment density (kg/L)
$\rho_w$	=	Density of water corresponding to water temperature (g/cm <sup>3</sup> )
$\theta$	=	Temperature correction factor (unitless)
$\theta_{br}$	=	Bed sediment porosity (unitless)
$\theta_{sv}$	=	Soil volumetric water content (mL water/cm <sup>3</sup> soil)
$a$	=	Empirical intercept coefficient (unitless)
$A$	=	Surface area of contaminated area (m <sup>2</sup> )
$A_{beef}$	=	Concentration of COPC in beef (mg COPC/kg FW tissue)
$A_{chicken}$	=	Concentration of COPC in chicken, meat (mg COPC/kg FW tissue)
$ADD$	=	Average daily dose (mg COPC/kg BW-day)
$ADD_{infant}$	=	Average daily dose for infant exposed to contaminated breast milk (pg COPC/kg BW infant/day)
$ADD_{mother}$	=	Average daily dose (mother) (pg COPC/kg BW mother/day)
$AEF$	=	Applicable average emission factor for the equipment type (kg/hr-source)
$A_{egg}$	=	Concentration of COPC in eggs (mg COPC/kg FW tissue)
$A_h$	=	Area planted (m <sup>2</sup> )
$A_{hi}$	=	Area planted to <i>i</i> th crop (m <sup>2</sup> )
$A_i$	=	Impervious watershed area receiving COPC deposition (m <sup>2</sup> )
$A_L$	=	Total watershed area receiving COPC deposition (m <sup>2</sup> )
$A_{milk}$	=	Concentration of COPC in milk (mg COPC/kg FW tissue)
$A_{pork}$	=	Concentration of COPC in pork (mg COPC/kg FW tissue)
$AT$	=	Averaging time (days)
$A_w$	=	Water body surface area (m <sup>2</sup> )
$b$	=	Empirical slope coefficient (unitless)
$Ba_{beef}$	=	Biotransfer factor for beef (day/kg FW tissue)
$Ba_{chicken}$	=	Biotransfer factor for chicken (day/kg FW tissue)
$Ba_{eggs}$	=	Biotransfer factor for eggs (day/kg FW tissue)
$BAF_{fish}$	=	Bioaccumulation factor for fish (L/kg FW tissue)
$Ba_{milk}$	=	Biotransfer factor for milk (day/kg FW tissue)
$Ba_{pork}$	=	Biotransfer factor for pork (day/kg FW tissue)
$BCF_{fish}$	=	Bioconcentration factor for fish (mg COPC/kg FW tissue)/(mg COPC/kg dissolved water)—unitless
$BD$	=	Soil bulk density (g soil/cm <sup>3</sup> soil)
$Br_{veg}$	=	Plant-soil bioconcentration factor for aboveground produce
$Br_{forage}$	=	Plant-soil bioconcentration factor for forage ( $\mu$ g COPC/g DW plant)/( $\mu$ g COPC/g soil)—unitless

LIST OF VARIABLES (Continued)

$Br_{grain}$	=	Plant-soil bioconcentration factor for COPC in grain ( $\mu$ g COPC/g DW plant)/( $\mu$ g COPC/g soil)—unitless
$Br_{rootveg}$	=	Plant-soil bioconcentration factor for COPC in belowground produce ( $\mu$ g COPC/g FW plant)/( $\mu$ g COPC/g soil)—unitless
$B_s$	=	Soil bioavailability factor (unitless)
$BSAF$	=	Biota-to-sediment accumulation factor (mg COPC/kg lipid tissue)/(mg COPC/kg sediment)—unitless
$BV_{veg}$	=	COPC air-to-plant biotransfer factor for aboveground produce ( $\mu$ g COPC/g DW plant)/( $\mu$ g COPC/g air)—unitless
$BV_{forage/silage}$	=	Air-to-plant biotransfer factor for forage and silage ( $\mu$ g COPC/g DW plant)/( $\mu$ g COPC/g air)—unitless
$C$	=	USLE cover management factor (unitless)
$C_a$	=	Total COPC air concentration ( $\mu$ g/m <sup>3</sup> )
$C_{acute}$	=	Acute air concentration ( $\mu$ g/m <sup>3</sup> )
$Cancer Risk_i$	=	Individual lifetime risk through indirect exposure to COPC carcinogen <i>i</i> (unitless)
$Cancer Risk_{inhal}$	=	Individual lifetime cancer risk through direct inhalation of COPC carcinogen <i>i</i> (unitless)
$C_{BS}$	=	Bed sediment concentration (or sediment bulk density) (g sediment/cm <sup>3</sup> water)
$C_{gen}$	=	Generic chemical concentration (mg COPC/kg tissue or media) or (mg/L)
$C_{stk_i}$	=	Stack concentration of non-Table A-1 list <i>i</i> th carcinogenic COPCs (carbon basis) (mg COPC/m <sup>3</sup> stack emissions)
$C_{stj}$	=	Stack concentration of Table A-1 list <i>i</i> th carcinogenic COPCs (carbon basis) (mg COPC/m <sup>3</sup> stack emissions)
$C_d$	=	Drag coefficient (unitless)
$C_{dw}$	=	Dissolved phase water concentration (mg COPC/L water)
$C_{fish}$	=	Concentration of COPC in fish (mg COPC/kg FW tissue)
$C_i$	=	Stack concentration <i>i</i> th identified COPC (carbon basis) (mg/m <sup>3</sup> )
$C_{nj}$	=	Stack concentration of non-carcinogenic COPC <i>j</i> (carbon basis) (mg/m <sup>3</sup> )
$CR$	=	Generic contact rate (kg/day or L/day)
$C_s$	=	Average soil concentration over exposure duration (mg COPC/kg soil)
$C_{sb}$	=	Concentration sorbed to bed sediment (mg COPC/kg sediment)
$C_{s,tD}$	=	Soil concentration at time <i>tD</i> (mg COPC/kg soil)
$C_{TOC}$	=	Stack concentration of TOC, including speciated and unspeciated compounds (mg COPC/m <sup>3</sup> stack emissions)
$C_w$	=	Gas phase air concentration ( $\mu$ g COPC/m <sup>3</sup> air)
$C_{VOC}$	=	Total stack concentration of volatile speciated COPCs with boiling points less than 100°C (mg COPC/m <sup>3</sup> stack emissions)
$C_{VOC(i)}$	=	Stack concentration of the <i>i</i> th volatile speciated COPC with a boiling point less than 100°C (carbon basis) (mg COPC/m <sup>3</sup> stack emissions)
$C_{water}$	=	Total COPC concentration in water column (mg COPC/L water column)
$C_{water}$	=	Total water body COPC concentration including water column and bed sediment (g COPC/m <sup>3</sup> water body) or (mg/L)

LIST OF VARIABLES (Continued)

$C_{yp}$	=	Unitized yearly average air concentration from particle phase ( $\mu\text{g-s/g-m}^3$ )
$C_{yv}$	=	Unitized yearly average air concentration from vapor phase ( $\mu\text{g-s/g-m}^3$ )
$C_{yww}$	=	Unitized yearly (water body and watershed) average air concentration from vapor phase ( $\mu\text{g-s/g-m}^3$ )
$D_a$	=	Diffusivity of COPC in air ( $\text{cm}^2/\text{s}$ )
$d_{bu}$	=	Depth of upper benthic sediment layer (m)
$D_{m,air}$	=	Mean particle size density for a particular filter cut size
$D_s$	=	Deposition term (mg COPC/kg soil-yr)
$d_w$	=	Depth of water column (m)
$D_w$	=	Diffusivity of COPC in water ( $\text{cm}^2/\text{s}$ )
$D_{ydp}$	=	Unitized yearly average dry deposition from particle phase ( $\text{s/m}^2\text{-yr}$ )
$D_{yvp}$	=	Unitized yearly (water body or watershed) average total (wet and dry) deposition from particle phase ( $\text{s/m}^2\text{-yr}$ )
$D_{ywp}$	=	Unitized yearly average wet deposition from particle phase ( $\text{s/m}^2\text{-yr}$ )
$D_{yww}$	=	Unitized yearly average wet deposition from vapor phase ( $\text{s/m}^2\text{-yr}$ )
$D_{ywwv}$	=	Unitized yearly (water body and watershed) average wet deposition from vapor phase ( $\text{s/m}^2\text{-yr}$ )
$d_z$	=	Total water body depth (m)
$ED$	=	Exposure duration (yr)
$EF$	=	Exposure frequency (days/yr)
$ER$	=	Soil enrichment ratio (unitless)
$E_v$	=	Average annual evapotranspiration ( $\text{cm/yr}$ )
$f_{bu}$	=	Fraction of total water body COPC concentration in benthic sediment (unitless)
$F_d$	=	Fraction of diet that is soil (unitless)
$F_i$	=	Fraction of plant type $i$ grown on contaminated soil and eaten by the animal (unitless)
$f_{lipid}$	=	Fish lipid content (unitless)
$F_w$	=	Fraction of COPC wet deposition that adheres to plant surfaces (unitless)
$f_w$	=	Fraction of total water body COPC concentration in the water column (unitless)
$F_v$	=	Fraction of COPC air concentration in vapor phase (unitless)
$GEF$	=	Applicable emission factor for sources with screening values >10,000 ppmv ( $\text{kg/hr-source}$ )
$H$	=	Henry's Law constant ( $\text{atm-m}^3/\text{mol}$ )
$HI$	=	Hazard index (unitless)
$HI_j$	=	Hazard index for exposure pathway $j$ (unitless)
$HQ$	=	Hazard quotient (unitless)
$HQ_i$	=	Hazard quotient for COPC $i$ (unitless)
$HQ_{inhal}$	=	Hazard quotient for direct inhalation of COPC $i$ (unitless)

LIST OF VARIABLES (Continued)

$I$	=	Average annual irrigation ( $\text{cm/yr}$ )
$I_i$	=	Daily intake of COPC ( $i$ ) from animal tissue $j$ ( $\text{mg/day}$ )
$k$	=	von Karman's constant (unitless)
$K$	=	USLE erodibility factor ( $\text{ton/acre}$ )
$k_b$	=	Benthic burial rate constant ( $\text{yr}^{-1}$ )
$K_{d,b}$	=	Bed sediment/sediment pore water partition coefficient ( $\text{cm}^3 \text{ water/g bottom sediment}$ )
$K_{d,j}$	=	Partition coefficient for COPC $i$ associated with sorbing material $j$ (unitless)
$K_{d,s}$	=	Soil-water partition coefficient ( $\text{cm}^3 \text{ water/g soil}$ )
$K_{d,w}$	=	Suspended sediments/surface water partition coefficient ( $\text{L water/kg suspended sediment}$ )
$K_G$	=	Gas phase transfer coefficient ( $\text{m/yr}$ )
$K_L$	=	Liquid phase transfer coefficient ( $\text{m/yr}$ )
$K_{oc}$	=	Soil organic carbon-water partition coefficient ( $\text{mL water/g soil}$ )
$K_{oc,j}$	=	Sorbing material-independent organic carbon partition coefficient for COPC $j$
$K_{ow}$	=	Octanol-water partition coefficient ( $\text{mg COPC/L octanol}/(\text{mg COPC/L octanol})$ )—unitless
$kp$	=	Plant surface loss coefficient ( $\text{yr}^{-1}$ )
$ks$	=	COPC soil loss constant due to all processes ( $\text{yr}^{-1}$ )
$ks_e$	=	COPC loss constant due to soil erosion ( $\text{yr}^{-1}$ )
$ks_g$	=	COPC loss constant due to biotic and abiotic degradation ( $\text{yr}^{-1}$ )
$ks_l$	=	COPC loss constant due to leaching ( $\text{yr}^{-1}$ )
$ks_r$	=	COPC loss constant due to surface runoff ( $\text{yr}^{-1}$ )
$ks_v$	=	COPC loss constant due to volatilization ( $\text{yr}^{-1}$ )
$k_v$	=	Water column volatilization rate constant ( $\text{yr}^{-1}$ )
$K_r$	=	Overall COPC transfer rate coefficient ( $\text{m/yr}$ )
$k_{wt}$	=	Overall total water body dissipation rate constant ( $\text{yr}^{-1}$ )
$L$	=	Monin-Obukhov Length (m)
$LADD$	=	Lifetime average daily dose ( $\text{mg COPC/kg BW-day}$ )
$L_{DER}$	=	Total (wet and dry) particle phase and wet vapor phase COPC direct deposition load to water body ( $\text{g/yr}$ )
$L_{df}$	=	Vapor phase COPC diffusion (dry deposition) load to water body ( $\text{g/yr}$ )
$leak\ rate$	=	Emission rate from the individual item of equipment ( $\text{kg/hr}$ )
$L_E$	=	Soil erosion load ( $\text{g/yr}$ )
$LEF$	=	Applicable emission factor for sources with screening values <10,000 ppmv ( $\text{kg/hr-source}$ )
$L_r$	=	Runoff load from pervious surfaces ( $\text{g/yr}$ )
$L_{nr}$	=	Runoff load from impervious surfaces ( $\text{g/yr}$ )
$L_T$	=	Total COPC load to the water body including deposition, runoff, and erosion ( $\text{g/yr}$ )
$LS$	=	USLE length-slope factor (unitless)

LIST OF VARIABLES (Continued)

$M_{skin}$	=	Mass of a thin (skin) layer of below ground vegetable (g)
$M_{vegetable}$	=	Mass of the entire vegetable (g)
$MF$	=	Metabolism factor (unitless)
$n$	=	Number of items of equipment of the applicable type in the stream (unitless)
$N_{gr}$	=	Equipment count (specific equipment type) for sources with screening values >10,000 ppmv
$N_{lc}$	=	Equipment count (specific equipment type) for sources with screening values <10,000 ppmv
$OC_i$	=	Organic carbon content of sorbing material $i$ (unitless)
$OC_{sed}$	=	Fraction of organic carbon in bottom sediment (unitless)
$p^{\circ}_L$	=	Liquid phase vapor pressure of chemical (atm)
$p^{\circ}_S$	=	Solid phase vapor pressure of chemical (atm)
$P$	=	Average annual precipitation (cm/yr)
$PF$	=	USLE supporting practice factor (unitless)
$Pd$	=	Aboveground exposed produce concentration due to direct (wet and dry) deposition onto plant surfaces (mg COPC/kg DW)
$P_i$	=	Total COPC concentration in plant type $i$ ingested by the animal (mg/kg DW)
$Pr$	=	Aboveground exposed and protected produce concentration due to root uptake (mg COPC/kg DW)
$Pr_{bg}$	=	Belowground produce concentration due to root uptake (mg COPC/kg DW)
$Pv$	=	Concentration of COPC in plant due to air-to-plant transfer (mg COPC/kg DW)
$Q$	=	COPC emission rate (g/s)
$Q_i$	=	Emission rate of COPC ( $i$ ) (g/s)
$Q_{(i,d)}$	=	Adjusted emission rate of COPC ( $i$ ) (g/s)
$Q_{CP(i,d)}$	=	Adjusted emission rate of Table A-1 carcinogenic COPC ( $i$ ) (g/s)
$Q_{CP_i}$	=	Emission rate of Table A-1 carcinogenic COPC ( $i$ ) (g/s)
$Q_f$	=	Anthropogenic heat flux ( $W/m^2$ )
$Q_{P_i}$	=	Quantity of plant type $i$ ingested by the animal each day (kg DW/day)
$Q_S$	=	Quantity of soil ingested by the animal each day (kg/day)
$Q_{vol,w,q}$	=	Adjusted emission rate of the $i$ th volatile speciated COPC with a boiling point less than 100°C (g/s)
$Q_{vol,i}$	=	Emission rate of the $i$ th volatile speciated COPC (g/s)
$Q_r$	=	Net radiation absorbed ( $W/m^2$ )
$r$	=	Interception fraction—the fraction of material in rain intercepted by vegetation and initially retained (unitless)
$R$	=	Universal gas constant (atm·m <sup>3</sup> /mol·K)

LIST OF VARIABLES (Continued)

$RCF$	=	Root concentration factor ( $\mu\text{g COPC/g DW plant}/(\mu\text{g COPC/ml soil water})$ )
$RO$	=	Average annual surface runoff from pervious surfaces (cm/yr)
$REL$	=	California EPA Air Toxics Hot Spots Program acute reference exposure levels
$RF$	=	USLE rainfall (or erosivity) factor ( $\text{yr}^{-1}$ )
$Rp$	=	Interception fraction of the edible portion of plant (unitless)
$SBCF$	=	Scale bias correction factor (unitless)
$SD$	=	Sediment delivery ratio (unitless)
$\Delta S_f$	=	Entropy of fusion [ $\Delta S_f/R = 6.79$ (unitless)]
$SF$	=	Slope factor ( $\text{mg/kg-day}^{-1}$ )
$S_r$	=	Whitby's average surface area of particulates (aerosols) = $3.5 \times 10^{-4} \text{ cm}^2/\text{cm}^3$ air for background plus local sources = $1.1 \times 10^{-3} \text{ cm}^2/\text{cm}^3$ air for urban sources
$SV$	=	Screening value (ppmv)
$T_a$	=	Ambient air temperature (K)
$T_1$	=	Time period at the beginning of combustion (yr)
$T_2$	=	Length of exposure duration (yr)
$tD$	=	Time period over which deposition occurs (time period of combustion) (yr)
$T_m$	=	Melting point of chemical (K)
$TOC_{VOC}$	=	Stack concentration of volatile TOC, including speciated and unspeciated compounds ( $\text{mg}/\text{m}^3$ )
$TOC_{CSV}$	=	Stack concentration of CSV TOC, including speciated and unspeciated compounds ( $\text{mg}/\text{m}^3$ )
$TOC_{GRAV}$	=	Stack concentration of GRAV TOC, including speciated and unspeciated compounds ( $\text{mg}/\text{m}^3$ )
$Tp$	=	Length of plant exposure to deposition per harvest of edible portion of plant (yr)
$tp_i$	=	Length of plant's exposure to deposition per harvest of the edible portion of the $i$ th plant group (yr)
$Total\ Cancer\ Risk$	=	Individual lifetime cancer risk through indirect exposure to all COPC carcinogens (unitless)
$Total\ Cancer\ Risk_{inh}$	=	Total individual lifetime cancer risk through direct inhalation of all COPC carcinogens
$TSS$	=	Total suspended solids concentration ( $\text{mg}/\text{L}$ )
$T_{wb}$	=	Water body temperature (K)
$t_{1/2}$	=	Half-time of COPC (days)
$u$	=	Current velocity (m/s)
$V_{dv}$	=	Dry deposition velocity (cm/s)
$V_f$	=	Average volumetric flow rate through water body ( $\text{m}^3/\text{yr}$ )

## LIST OF VARIABLES (Continued)

$VG_{sz}$	=	Empirical correction factor for aboveground produce (forage and silage)(unitless)
$VG_{smwz}$	=	Empirical correction factor for below ground produce (unitless)
$VOC$	=	Total VOC emission rate for an equipment type (kg/hr)
$VOC_i$	=	VOC emission rate from all equipment in the stream of a given equipment type (kg/hr)
$V_p$	=	Vapor pressure of COPC (atm)
$W$	=	Average annual wind speed (m/s)
$w_b$	=	Rate of burial (m/yr)
$WF_{VOC}$	=	Average weight fraction of VOC in the stream (unitless)
$X_s$	=	Unit soil loss (kg/m <sup>2</sup> -yr)
$Y_h$	=	Dry harvest yield = $1.22 \times 10^{11}$ kg DW, calculated from the 1993 U.S. average wet weight $Y_h$ of $1.35 \times 10^{11}$ kg (USDA 1994b) and a conversion factor of 0.9 (Fries 1994)
$Y_i$	=	Harvest yield of <i>i</i> th crop (kg DW)
$Y_p$	=	Yield or standing crop biomass of edible portion of plant (productivity) (kg DW/m <sup>2</sup> )
$Y_p$	=	Yield or standing crop biomass of the edible portion of the plant (productivity) (kg DW/m <sup>2</sup> )
$Z_s$	=	Soil mixing zone depth (cm)
0.01	=	Units conversion factor (kg cm <sup>3</sup> /mg-m <sup>3</sup> )
$10^{-4}$	=	Units conversion factor (g/ $\mu$ g)
$10^4$	=	Units conversion factor (kg/mg)
0.31536	=	Units conversion factor (m-g-s/cm- $\mu$ g-yr)
365	=	Units conversion factor (days/yr)
907.18	=	Units conversion factor (kg/ton)
0.1	=	Units conversion factor (g-kg/cm <sup>3</sup> -m <sup>3</sup> )
0.001	=	Units conversion factor (kg-cm <sup>3</sup> /mg-m <sup>3</sup> )
100	=	Units conversion factor (mg-cm <sup>3</sup> /kg-cm <sup>3</sup> )
1000	=	Units conversion factor (mg/g)
4047	=	Units conversion factor (m <sup>2</sup> /acre)
$1 \times 10^3$	=	Units conversion factor (g/kg)
$3.1536 \times 10^7$	=	Units conversion factor (s/yr)

## Chapter 1 Introduction

### What's Covered in Chapter 1:

- ♦ Objective and Purpose
- ♦ Related Trial Burn Issues
- ♦ Reference Documents
- ♦ Document Organization

Risk assessment is a science used to evaluate the carcinogenic risks and noncarcinogenic hazards to human health that are attributable to emissions from hazardous waste combustion units. These risk assessments include the evaluation of both direct and indirect risks. There is sufficient guidance available regarding the performance of direct inhalation risk assessments. On the other hand, indirect risk assessments are newer and more complex. As a result, this document describes the evaluation of direct inhalation risk, but primarily focuses on the procedures used to estimate risk resulting from indirect pathways. The following definitions as adopted from the National Academy of Sciences 1983, *Risk Assessment in the Federal Government*, for use throughout this guidance:

Risk Assessment	The scientific evaluation of potential health impacts that may result from exposure to a particular substance or mixture of substances under specified conditions.
Hazard	An impact to human health by chemicals of potential concern.
Risk	An estimation of the probability that an adverse health impact may occur as a result of exposure to chemicals in the amount and by the pathways identified.
Dose	Defined as one oral exposure.
Exposure	Exposure to chemicals by relevant pathways to identified receptors.
Indirect Exposure	Resulting from contact of human and ecological receptors with soil, plants, or waterbodies on which emitted chemical has been deposited. For screening level purposes, indirect exposure include ingestion of above ground fruits and vegetables, beef and milk, freshwater fish and soil.

Direct Exposure      Exposure via inhalation.

This Human Health Risk Assessment Protocol (HHRAP) has been developed as national guidance to consolidate information presented in other risk assessment guidance and methodology documents previously prepared by U.S. EPA and state environmental agencies. In addition, the HHRAP also addresses issues that have been identified while conducting risk assessments for existing hazardous waste combustion units. The overall purpose of this document is to explain how risk assessments should be performed at hazardous waste combustion facilities. This document is intended as (1) guidance for personnel conducting risk assessments, and (2) an information resource for permit writers, risk managers, and community relations personnel.

In the April 19, 1996, preamble to the proposed MACT rule, U.S. EPA recommended that site-specific risk assessments be conducted as part of the RCRA permitting process for hazardous waste combustors as necessary to protect human health and the environment. Often, the determination of whether or not a permit is sufficiently protective can be based on its conformance to the applicable technical standards specified in the regulations. Since the time that the current regulations for hazardous waste incinerators and boilers/industrial furnaces were issued (1981 and 1991, respectively), however, information has become available to suggest that these performance standards may not fully address potentially significant risks. Many recent studies (including the *Draft Health Reassessment of Dioxin-Like Compounds, Mercury Study Report to Congress*, and *Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Information Document*) indicate that there can be significant risks from indirect exposure pathways (e.g., pathways other than direct inhalation). The food chain pathway appears to be particularly important for bioaccumulative pollutants which may be emitted from hazardous waste combustion units. In many cases, risks from indirect exposure may constitute the majority of the risk from a hazardous waste combustor. This key portion of the risk from hazardous waste combustor emissions was not directly taken into account when the hazardous waste combustion standards were developed. In addition, uncertainty remains regarding the types and quantities of non-dioxin products of incomplete combustion emitted from combustion units and the risks posed by these compounds.

The RCRA "omnibus" authority of §3005(c)(3) of RCRA, 42 U.S.C. §6925(c)(3) and 40 CFR. §270.32(b)(2) gives the Agency both the authority and the responsibility to establish permit conditions on a

case-by-case basis as necessary to protect human health and the environment. Performance of a site-specific risk assessment can provide the information necessary to determine what, if any, additional permit conditions are necessary for each situation to ensure that operation of the combustion unit is protective of human health and the environment. Under 40 C.F.R. §270.10(k), U.S. EPA may require a permit applicant to submit additional information (e.g., a site-specific risk assessment) that the Agency needs to establish permit conditions under the omnibus authority. In certain cases, the Agency may also seek additional testing or data under the authority of RCRA §3013 (where the presence or release of a hazardous waste "may present a substantial hazard to human health or the environment") and may issue an order requiring the facility to conduct monitoring, testing, analysis, and reporting. Any decision to add permit conditions based on a site-specific risk assessment under this authority must be justified in the administrative record for each facility, and the implementing agency should explain the basis for the conditions.

The permitting agency should consider several factors in its evaluation of the need to perform a risk assessment (human health and ecological). These factors include:

- whether any proposed or final regulatory standards exist that U.S. EPA has shown to be protective for site-specific receptors
- whether the facility is exceeding any final technical standards
- the current level of hazardous constituents being emitted by a facility, particularly in comparison to proposed or final technical standards, and to levels at other facilities where risks have been estimated
- the scope of waste minimization efforts and the status of implementation of a facility waste minimization plan
- particular site-specific considerations related to the exposure setting (such as physical, land use, and sensitive subpopulation characteristics) and the impact of these characteristics on potential risks
- the hazardous constituents most likely to be found and those most likely to pose significant risk
- the volume and types of wastes being burned
- the level of public interest and community involvement attributable to the facility

This list is by no means exhaustive, but is meant only to suggest significant factors that have thus far been identified. Others may be equally or more important.

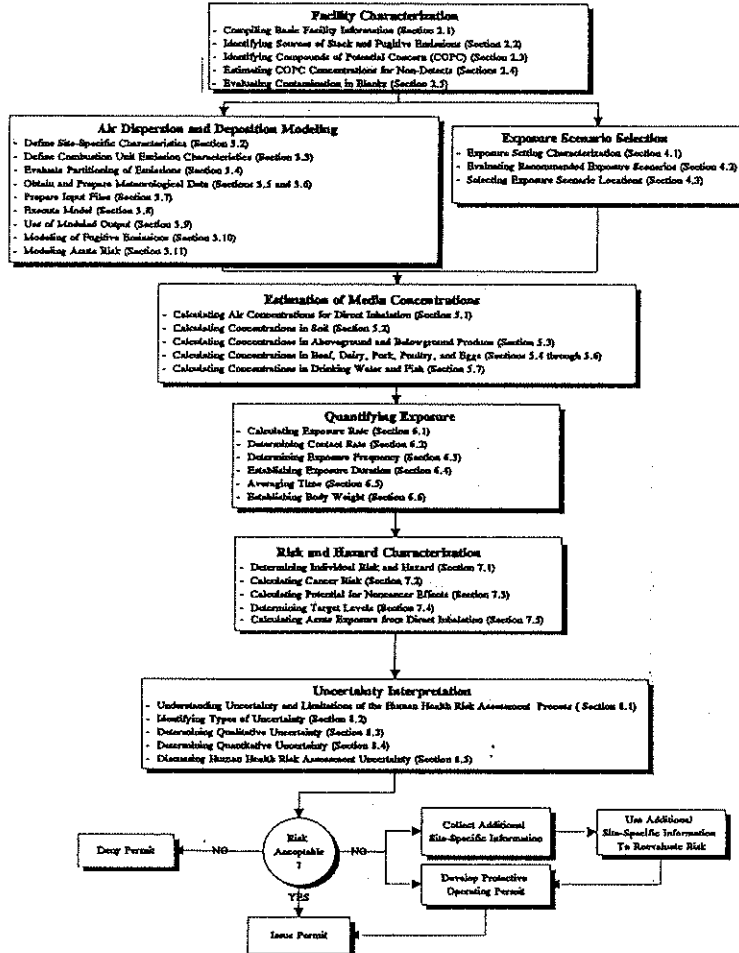
The companion document of the HHRAP is the Screening Level Ecological Risk Assessment Protocol (SLERAP). U.S. EPA OSW has prepared these guidance documents as a resource to be used by authorized agencies developing risk assessment reports to support permitting decisions for hazardous waste combustion units.

### 1.1 OBJECTIVE AND PURPOSE

U.S. EPA OSW's objective is to present a user-friendly set of procedures for performing risk assessments, including (1) a complete explanation of the basis of those procedures, and (2) a comprehensive source of data needed to complete those procedures. The first volume of this document provides the explanation (Chapters 1 through 9); and the second volume (Appendixes A-B) provides the data sources. Appendix A presents compound-specific information necessary to complete the risk assessment. Appendixes B and C present a user-friendly set of procedures for performing risk assessments. Figure 1-1 summarizes the tasks needed to complete a risk assessment and refers the reader to chapters in this guidance in which each task is described.

Implementation of this guidance will demonstrate that developing defensible estimates of compound emission rates is one of the most important elements of the risk assessment. As described in Chapter 2, traditional trial burns conducted to measure destruction and removal efficiency (DRE) do not sufficiently characterize organic products of incomplete combustion (PIC) and metal emissions for use in performing risk assessments. In some instances, a facility or regulatory agency may want to perform a pretrial burn risk assessment, following the procedures outlined in this document, to ensure that sample collection times during the trial burn or risk assessment burn are sufficient to collect the sample volumes needed to meet the detection limits needed for the risk assessment. The decision to perform such an assessment should consider regulatory permitting schedules and other site-specific factors.

FIGURE 1-1  
HUMAN HEALTH RISK ASSESSMENT PROCESS



U.S. EPA OSW anticipates that risk assessments will be completed for new and existing facilities as part of the permit application process. The HHRAP recommends a process for evaluating *reasonable*—not theoretical worst-case maximum—potential risks to receptors posed by emissions from RCRA regulated units. The use of existing and site-specific information early in, and throughout, the risk assessment process is encouraged; conservative assumptions should be made only when needed to ensure that emissions from combustion units do not pose unacceptable risks. More conservative assumptions may be incorporated to make the process fit a classical “screening level” approach that is more conservative and may be easier to complete.

Regardless of whether theoretical worst case or more reasonable conservative assumptions are used in completing the risk assessment process, every risk assessment is limited by the quantity and quality of:

- site-specific environmental data
- emission rate information
- other assumptions made during the risk estimation process (for example, fate and transport variables, exposure assumptions, and receptor characteristics)

These limitations and uncertainties are described extensively throughout this document and the appendices, and are summarized in Chapter 8.

Unacceptable risks or other significant issues identified by collecting preliminary site information and completing risk assessment calculations can be addressed by the permitting process or during an iteration of the risk assessment. After the initial risk assessment has been completed, it may be used by risk managers and permit writers in several ways:

- If the initial risk assessment indicates that estimated cancer risks and noncancer hazards are below regulatory levels of concern, risk managers and permit writers will likely proceed through the permitting process without adding any risk-based unit operating conditions to the permit.
- If the initial risk assessment indicates potentially unacceptable risks, additional site-specific information demonstrated to be more representative of the exposure setting may be collected and additional iterations of risk assessment calculations can then be performed.



If the initial risk assessment or subsequent iterations indicate potentially unacceptable risks, risk managers and permit writers may use the results of the risk assessment to revise tentative permit conditions (for example, waste feed limitations, process operating conditions, and expanded environmental monitoring). To determine if the subject hazardous waste combustion unit can be operated in a manner that is protective of human health and the environment, an additional iteration of the risk assessment should be completed using the revised tentative operating conditions. If the revised conditions still indicate unacceptable risks, this process can be continued in an iterative fashion until acceptable levels are reached. In some situations, it may be possible to select target risk levels and back-calculate the risk assessment to determine the appropriate emission and waste feed rate levels. In any case, the acceptable waste feed rate and other appropriate conditions can then be incorporated as additional permit conditions.

If the initial risk assessment, or subsequent iterations, indicate potentially unacceptable risks, risk managers and permit writers may also choose to deny the permit.

This process is also outlined in Figure 1-1. As stated earlier, in some instances, a facility or regulatory agency may want to perform a pretrial burn risk assessment—following the procedures outlined in this document—to ensure that sample collection times during the trial burn or risk assessment burn are sufficient to collect the sample volumes necessary to meet the appropriate detection limits for the risk assessment. This is expected to reduce the need for additional trial burn tests or iterations of the risk assessment due to problems caused when detection limits are not low enough to estimate risk with certainty sufficient for regulatory decision making. For example, if detection limits are too high then estimates of risk based on detection limits may be overly conservative.

### 1.2 RELATED TRIAL BURN ISSUES

In the course of developing this guidance and completing risk assessments across the country, U.S. EPA OSW has learned that developing defensible estimates of compound of potential concern (COPC) emission rates is one of the most important parts of the risk assessment process. As described in Chapter 2, traditional trial burns conducted to measure destruction and removal efficiency (DRE) do not sufficiently characterize organic products of incomplete combustion (PIC) and metal emissions for use in performing risk assessments.

U.S. EPA OSW considers the trial burn and risk assessment planning and implementation processes as interdependent aspects of the hazardous waste combustion unit permitting process. In addition, U.S. EPA

OSW advocates that facility planning, regulatory agency review, and completion of tasks needed for both processes be conducted simultaneously to eliminate redundancy or the need to repeat activities. U.S. EPA OSW expects that the following guidance documents will typically be used as the main sources of information for developing and conducting appropriate trial burns:

- U.S. EPA. 1989f. *Handbook: Guidance on Setting Permit Conditions and Reporting Trial Burn Results. Volume II of the Hazardous Waste Incineration Guidance Series.* Office of Research and Development (ORD). EPA/625/6-89/019. January.
- U.S. EPA. 1989g. *Handbook: Hazardous Waste Incineration Measurement Guidance Manual. Volume III of the Hazardous Waste Incineration Guidance Series.* Office of Solid Waste and Emergency Response (OSWER). EPA/625/6-89/021. June.
- U.S. EPA. 1992c. *Technical Implementation Document for EPA's Boiler and Industrial Furnace Regulations.* OSWER. EPA-530-R-92-011. March.
- U.S. EPA. 1994n. *Draft Revision of Guidance on Trial Burns. Attachment B, Draft Exposure Assessment Guidance for Resource Conservation and Recovery Act (RCRA) Hazardous Waste Combustion Facilities.* OSWER. June 2.
- Generic Trial Burn Plan and QAPPs developed by EPA regional offices or states.

### 1.3 REFERENCE DOCUMENTS

This section describes, in chronological order, the primary guidance documents used to prepare this HHRAP. Some of the guidance documents received a thorough review from EPA's Science Advisory Board, which mostly supported the work. Additional references used to prepare this HHRAP are listed in the References chapter of this document. These documents have been developed over a period of several years; in most cases, revisions to the original guidance documents address only the specific issues being revised rather than representing a complete revision of the original document. The following discussion lists and briefly describes each document. Overall, each of the guidance documents reflects a continual enhancing of the methodology. The most current risk assessment methodology frequently referenced in this guidance is the U.S. EPA NCEA guidance, *Methodology for Assessing Health Risks Associated with Multiple Exposure Pathways to Combustor Emissions* (In Press).

References, such as "U.S. EPA 1990c," correspond to the citation for the document specified in the Reference section of this guidance.

The following document was the first U.S. EPA guidance document for conducting risk assessments at combustion units:

- U.S. EPA. 1990e. *Interim Final Methodology for Assessing Health Risks Associated with Indirect Exposure to Combustor Emissions*. Environmental Criteria and Assessment Office. ORD. EPA-600-90-003. January.

This document outlined and explained a set of general procedures for conducting risk assessments. This document was subsequently revised by the following:

- U.S. EPA. 1993h. *Review Draft Addendum to the Methodology for Assessing Health Risks Associated with Indirect Exposure to Combustor Emissions*. Office of Health and Environmental Assessment. ORD. EPA-600-AP-93-003. November 10.

This document outlined recommended revisions to previous U.S. EPA guidance (1990e), which have been used by the risk assessment community since the release of the document; however, these recommended revisions were never formally incorporated into the original document. In 1994, U.S. EPA issued several additional risk assessment documents, including the following:

- U.S. EPA. 1994f. *Draft Exposure Assessment Guidance for RCRA Hazardous Waste Combustion Facilities*. OSWER. EPA-530-R-94-021. April.

The actual substance of the 1994 U.S. EPA guidance (1994f) is included in the following series of attachments, all issued as separate documents:

- U.S. EPA. 1994g. *Draft Guidance for Performing Screening Level Risk Analyses at Combustion Facilities Burning Hazardous Wastes. Attachment C, Draft Exposure Assessment Guidance for RCRA Hazardous Waste Combustion Facilities*. April 15.
- U.S. EPA. 1994h. Table 1, "Chemicals Recommended for Identification," and Table 2, "Chemicals for Potential Identification." *Attachment A, Draft Exposure Assessment Guidance for RCRA Hazardous Waste Combustion Facilities*. April 15.
- U.S. EPA. 1994i. *Draft Revision, Implementation Guidance for Conducting Indirect Exposure Analysis at RCRA Combustion Units. Attachment, Draft Exposure Assessment Guidance for RCRA Hazardous Waste Combustion Facilities*. April 22.

- U.S. EPA. 1994j. *Draft Guidance on Trial Burns. Attachment B, Draft Exposure Assessment Guidance for RCRA Hazardous Waste Combustion Facilities*. May 2.
- U.S. EPA. 1998 (In Press). *Guidance on Collection of Emissions Data to Support Site-Specific Risk Assessments at Hazardous Waste Combustion Facilities*. Internal Review Draft. Prepared by EPA Region 4 and the Office of Solid Waste.

Combined, these four documents present a revised procedure for completing a risk assessment. Because the original U.S. EPA guidance documents (1990e and 1993h) contained much of the background information necessary to complete the risk assessment process, this information was not repeated. In 1994, this new guidance was further revised by the following documents:

- U.S. EPA. 1994n. *Draft Revision of Guidance on Trial Burns. Attachment B, Draft Exposure Assessment Guidance for RCRA Hazardous Waste Combustion Facilities*. OSWER. June 2.
- U.S. EPA. 1994p. *Errata, Draft Guidance for Performing Screening Level Risk Analyses at Combustion Facilities Burning Hazardous Wastes. Attachment C, Draft Exposure Assessment Guidance for RCRA Hazardous Waste Combustion Facilities*. October 4.
- U.S. EPA. 1994r. *Revised Draft Guidance for Performing Screening Level Risk Analyses at Combustion Facilities Burning Hazardous Wastes. Attachment C, Draft Exposure Assessment Guidance for RCRA Hazardous Waste Combustion Facilities*. Office of Emergency and Remedial Response. OSW. December 14.

More recently, NC DEHNR developed the following guidance document for conducting risk assessments:

- NC DEHNR. 1997. *North Carolina Protocol for Performing Indirect Exposure Risk Assessments for Hazardous Waste Combustion Units*. January.

The NC DEHNR document reiterates U.S. EPA procedures (1994r), with the addition of a tiered approach that allows the regulatory agency or facility to choose the investment they want to make in conducting risk assessments. For instance, a small, on-site unit with limited waste stream variability is allowed the opportunity to conduct a Tier 1 assessment (more worst-case), whereas a larger facility with a diverse waste feed mixture may decide to complete a Tier 2 or 3 assessment (progressively more site-specific).

Finally, U.S. EPA OSW contracted for the development of *The Background Information Document to the Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion*

*Units Burning Hazardous Wastes* (Research Triangle Institute 1996) to support the proposed Hazardous Waste Combustion Rule. This document was reviewed and considered throughout the development of the HHRAP in order to ensure that the approach outlined is consistent with the most current OSW risk assessment policy.

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ATTACHMENT M

*TABLE OF COMMENTS AND EXHIBITS*

*Documents Related to the Use of Alternative Treatment Technologies  
and the Risk of Storage*

*and*

*"Perspectives on the Umatilla Quantitative Risk Assessment Results,"  
SAIC, September, 1996 (begins on page M-3)*

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## ATTACHMENT M

### Documents Related to the Use of Alternative Treatment Technologies and the Risk of Storage

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
48	Annual Status Report on the Disposal of Chemical Weapons and Materiel for Fiscal Year 1997	9/30/97	Department of Defense	98-0027	This Exhibit is an excerpt of the Status Report and includes a project schedule (Page number unknown) and pp. 11 and 57 which discuss the "current status" of each stockpile site.  Cited in Item No. 98-1275 (p. 63, lines 13-14) support the contention that use of alternative technologies, as evidenced by the schedules given for the "alternative technology" sites in Newport, IN and Aberdeen, MD, would not have resulted in a delay at Umatilla.
63	Pilot Testing of Neutralization/Biotreatment of Mustard Agent at Aberdeen Proving Ground, Maryland - Final Environmental Impact Statement	7/1/98	U.S. Army Program Manager for Chemical Demilitarization (PMCD)	No Record Number Assigned	Exhibit 63 is a partial copy of the EIS prepared for the Aberdeen Chemical Agent Disposal Facility, that will use neutralization followed by biotreatment to destroy the stockpile of mustard agent stored at the Aberdeen Proving Ground. Petitioners state that "almost seventy percent of the HD stored at Umatilla is in bulk storage and could be disposed of using this technology."  Cited in Item No. 98-1247 (p. 8); Item No. 98-1285 (p. 8); Item No. 99-0704 (p. 13); and 99-2201 (p. 35).

<sup>1</sup> The DEQ Chemical Demilitarization Program maintains a database of documents related to the Umatilla Chemical Agent Disposal Facility. Most documents are assigned a record number for tracking purposes. Individual "Exhibits" submitted during the course of G.A.S.P., et al., v. EQC, et al., (Case No. 9708-06159, Oregon Circuit Court) were not assigned record numbers at the time of submittal—only the document the Exhibit was attached to was assigned a number. Some Exhibits do have Administrative Record Numbers because the document had been previously received.

<sup>2</sup> No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (Included as Attachment A)  
 No. 98-1275: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)  
 No. 98-1285: "Petitioners' Additional Documentary Evidence," November 10, 1998 (Case No. 9708-06159)  
 No. 99-0704: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)  
 No. 99-2201: "Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF]," December 17, 1999 (Included in Attachment E)

## ATTACHMENT M

### Documents Related to the Use of Alternative Treatment Technologies and the Risk of Storage

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
65	Public Health Assessment for US Army Umatilla Depot Activity - Public Health Service Agency for Toxic Substance and Disease Registry	9/30/97	U.S. Department of Health and Human Services	No Record Number assigned	<p>Exhibit 65 is an Assessment prepared by the DHHS to “evaluate the possible pathways of exposure to contamination at the former Umatilla Depot Activity.” The Assessment was undertaken as part of a review of the “Superfund” sites at the Umatilla Depot.</p> <p>Item No. 98-1285 (p. 9) cites this Exhibit to “shatter the myth, still perpetuated by the Army, that the risk of storage is greater than the risk of incineration.”</p>



# Perspectives on the Umatilla Quantitative Risk Assessment Results

Prepared by  
Science Applications International Corporation  
for U.S. Army Program Manager for Chemical Demilitarization

September 1996

## Introduction

A risk assessment has been completed for the Umatilla Chemical Agent Disposal Facility (UMCDF). A summary of the methods and results is provided in *Umatilla Chemical Agent Disposal Facility Phase 1 Quantitative Risk Assessment* (SAIC, 1996). The study provides estimates of the public risks of accidental agent release from the chemical stockpile and from proposed disposal facility operations.

The risk assessment document includes some comparisons of risks of storage and processing. The risk assessment is only an assessment of risks and does not include conclusions regarding acceptability of risk. Acceptability of risk is determined by society, generally through the elected or appointed officials.

In deliberating the permits for the disposal process, the State of Oregon Environmental Quality Commission and Department of Environmental Quality have expressed a desire to have additional explanation of risk through comparisons to other risks that society and individuals face in everyday life. Comparisons need to be carefully selected and considered by the decision makers. Society, individuals, and decision makers have perceptions of risk that are the controlling factor in risk decision making. To aid the State officials in their understanding of risks, some risk comparisons are provided in this paper. Again, conclusions regarding acceptability are not made.

Risk comparison is a difficult endeavor because of varying risk perceptions. Several different ways of viewing the risks are provided here. More detailed comparisons can be done, and there is substantial literature on risk comparison (e.g., Covello, 1990; Okrent, 1980; and Cohen, 1991). Additional information that could be used to compare risks is also provided in Section 2 of the QRA (SAIC, 1996).

## Societal Risk Results

Figure 1 is one summary of the findings of the study. It illustrates the risk of disposal processing at the UMCDF, the risk of munition storage at the Umatilla Chemical Depot (UMCD) during the approximate 3-year disposal period, and the risk of continued storage for 20 years (if no processing were undertaken). The storage risk during the disposal period accounts for the reduction in the inventory of munitions as they are processed at the facility. This is termed *societal risk* because it indicates the impact on the affected population (e.g., the society surrounding UMCD). Figure 1 illustrates, on the vertical scale, the probability of exceeding the number of fatalities shown on the horizontal scale. The scales on this graph are logarithmic, that is they are evenly divided in factors of 10, enabling the illustration of large changes on a single figure. The risk curves in the figure are specifically designed to provide the user with an understanding not only of the probability of accidents, but the probability of different size accidents. From Figure 1, it is seen that the probability of incurring one or more public fatalities is approximately:

- 1 in 300,000 for 3.3 years of disposal processing at UMCDF
- 1 in 6,000 for 3.3 years of stockpile storage at UMCD during processing
- 1 in 400 for continued stockpile storage at UMCD for 20 years with no processing.

The area under each of the curves in Figure 1 is the value most typically referred to as *the risk*. It represents the average risk (statistically expected fatalities) over all accidents and potential consequences. The results of the UMCDF QRA indicate that the fatality risk is approximately:

- 0.00002 for 3.3 years of disposal processing at UMCDF
- 0.04 for 3.3 years of stockpile storage at UMCD during processing
- 0.6 for continued stockpile storage at UMCD for 20 years with no processing.

The actual risk during the disposal process is the sum of the disposal processing risk and the risk of storage during the disposal process. During the 3.3 years of disposal processing, the risk is therefore the sum of the bottom two curves in Figure 1. From the values in the figure it is clear that the risk of the disposal process is a very small addition to the storage risk during disposal.

Figure 1 provides some other insights for decision makers. Typically decision makers consider not only the overall risk but also the risk of different size accidents, reflecting society's concern with large accidents. For example, in 1990 in the U. S. there were 46,814 deaths in motor vehicle accidents and 941 deaths due to air transport (National Safety Council, 1993). Airline crashes, however, gather the attention of media and society because they typically involve many deaths, whereas the automobile statistic, which equates to over

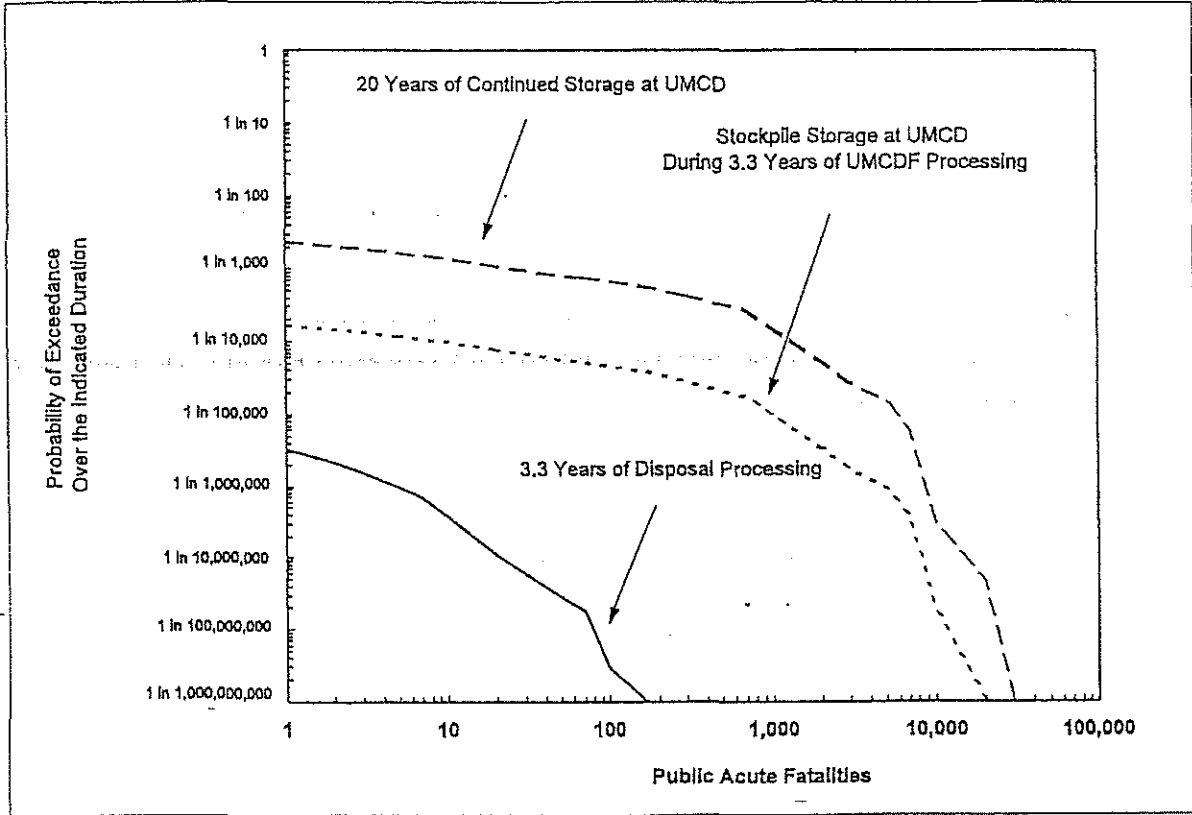


Figure 1. Summary of Umatilla Risk Results

100 people killed in motor vehicle accidents per day, appears to be more readily accepted by society because each accident typically involves a few deaths. It can be seen from Figure 1 that the risk of processing is less than storage but, perhaps more importantly, the risk of accidents with large numbers of deaths is much lower. There are an estimated 200 deaths at a 1-in-a-billion probability for the disposal processing, while at the same probability there is the potential for more than 10,000 deaths due to a storage accident.

In terms of the magnitude of the consequences, disposal processing accidents are estimated to have average consequences ranging up to 14 deaths, with an average across all accident sequences of approximately 1 death (SAIC, 1996, Table 13-1). On the other hand, accidents associated with continued storage are estimated to have average consequences up to 235 deaths with an average of 85 deaths across all scenarios (SAIC, 1996, Table 15-5).

## Perspective on Societal Risk

Comparison of societal risks is problematic for a single facility. The risks associated with UMCD are limited to a specific population, whereas societal risks generally result from all endeavors over a large population. A representative list of societal risks in terms of expected deaths per year is provided in Table 1. As indicated, the accidents associated with UMCD are estimated to be very small compared to other societal risks in Oregon. This comparison may be of limited value since it does not indicate the impact on people closest to UMCD, which is captured in the estimate of the individual risks discussed in the next section.

Table 1. Some Societal Risks in Oregon (Expected Deaths per Year)

No. of Deaths in Oregon Per Year	Cause <sup>a</sup>
<u>1,293</u>	<u>All accidental deaths</u>
678	Motor vehicle
56	Drownings
33	Machinery (including farm equip.)
25	Fires
6	Railway
4	Electric current
0.03	Stockpile storage <sup>b</sup>
0.000006	Disposal processing <sup>c</sup>

- a. All except the last two entries based on actuarial data from 1989 from the National Safety Council, 1993. The last two entries from the Phase 1 QRA for Umatilla (SAIC, 1996).
- b. In other words, one death every 33 years.
- c. In other words, one death every 160,000 years.

## Individual Risk Results

Risks have also been calculated on a per-person basis. This is typically referred to as individual risk, although it is calculated for groups of people living various distances from UMCD, not for specific individuals. Individual risk is an estimate of the probability of death for potentially exposed persons. For the most exposed people, living between 1 to 3 miles from

the facility, the individual fatality risk is

1 in 27 million per year of disposal operation

1 in 300,000 per year of continued storage.

Thus the annual risk to the individuals closest to the facility is about 90 times greater per year for continued storage versus disposal operations. These risks have also been calculated for the entire disposal process compared to 20 years of continued storage.

1 in 8 million for the total 3.3 years of disposal operations

1 in 15,000 for 20 years of continued storage.

If these are compared as options, then the individual risk associated with continued storage is over 500 times greater than disposal processing.

### Perspective on Individual Risk

Although the relative difference in risk is important, it is useful for decision makers to compare the risks to other individual risks. A sampling of comparisons is provided here to illustrate this process. As noted in the introduction, decision makers and stakeholders will develop their own comparisons and conclusions based on their values and risk perceptions.

The annual chance of accidental death due to all causes (car accidents, drowning, falls, poisoning, etc.) for an average individual in the State of Oregon is approximately 4 in 10,000 (or 400 in a million). Table 2 lists the individual risks on the same basis.

Table 2. Estimated Chemical Weapons Disposal and Storage Individual Risks Compared to Individual Risk of Accidental Death in Oregon

Risk Result	% of Oregon Total Accidental Death Rate	Description
400 in a million	100%	Individual chance of accidental death per year in Oregon, all causes
3 in a million	~1%	Individual chance of death per year due to continued storage for individuals living closest to the facility
0.04 in a million	0.01%	Individual chance of death per year due to disposal operations for individuals living closest to the facility

Table 3 provides some additional comparisons of the estimated values from the QRA to other individual risks. (Oregon-specific results were not readily available, so U.S. averages are listed.) The results enable consideration of the estimated risks compared to other risks an individual might be exposed to. Society's perception of the need to be protected from various risks can then be factored into decision making.

Table 3. Average Individual Risks in the United States

Risk of Death to an Average Person in the U. S.	Percent of Total Accidental Death Risk	Description
<u>370 in a million</u>	<u>100%</u>	<u>All accidental causes</u>
200 in a million	54%	All motor vehicle accidents
32 in a million	9%	Pedestrian death due to motor vehicle
20 in a million	5%	Accidental poisoning
5 in a million	1%	Choking on food
3 in a million	~1%	Continued storage at UMCD for individuals living closest (1-3 miles) to the facility
0.4 in a million	0.1%	Lightning
0.1 in a million	0.03%	Dog bites
0.04 in a million	0.01%	Disposal operations at UMCDF for individuals living closest (1-3 miles) to the facility
0.04 in a million	0.01%	Venomous snakes, lizards, and spiders
0.02 in a million	0.005%	Fireworks accidents

### Cancer Risk

The QRA included an estimate of risk of cancer due to accidental release of mustard agents (only mustard is a carcinogen). The cancer risk due to accidental release was estimated to be very small. Table 4 lists the individual risk of induced cancer compared to other individual risks of death. This comparison includes several limitations. First, the estimated values in the QRA are for cancer induced over a lifetime, not necessarily death due to cancer; the other entries are for death. Second, the death rate information is based on the U.S. population as a

Table 4. Individual Risk of Death (Average of U. S. Population)  
Compared to QRA Estimates of Cancer Incidence.

Annual Individual Risk of Death <sup>a</sup>	% of Total	Cause
8,630 in a million	100%	All causes of death
2,895 in a million	34%	Heart disease
2,030 in a million	24%	Cancer
570 in a million	7%	Stroke
370 in a million	4%	Accidents
120 in a million	1%	Suicide
2,645 in a million	30%	All other causes
10 in a million	—	USEPA upper bound screening for lifetime cancer incidence due to facility emissions <sup>b</sup>
0.00001 in a million	10 <sup>-7</sup> % <sup>c</sup>	Cancer incidence risk for accidental releases during 20 years of storage for people closest to UMCD <sup>b</sup>
0.000002 in a million	10 <sup>-10</sup> % <sup>c</sup>	Cancer incidence risk for accidental releases during 3.3 years of disposal processing for people closest to UMCD <sup>b</sup>

- a. Death rates are values for an average individual in the population as a whole. There are substantial differences in death rates and causes among different age groups.
- b. These items are listed for convenience, but they represent cancer incidence in a lifetime, not annual risk of death, as the other items in the table.
- c. 10<sup>-7</sup> = 0.0000001, 10<sup>-10</sup> = 0.0000000001

whole. There are substantial differences among age groups as to death rates and causes. However, the table is useful for indicating the small values calculated in the QRA.

There is one other consideration regarding cancer risk. A human health risk assessment is also being completed for UMCDF to meet the requirements of the Resource Conservation and Recovery Act (RCRA) Part B permit. As part of that process, the screening risk assessment involves evaluating the cancer risk to individuals from incinerator emissions using a screening method. That is, a conservative assessment of the cancer risk is estimated and the result is compared to a threshold predetermined to be below regulatory concern (1 in 100,000 chance of lifetime induced cancer). The screening risk assessment is therefore not intended to provide a best estimate, only to show attainment of a goal that is judged to protect the public

from any undue cancer risk. The cancer risk due to emissions is therefore part of the decision makers input. However, the methodology is established so that if the individual risk to the most exposed individuals are below the threshold of regulatory concern, no additional analysis is performed. The threshold is provided in Table 4 as a point of reference.

## Other Perspectives on Risk

Risk values are sometimes difficult to comprehend because they are a combination of how often something happens and how many people are affected. Another consideration useful for understanding risks is how often the accidents that could lead to public health effect could be expected to occur. In the risk assessment thousands of potential accidents were analyzed, ranging from those that might be expected to occur during the facility lifetime to accidents that are extremely rare. Tables 13-1 and 15-1 in the Phase 1 QRA (SAIC, 1996) list the accidents that contribute most to risk. Table 5 repeats some of that information and lists some other events for perspective.

Table 5. Comparison of Accident Frequencies

Recurrence Intervals	Description of Event	% Contr. to Risk
<u>Disposal Processing</u>		
30,000-500,000 yrs	Earthquake causes large release at UMCDF	71%
5,000 yrs	Handling accident causes igloo fire	14%
<u>Storage</u>		
1,500 yrs	Richter 5.5 earthquake causes large release	14%
3,800 yrs	Richter 6.5 earthquake causes large release	27%
11,000 yrs	Richter 6.8 earthquake causes large release	22%
32,000- 500,000 yrs	Richter 6.8 - 7.5 earthquake causes large release	35%
2,500,000 yrs	Aircraft crash into mustard storage	<1%
<u>Other Rare Events</u>		
164 yrs	Lightning strike to an acre of land near Umatilla	—
55,000 yrs	Greater than 1 pound meteorite strike per square mile	—
800,000 yrs	Lightning strike to a square yard of land near Umatilla	—
35,000,000 yrs	Greater than 1 pound meteorite strike per acre	—



For example, for disposal processing, the most frequent accident that contributes significantly has an average recurrence interval of about 5,000 years. (This is a handling accident that leads to an igloo fire.) Essentially, this can be taken as meaning that if that plant were to operate for 5,000 years, this accident would likely occur. It is difficult to gain perspective on these types of events because the time frames are outside the human range of experience. Lightning is one familiar phenomenon. For the area of Oregon around Umatilla, the lightning strike recurrence interval for an acre of land is about 164 years (based on area alone, does not account for conductors, lightning protection, or other phenomena that make some areas more likely to be struck than others.) However, to a single square yard of land, the lightning recurrence interval is 800,000 years. Meteorites striking the earth is another infrequent phenomena; for example, the recurrence interval for a 1 pound meteorite per acre is 35 million years.

Considering the fact that earthquakes are an important part of the risk, another viewpoint is gained by examining the historical record. Table 5-2 of the QRA (SAIC, 1996) lists two earthquakes that have occurred within 50 miles of the site.

Date	Approximate Richter Magnitude	Distance from UMCD
July 6, 1936	6 - 7.5	48 mi
March 7, 1893	6 - 7.5	7 mi

In earthquakes of this size, masonry is damaged; chimneys fall, etc. Thus, although not frequent, significant earthquakes do occur in this area. Generally, earthquakes that could result in releases from the facility or stockpile would be of Richter 5.5 or greater.

Finally, there has been some concern about the risk due to airplane crashes. As indicated, the recurrence interval for a crash (medium to large airplane) into the mustard storage area is about 2,500,000 years, a very rare event. Also shown in table 15-5 of the QRA (SAIC, 1996) is the average agent-related deaths associated with the crash—60 deaths. The mustard storage area covers about an acre. The air traffic over the depot is not heavy and is not higher than others areas such as Hermiston or Pasco. The average school, office building, or hospital is roughly the size of the mustard storage area. An airplane crash into any of those facilities might very well cause 60 or more deaths. Attempts to reduce the risk of airline crash to citizens in the area would require examining a broader scope than just the chemical storage area.

## References

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Okrent, D. "Comment on Societal Risk," *Science*, Vol. 208, 25 April 1980.

Science Applications International Corporation. *Umatilla Chemical Agent Disposal Facility Phase 1 Quantitative Risk Assessment*, U. S. Army Program Manager for Chemical Demilitarization, September 1996.

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ATTACHMENT N

*TABLE OF COMMENTS AND EXHIBITS*

*Transcripts from various Utah-related proceedings  
(State and Federal Courts and USHW Board)*

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## ATTACHMENT N

### Transcripts from various Utah-related proceedings (State Court and USHW Board)

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
23	Deposition of John K. Cluff (CWWG, et al. v. U.S. Army, et al.; Case No. 96-CV-0425C; TOCDF)	7/17/96	John Cluff	99-1724	<p>Exhibit includes pp. 14-17, 26-29, 38-61, 70-73, and 114-117 of Pages 2-117 (Volume II) of John Cluff's deposition. The Department obtained a complete copy (190 pages total) of John Cluff's July 17-18, 1996 deposition.</p> <p>At the time of this deposition, John Cluff was the "Assistant Project Manager for Systemization and Operations" working for the PMCD field office at TOCDF.</p> <p>Petitioners (98-1275, p.32, lines 18-23) use John Cluff's testimony (pp. 51-59 of this transcript) to support the contention that the Army decided not to burn the DPE suits in the DUN because of concern over the incineration by-products from the suit material.</p> <p>Petitioners (98-1275, p.34, lines 11-16) use John Cluff's testimony (pp. 45-49 of this transcript) to support the contention that the BRA is not being operated at TOCDF due to "mechanical problems."</p>

<sup>1</sup> The DEQ Chemical Demilitarization Program maintains a database of documents related to the Umatilla Chemical Agent Disposal Facility. Most documents are assigned a record number for tracking purposes. Individual "Exhibits" submitted during the course of G.A.S.P., et al., v. EQC, et al., (Case No. 9708-06159, Oregon Circuit Court) were not assigned record numbers at the time of submittal—only the document the Exhibit was attached to was assigned a number. Some Exhibits do have Administrative Record Numbers because the document had been previously received.

<sup>2</sup> No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (Included as Attachment A)  
 No. 98-1275: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)  
 No. 98-1285: "Petitioners' Additional Documentary Evidence," November 10, 1998 (Case No. 9708-06159)  
 No. 99-0704: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)  
 No. 99-2201: "Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF]," December 17, 1999 (Included in Attachment E)

## ATTACHMENT N

### Transcripts from various Utah-related proceedings (State Court and USHW Board)

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
24	Deposition of John K. Cluff (CWWG, et al. v. U.S. Army, et al.; Case No. 96-CV-0425C; TOCDF)	7/18/96	John Cluff	99-1724	Exhibit includes pp. 178-181 and 186-189 of Pages 118-189 (Volume II) of John Cluff's deposition. The Department obtained a complete copy of John Cluff's July 17-18, 1996 deposition. The excerpted pages contain questions/answers related to the performance of the Dunnage Incinerator at TOCDF (See also Exhibit 23).
25	Deposition of Timothy W. Thomas (CWWG, et al. v. U.S. Army, et al.; Case No. 2:96-CV-0425C; TOCDF)	2/5/98	Timothy Thomas	99-1727	<p>Exhibit 25 includes pp. 134-135 of Timothy Thomas' deposition. (The complete deposition is 258 pages.) The excerpt focuses analysis of chemical agent, especially from ton containers. Mr. Thomas is the on-site TOCDF Project Manager for the (Army's) Program Manager for Chemical Demilitarization.</p> <p>Item No. 98-1275 (p. 33, lines 8-11) refers to pages 204 and 206 (pages not actually included in Exhibit) of this transcript related to the Army's intention to use the DUN.</p> <p>Item No. 98-1275 (p. 41, line 3-4) cites this Exhibit (no page numbers were given) as supporting the Petitioner's contention that "TOCDF releases chemical warfare agent out of its stacks."</p> <p>Item No. 98-1275 (p. 47, line 0) cites this Exhibit (page 155, not actually included in Exhibit) to state that the Department has not "...address[ed] significant problems assessing what is in the munitions that will be incinerated."</p> <p>Item No. 98-1275 (p. 54, lines 15-17) cites page 30 (not included) of this Exhibit to show that Mr. Thomas "recanted" his testimony about agent releases that was given during the USHW Board hearing in March, 1997 (see Exhibit 43).</p> <p style="text-align: center;"><b>See Attachment U for additional excerpts from the testimony of Timothy Thomas.</b></p>

## ATTACHMENT N

### Transcripts from various Utah-related proceedings (State Court and USHW Board)

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
26	Affidavit of John Houston Miller	6/3/96	John Houston Miller	No Record Number Assigned	<p>The origin of this affidavit is not clear, but it is assumed to be a document generated in CWWG v. U.S. Army (Case No. 96-CV-0425C). There are two attachments referenced within the Affidavit that were not included with this exhibit (Dr. Miller's Curriculum Vitae and "EPA Documents"). At the time of this Affidavit, Dr. Miller was a Professor of Chemistry at George Washington University in Washington, D.C.</p> <p>Item No. 98-1275 (p. 35, lines 22-23) cites Exhibit 26 to support the contention that the DFS is unable to meet DRE requirements, especially for PCB emissions when incinerating rockets. The Petitioners also cite Exhibit 26 in describing the failure of the DFS to meet TSCA requirements during a trial burn in 1997.</p>
30	Deposition of James Cudahy (CWWG, et al. v. U.S. Army, et al.; Case No. 2:96-CV-0425C; TOCDF)	2/16/98	James Cudahy	99-1723	<p>Exhibit 30 includes Pg. 72 of the deposition of James Cudahy. (total length of 139 pages, with various declarations prepared by Mr. Cudahy). At the time of the deposition, Mr. Cudahy was the President of Focus Environmental, Inc., an "environmental engineering firm that specializes in the design, permitting and technical evaluation of hazardous waste incineration and other thermal treatment systems."</p> <p>Item No. 98-1275 (p. 40, line 16; Page 54, line 22) cites this Exhibit as supporting the Petitioner's contention that "TOCDF releases chemical warfare agent out of its stacks (as will UMCDF) and into the ambient environment." Also cited in Item No. 99-0704 (p. 7)</p> <p style="text-align: center;"><b>See Attachment U (Page U-47) for additional excerpts from the Declarations of James Cudahy.</b></p>

## ATTACHMENT N

### Transcripts from various Utah-related proceedings (State Court and USHW Board)

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
33	Telephonic Deposition of Richard Holmes (CWWG, et al. v. U.S. Army, et al.; Case No. 2:96-CV-0425C; TOCDF)	4/14/98	Richard Holmes	99-1722	<p>This Exhibit includes pp. 101-104 of the deposition of Richard Holmes, primarily related to the M-55 rocket processing for the TSCA trial burn. The Department obtained a complete copy of Richard Holmes' April 1998 deposition (total length of 450 pages). Richard Holmes' position at the time of this deposition was self-described as "group leader for site support" within the (Army's) Program Manager for Chemical Stockpile Disposal (PMCS) Operations Team at Edgewood, Maryland.</p> <p>Item No. 98-1275 (p. 33, lines 9-10) refers to page 173 (although page 173 was not part of the Exhibit) of this transcript related to the Army's intention to use the DUN and what types of wastes were to be fed to the DUN.</p> <p>Item No. 98-1275 (p. 40, line 20) cites this Exhibit (no page number was given) as supporting the Petitioner's contention that "TOCDF releases chemical warfare agent out of its stacks (as will UMCDF) and into the ambient environment."</p> <p>Also cited in Item No. 99-0704 (p. 7).</p> <p style="text-align: center;"><b>(See Attachment U (Page U-101) for an additional excerpt from the deposition of Richard Holmes.)</b></p>
34	Continuation of the Telephonic Deposition of Richard Holmes (CWWG, et al. v. U.S. Army, et al.; Case No. 2:96-CV-0425C; TOCDF)	4/15/98	Richard Holmes	99-1722	<p>This Exhibit includes pp. 240-251 of the deposition of Richard Holmes (also see Exhibit 33]. This portion of Mr. Holmes' deposition relates to the MC-1 bomb incident on March 30, 1998 described in Exhibits 31 and 32.</p> <p>Item No. 98-1275 (p. 40, line 21) cites this Exhibit (no page number was given) as supporting the Petitioner's contention that "TOCDF releases chemical warfare agent out of its stacks (as will UMCDF) and into the ambient environment."</p>



## ATTACHMENT N

### Transcripts from various Utah-related proceedings (State Court and USHW Board)

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
					<p>Item No. 98-1275 (p. 44, line 0-3) again cites this Exhibit (although the Exhibit No. cited here was incorrect), specifically p. 248 and p. 258 (pages not actually part of the Exhibit) of Holmes' deposition (which contain an examination of Mr. Holmes related to the MC-1 bomb incident).</p> <p>Exhibit 34 is also cited in Item No. 98-1247, p. 5; Also cited in Item No. 99-0704 (p. 7); and in Item No. 99-2201, p. 12.]</p>
36	Cross-examination of John K. Cluff (CWWG, et al. v. U.S. Army, et al.; Case No. 2:96-CV-0425C; TOCDF)	7/25/96	John Cluff	99-1725	<p>This Exhibit includes pp. 407-409 of a transcript from the cross-examination of John Cluff on 7/25/96. The Department obtained a copy of the complete cross-examination (Pages 384-418 of the court transcript) of Mr. Cluff.</p> <p>Item No. 98-1275 (p. 54, Lines 15-22) refers to this exhibit number, but the reference appears to be incorrect. This purpose of the cross examination of Mr. Cluff was to clarify some information from his deposition.</p> <p>(See Exhibit 26 above.)</p>
42	Examination of Deborah Ng; Utah DEQ Solid and Hazardous Waste Control Board; Hearing on TOCDF Permit Modification; Transcript of Proceedings	3/19/97	Deborah Ng	No Record Number Assigned	<p>This Exhibit includes pp. 424-431 of the testimony of Deborah Ng. The Department had obtained and reviewed a copy of Ng's March, 1997 testimony during the course of proceedings for the Petition for Reconsideration before the EQC in June, 1997. Ms. Ng is a Chemical Engineer with the Utah DEQ's Division of Solid and Hazardous Waste.</p> <p>The excerpted pages in this Exhibit include the examination of Ms. Ng of the Utah DEQ by Mick Harrison, and a cross-examination by Mr. Kohns, focusing on the issue of agent analysis that was conducted by the Utah DEQ.</p> <p>Item No. 98-1275 (p. 38, line 1) refers to page 472 (this page</p>

## ATTACHMENT N

### Transcripts from various Utah-related proceedings (State Court and USHW Board)

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
					<p>was not actually included with this Exhibit) of this transcript related to the ability of the stack ACAMS to detect chemical agent.</p> <p>Item No. 98-1275 (p. 51, line 3) refers to pp. 256 (this page was not actually included with this Exhibit) and 426-430 of this transcript to support their contention that "chemical warfare agents contained in the stockpiled munitions may have a substantial amount of degradation by-products."</p>
43	Examination of Timothy Thomas (CWWG, et al. v. U.S. Army, et al.; Case No. 2:96-CV-0425C; TOCDF), Transcript of Preliminary Injunction Hearing  <i>3/3/97</i>	3/3/97	Timothy Thomas	98-1243	<p>This Exhibit includes pp. 109-112 of the transcript the examination of Timothy Thomas. The Exhibit excerpt is a discussion of ACAMS stack alarms at TOCDF.</p> <p>A complete copy of the transcript (123 pages) of Mr. Thomas' testimony, including the conclusion of his testimony on March 4, 1997, was received in the DEQ Hermiston office on April 22, 1997. The testimony of Mr. Thomas was not, however, specifically reviewed in the staff report that was prepared for the Petition for Reconsideration that was denied by the EQC on June 5, 1997.</p> <p>Item No. 98-1275 (p. 51, line 7-8) refers to pp. 111-112 of this transcript to support the contention that "chemical warfare agents contained in the stockpiled munitions may have a substantial amount of degradation by-products."</p> <p>Item No. 98-1275 (p. 56, line 23) refers to pp. 109-112 of this transcript to support their contention that "TOCDF's stack ACAMS are unreliable and cannot determine in an accurate and timely fashion when chemical warfare agents are being released through the stack." [Also cited in Item No. 99-2201 (p. 12)]</p>

## ATTACHMENT N

### Transcripts from various Utah-related proceedings (State Court and USHW Board)

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
44.1	Examination of Dennis Downs, Scott Anderson, and Martin Gray; Utah DEQ Solid and Hazardous Waste Control Board; Hearing on TOCDF Permit Modification; Transcript of Proceedings	3/18/97	Downs; Gray; Anderson	98-1242	<p>This Exhibit includes pp. 111-118 (excerpt of examination of Dennis Downs, related to concrete cracking and leaks into the vestibules); pp. 210-213 (excerpt of examination of Scott Anderson regarding concrete cracks and professional conduct by HW staff); pp. 230-233, 238-241, 274-277, and 394-395 (excerpt of testimony of Martin Gray regarding vestibule leaks) at TOCDF.</p> <p>A complete copy of the transcript (1108 pages) of the DSHW Board hearing held March 18-20, 1997, was received in the DEQ Hermiston office on April 22, 1997. The specific testimony referenced in this exhibit was not, however, specifically reviewed in the staff report that was prepared for the Petition for Reconsideration that was denied by the EQC on June 5, 1997.</p> <p>Dennis Downs is the Manager of the Utah DEQ Division of Solid and Hazardous Waste. Scott Anderson is Manager of the Hazardous Waste Branch of the Utah DSHW. Martin Gray is the Manager of the DSHW Hazardous Waste Branch's Chemical Demilitarization Section.</p> <p>Item No. 98-1275 (p. 54, line 11) refers to page 249 (not actually included in Exhibit) of this transcript as support for their contention that "TOCDF emits agent from the stack."</p> <p>Item No. 98-1275 (p. 54, line 24) refers to pp. 111, 115, 211, 232, 238, 275-276, 423, and 498 (pp. 423 and 498 were not actually included in the Exhibit) of this transcript to support their contention that because "TOCDF has experienced agent migration or leaks into areas where agent is not supposed to be present," then it is "...clear that the Army is unable to fully</p>

## ATTACHMENT N

### Transcripts from various Utah-related proceedings (State Court and USHW Board)

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
					<p>control and contain nerve and blister agents. Releases from the UMCDF incinerator facility must be expected and subject to risk assessment.”</p> <p>Item No. 98-1275 (p. 56, line 21) refers to pp. 349-350 (not included with exhibit) of this transcript to support their contention that “TOCDF’s stack ACAMS are unreliable and cannot determine in an accurate and timely fashion when chemical warfare agents are being released through the stack.”</p>
44.2	<p>Examination of Deborah Ng and Donald Smith; Utah DEQ Solid and Hazardous Waste Control Board; Hearing on TOCDF Permit Modification; Transcript of Proceedings</p>	3/19/97	Ng and Smith	No Record Number Assigned	<p>This Exhibit includes pp. 420-423 (excerpt of examination of Deborah Ng, related to a particulate sample, risk assessments, and maintaining negative pressure); pp. 496-499 (excerpt of examination of Mr. Smith regarding vestibule and concrete leaks); and pp.712-713 (adjournment).</p> <p>A complete copy of the transcript (1108 pages) of the DSHW Board hearing held March 18-20, 1997, was received in the DEQ Hermiston office on April 22, 1997. The specific testimony referenced in this exhibit was not, however, specifically reviewed in the staff report that was prepared for the Petition for Reconsideration that was denied by the EQC on June 5, 1997.</p> <p>Item No. 98-1275 (p. 56, line 23 and p. 57, line 1) refers to pp. 390-394 and p. 472 (none of the pages referenced were actually included in the Exhibit) of this transcript to support their contention that “TOCDF’s stack ACAMS are unreliable and cannot determine in an accurate and timely fashion when chemical warfare agents are being released through the stack.”</p>

## ATTACHMENT N

### Transcripts from various Utah-related proceedings (State Court and USHW Board)

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
47	Examination of Mr. Timothy Thomas; Utah DEQ Solid and Hazardous Waste Control Board; Hearing on TOCDF Permit Modification; Transcript of Proceedings	3/20/97	Timothy Thomas	98-1242	<p>This Exhibit includes partial copies of what appears to pp. 888-891, and a copy of pp. 892-895 from the testimony of Mr. Timothy Thomas during a Utah DEQ Solid and Hazardous Waste Control Board hearing held March 18-20, 1997. The excerpt focuses on agent releases and concrete cracks at TOCDF. At the time of this testimony Timothy Thomas was the TOCDF Site Project Manager for the Army's Program Manager for Chemical Demilitarization (PMCD).</p> <p>A complete copy of the transcript (1108 pages) of the DSHW Board hearing held March 18-20, 1997, was received in the DEQ Hermiston office on April 22, 1997. The specific testimony referenced in this exhibit was not, however, specifically reviewed in the staff report that was prepared for the Petition for Reconsideration that was denied by the EQC on June 5, 1997.</p> <p>Item No. 98-1275 (p. 54, lines 13-14) refers to pp. 891-892 of this transcript to support the statement that "TOCDF Project director Tim Thomas acknowledged that since August 22, 1996 there have been at least six (6) confirmed stack releases of nerve agent GB."</p> <p>Item No. 98-1275 (p. 58, lines 16-17) refers to pp. 877-878 of this transcript (testimony of Dr. Finley) to support the statement that "EPA's Dioxin Health Assessment Study concludes that an appropriate RfD for non-cancer effects from dioxin exposure would be 10 to 1000 times less than the current national exposure levels for dioxin."</p> <p style="text-align: center;">(See Attachment U for additional excerpts from the testimony of Timothy Thomas.)</p>

## ATTACHMENT N

### Transcripts from various Utah-related proceedings (State Court and USHW Board)

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
49	Deposition of Robert Bruce Perry (CWWG, et al. v. U.S. Army, et al.; Case No. 96-CV-0425C; TOCDF)	7/16/96	Robert Bruce Perry	99-1728	<p>This Exhibit is an excerpt of the deposition of Robert Bruce Perry related to the use of the DUN at TOCDF and includes pp. 230-233 of a 247-page transcript. Mr. Perry is the Chief of the Risk Management quality Assurance Office within the Office of the [Army's] Program Manager for Chemical Demilitarization."</p> <p>The Department obtained a complete copy of Mr. Perry's July 16, 1996, deposition. The deposition itself is 247 pages long, with approximately 400 pages of attachments. See Exhibit 59.</p>
59	Deposition of Robert Bruce Perry (CWWG, et al. v. U.S. Army, et al.; Case No. 96-CV-0425C; TOCDF)	7/16/96	Robert Bruce Perry	99-1728	<p>Item No. <b>98-1285</b> (p. 7) cites p. 231 of this Exhibit to support the contention that the Dunnage incinerator was never planned for use at TOCDF because of concerns about its performance. (This Exhibit is a duplicate of Exhibit 49.) [Also cited in Item No. <b>98-1247</b> (p. 8)]</p>
64	Excerpts from the testimony of Army expert Gary Boyd (CWWG, et al. v. U.S. Army, et al.; Case No. 96-CV-0425C; TOCDF)	7/29/96	Gary Boyd Science Applications International Corporation (SAIC)	99-1726	<p>Exhibit includes pp. 923-926, 931-938, 951-958 of Pages 923-1017 of Gary Boyd's testimony related to the Quantitative Risk Assessment (QRA) conducted for TOCDF. (Mr. Boyd was one of the authors of the QRA.)</p> <p>Cited in Item No. <b>98-1275</b> (p. 46, lines 16-20) assert that the "QRA provides very limited information which is unsuited for the analyzes (sic) the DEQ/EQC were mandated to perform." and in Item No. <b>98-1285</b> (p. 8) to state that the [DEQ and EQC] "improperly relied on the QRA to provide substantial evidence regarding the determination that the risk of continued storage was more significant than incineration."</p> <p>[Also cited in Item No. <b>98-1247</b> (p. 8-9), and Item No. <b>99-0704</b> (p. 14).</p>

# ATTACHMENT O

## ***TABLE OF COMMENTS AND EXHIBITS***

***Miscellaneous documents related to the  
Tooele Chemical Agent Disposal Facility (TOCDF)***

***and***

***“Tooele Chemical Agent Disposal Facility: Update on National Research  
Council Recommendations,” National Research Council, 1999  
(begins on Page O-3)***

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## ATTACHMENT O

### Miscellaneous documents related to the Tooele Chemical Agent Disposal Facility (TOCDF)

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
31	Affidavit of Pat Costner	7/27/98	Pat Costner	Record Number Not Assigned	<p>This Affidavit gives Ms. Costner's credentials and states that she has reviewed information concerning an incident at TOCDF (see Exhibit 32) and that she believes the incident resulted in a "significant" release of agent out the stack at TOCDF on March 30, 1998.</p> <p>Item No. 98-1275 (p. 40, line 17; and p. 44, lines 3-11) cites this Exhibit as supporting the Petitioner's contention that "TOCDF releases chemical warfare agent out of its stacks (as will UMCDF) and into the ambient environment."</p> <p>Exhibit 31 is also cited in Item No. 98-1247, p. 5; Item No. 99-0704, p. 7; and in Item No. 99-2201, p. 12.</p>
32	TOCDF Unusual Occurrence Report: Metal Parts Furnace Feed Rate Exceedance	4/2/98	Michael J. Rowe, Timothy Thomas, Harold Oliver	Record Number Not Assigned	<p>This Report describes the event that occurred on March 30, 1998, related to insufficient draining of an MC-1 bomb that was subsequently processed through the MPF.</p> <p>Item No. 98-1275 (p. 40, line 19; and pp. 43-44) cites this Exhibit as supporting the Petitioner's contention</p>

<sup>1</sup> The DEQ Chemical Demilitarization Program maintains a database of documents related to the Umatilla Chemical Agent Disposal Facility. Most documents are assigned a record number for tracking purposes. Individual "Exhibits" submitted during the course of G.A.S.P., et al., v. EQC, et al., (Case No. 9708-06159, Oregon Circuit Court) were not assigned record numbers at the time of submittal—only the document the Exhibit was attached to was assigned a number. Some Exhibits do have Administrative Record Numbers because the document had been previously received.

<sup>2</sup> No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (Included as Attachment A)  
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## ATTACHMENT O

### Miscellaneous documents related to the Tooele Chemical Agent Disposal Facility (TOCDF)

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
					<p>that "TOCDF releases chemical warfare agent out of its stacks (as will UMCDF) and into the ambient environment."</p> <p>Exhibit 32 is cited in 98-1247 (p. 4) as support for the Petitioners' contention that "incidents like this one demonstrate why the current incineration technology is unsafe and not the best available technology."</p> <p>Exhibit 32 is also cited in Item No. 99-2201, p. 12 and in Item No. 99-0704, p. 7.</p>
46	Excerpts from the Journals of Gary Millar	9/9/96	Unknown	Record Number Not Assigned	<p>This Exhibit is a document entitled "From the Journals of Gary Millar," although there is no indication who prepared the document (assumed to be transcribed from a hand-written journal). There are reference numbers after each statement, although there is no indication what the numbers are referencing.</p> <p>Item No. 98-1275 (page 56, lines 4-5) cites this exhibit, but also the "Memoranda between Tim Thomas and Gary Millar at 460-464, 467-473, 478-479, and 481," which were not included with the copy of Exhibit 46 received by the Department.</p>

**Tooele  
Chemical Agent  
Disposal Facility**

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**Update on  
National Research Council  
Recommendations**

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NATIONAL ACADEMY OF SCIENCES

EQC Meeting May 18, 2000  
Attachment O, Page O-3

00-0188

STATE OF OREGON  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
RECEIVED

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# Tooele Chemical Agent Disposal Facility

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HERMISTON OFFICE

## Update on National Research Council Recommendations

Committee on Review and Evaluation of the  
Army Chemical Stockpile Disposal Program

Board on Army Science and Technology

Commission on Engineering and Technical Systems

National Research Council

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NATIONAL ACADEMY PRESS  
Washington, D.C. 1999

EQC Meeting May 18, 2000  
Attachment O, Page O-4

NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competencies and with regard for appropriate balance.

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## Preface

The United States has maintained a stockpile of highly toxic chemical agents and munitions for more than half a century. In 1985, Public Law 99-145 mandated an "expedited" effort to dispose of M55 rockets containing unitary chemical warfare agents because of their potential for self-ignition. This program soon expanded into the Army Chemical Stockpile Disposal Program (CSDP), whose mission was to eliminate the entire stockpile of unitary chemical weapons. The CSDP developed the baseline incineration system for that purpose. Since 1987, the National Research Council (NRC), through its Committee on Review and Evaluation of the Army Chemical Stockpile Disposal Program (Stockpile Committee), has overseen the Army's disposal program and has endorsed the baseline incineration system as an adequate technology for destroying the stockpile. In 1992, after setting several intermediate goals and dates, Congress enacted Public Law 102-484, which directed the Army to dispose of the entire stockpile of unitary chemical warfare agents and munitions by December 31, 2004.

In the 1970s, the Army had commissioned studies of different disposal technologies and tested several of them. In 1982, the Army selected incineration as the method it would use for the disposal of agents and associated propellants and explosives and the thermal decontamination of metal parts. In 1984, the NRC Committee on Demilitarizing Chemical Munitions and Agents reviewed a range of disposal technologies and endorsed the Army's selection of incineration. In response to public concerns about incineration and the evolution of other potential disposal technologies, the NRC has also carried out several evaluations of alternative technologies and recommended the development of chemical detoxification technologies for application at the two stockpile storage sites where chemical agent is stored only in bulk (with no energetically configured munitions).

Incineration technology is embodied in today's baseline incineration system, which was developed largely at the Chemical Agent Munitions Disposal System

(CAMDS) experimental facility at Tooele Army Depot, Utah. The first full-scale operational plant, the Johnston Atoll Chemical Agent Disposal System (JACADS), in the Pacific Ocean southwest of Hawaii, was completed in 1990 and is nearing the conclusion of chemical weapons disposal operations on Johnston Island. Construction of the first disposal facility in the continental United States was started in 1989 at the Tooele Army Depot (now Deseret Chemical Depot) in Utah. The design of the Tooele Chemical Agent Disposal Facility (TOCDF) represents a second generation baseline system, which incorporates improvements based on experience with the JACADS facility, advances in technology, and recommendations made by the Stockpile Committee. Systemization testing began in August 1993, and agent operations began on August 22, 1996.

The Stockpile Committee has monitored operations at the TOCDF since the start-up of systemization. The following NRC reports were issued by the Stockpile Committee in its TOCDF oversight role:

- *Review of Systemization of the Tooele Chemical Agent Disposal Facility*
- *Risk Assessment and Management at the Deseret Chemical Depot and the Tooele Chemical Agent Disposal Facility*

Published in 1996, the *Systemization* report reviewed the status of the TOCDF as systemization (pre-operational) testing was nearing completion and the facility was about to start agent operations. The report contained several sets of recommendations: some that were general and continuing; some that were to be coordinated with the start of agent operations; some that were to be completed prior to agent operations; and some that were to be completed during the first year of agent operations. The more recent *Risk Assessment and Management* (1997) report addressed issues related to the quantitative and health risk assessments performed for the TOCDF and the adjacent storage site and the Army's implementation of a risk management plan.



Following up on the recommendations in the *Systemization* report and the *Risk Assessment and Management* report, this report reviews the status of the TOCDF after more than two years of agent operations. This report also follows up on relevant recommendations from earlier Stockpile Committee reports and a recent letter report, *Public Involvement and the Army Chemical Stockpile Disposal Program*. The committee's intent is to document the Army's responses to these recommendations, noting which ones have been satisfactorily addressed and which ones have not been completely or adequately addressed. The latter group will provide a basis for the Stockpile Committee's oversight in the future. Although the focus of this report is on the TOCDF, some of the

findings and recommendations also apply to other sites and to the CSDP as a whole.

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This report has been reviewed by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the authors and the NRC in making the published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The contents of the review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their participation in the review of this report:

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## Acronyms

ACAMS	automatic continuous air monitoring system
ATB	agent trial burn
BRA	brine reduction area
CAC	Citizens Advisory Commission
CAMDS	Chemical Agent Munitions Disposal System
CEMS	continuous emission monitoring system(s)
CMP	change management process
CSDP	Chemical Stockpile Disposal Program
CSEPP	Chemical Stockpile Emergency Preparedness Program
CWC	Chemical Weapons Convention
DAAMS	depot area air monitoring system
DCD	Deseret Chemical Depot
DFS	deactivation furnace system
DRE	destruction removal efficiency
DSHW	Utah Division of Solid and Hazardous Waste
DUN	dunnage furnace
EG&G	Edgerton, Germerhausen and Grier
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FTIR	Fourier transform infrared (spectrometer)
GA	tabun (a nerve agent)
GB	sarin (a nerve agent)
GC-MSD	gas chromatograph-mass spectrometric detector
H	nondistilled mustard
HD	distilled mustard
HRA	health risk assessment
HT	thickened mustard
ITEQ	International Toxic Equivalence
JACADS	Johnston Atoll Chemical Agent Disposal System
LIC	liquid incinerator

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MPF	metal parts furnace
NRC	National Research Council
OSHA	Occupational Safety and Health Administration
OVT	operational verification testing
PAS	pollution abatement system
PCB	polychlorinated biphenyl
PCDD/F	polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans
PFPD	pulsed-flame photometric detector
PFS	PAS carbon bed filter system
PLL	Programmatic Lessons Learned
PMCD	Program Manager for Chemical Demilitarization
POIO	Public Outreach and Information Office
PQL	practical quantification limits
QRA	quantitative risk assessment
RCRA	Resource Conservation and Recovery Act
RIR	recordable injury rate
RMP	Risk Management Plan
SVOC	semivolatile organic compound
TOCDF	Tooele Chemical Agent Disposal Facility
TSCA	Toxic Substances Control Act
VOC	volatile organic compound
VX	a nerve agent

# Executive Summary

This report reviews the status of the U.S. Army Chemical Stockpile Disposal Program (CSDP) operations at Tooele, Utah, with respect to previous recommendations and observations made by the National Research Council (NRC) Committee on Review and Evaluation of the Army Chemical Stockpile Disposal Program (Stockpile Committee). The committee recognizes actions that have satisfied recommendations, identifies recommendations that require further action, and provides additional recommendations for improving the overall CSDP performance at the Tooele Chemical Agent Disposal Facility (TOCDF), Tooele, Utah, and other sites. In a 1994 NRC report, *Recommendations for the Disposal of Chemical Agents and Munitions*, the Stockpile Committee established the following general criterion for evaluating CSDP activities: "The Chemical Stockpile Disposal Program should proceed expeditiously and with technology that will minimize total risk to the public at each site."

The TOCDF is the first operational baseline incineration system for the disposal of chemical agents and munitions in the continental United States. The facility is adjacent to the Deseret Chemical Depot (DCD), where 43 percent of the total chemical agent stockpile was stored before the start of TOCDF operations in August 1996. Since then, more than 20 percent of the chemical agent stored at the DCD has been destroyed. The Johnston Atoll Chemical Agent Disposal System (JACADS), located about 700 miles southwest of Hawaii, was the prototype baseline incineration system and the first to become operational (July 1990). To date, it has destroyed more than 80 percent of the chemical agent and munitions stored on Johnston Atoll (originally about 6 percent of the total stockpile). Baseline facilities are under construction at three additional storage sites in the continental United States (Anniston, Alabama; Umatilla, Oregon; and Pine Bluff, Arkansas).

Chemical agents are stored at four additional sites. Two of these, Aberdeen, Maryland, and Newport, Indiana, contain only bulk quantities of agent (no munitions).

Chemical-based "neutralization" disposal technologies are being implemented at these sites. The remaining two sites, Pueblo, Colorado, and Blue Grass, Kentucky, contain chemical agent in munitions. Alternative disposal technologies, which are presently undergoing evaluation, may be implemented at these sites. The focus of this report is primarily on operational and planned baseline incineration facilities, especially the TOCDF, but broader programmatic matters, such as risk management and public involvement, are also addressed and are applicable to all CSDP sites.

The major aspects of TOCDF operations reviewed in this report are:

- systems performance and plant operations (Chapter 2)
- trial burn tests to establish compliance with Resource Conservation and Recovery Act (RCRA) and Toxic Substances Control Act (TSCA) emission levels (Chapter 2)
- improvements to the monitoring systems for airborne agent (Chapter 2)
- risk management (Chapter 3)
- safety programs and performance (Chapter 4)
- public and community interactions (Chapter 5)

Findings and recommendations are presented in Chapter 6.

## Systems Performance and Plant Operations

The Army and its TOCDF contractor, EG&G Defense Materials, Inc., have satisfied many, but not all, of the Stockpile Committee's recommendations related to system performance and plant operations. The start-up period has been completed, and operations so far indicate that program destruction goals can be met. Because of TSCA permit delays on the deactivation furnace system (DFS), the Environmental Protection Agency

(EPA) mandated a delay in processing M55 rockets, which has significantly slowed the planned reduction of stockpile storage risk. In the interim, operations were continued on bulk items. Following the successful DFS trial burn in November 1998, the Army was processing M55 rockets at half rate under a RCRA permit limitation.<sup>1</sup> When the TSCA permit was issued in mid-1999, the RCRA limitation was lifted. The TOCDF is now authorized to process M55 rockets at the full rate and is proceeding toward meeting its original risk reduction goals as soon as possible.

Some early operational problems were linked to important safety management issues. These problems, and the investigations necessitated by them, have taken time and management resources that might otherwise have been applied to improving operating performance.

Unresolved issues involving the disposal of dunnage and problems with the slag removal system heater are not critical to continuing safe performance, but their prompt resolution (in the interest of minimizing waste and reducing the number of plant shutdowns for heater replacement) remains a high priority. For example, because it is more economical to ship waste brine off site, the Army has not retested the compliance of the brine reduction area (BRA) with particulate emissions standards. If off-site brine disposal becomes infeasible, this could affect TOCDF operations.

### **Trial Burn Tests to Establish Compliance with RCRA and TSCA**

The committee has reviewed and evaluated the results of trial burns conducted on the various incinerators comprising the baseline system. Trial burns were conducted in accordance with RCRA and TSCA protocols. The acceptance criteria for the RCRA trial burn of the liquid incinerators, the DFS, and the metal parts furnace

<sup>1</sup>Because of artifact contamination, some of the initial DFS test runs after the destruction and removal of polychlorinated biphenyl (PCB) were inconclusive. The retest unambiguously demonstrated compliance with TSCA requirements.

<sup>2</sup>Risk management is a decision-making process for balancing alternative strategies and consequences and a process for implementing those decisions. Risk management is based on: (1) a thorough assessment of performance and the full spectrum of risks to the public, workers, the environment, and property; (2) the prioritization of risks so they can be addressed in order of seriousness; (3) methods of assessing the impact of proposed changes in

have been met. A second test of the DFS polychlorinated biphenyl (PCB) destruction efficiency showed that emissions levels meet TSCA criteria. The TOCDF has been issued a TSCA permit for the DFS, and activities to obtain a national TSCA permit are still ongoing. Certification of the BRA is not required as long as waste brine is being processed off site. An application was submitted in late 1998 for the RCRA permit renewal, allowing six months for regulators to review the application before the present permit expired in June 1999. At the time of publication, the regulators had completed work with the Army on the permit renewal, but its issuance was pending until the conclusion of a public comment period.

### **Improvements in Monitoring Systems**

False-positive alarms from the current automatic continuous air monitoring system continue to occur and interrupt agent destruction operations. Although the Army appears to be making reasonable progress in addressing the committee's previous recommendations—including upgrading both the automatic continuous air monitoring system and the depot area air monitoring system—the development, testing, and deployment of more reliable agent monitors should be expedited as much as possible. The development and testing of Fourier transform infrared technology for the real-time detection of an agent release is also proceeding, but real-time alarms are still in development.

### **Risk Management**

The risk management program<sup>2</sup> uses the health risk assessment (HRA) and quantitative risk assessment (QRA) as quantitative tools to evaluate and manage the

procedures, management, or equipment; (4) evaluations of abnormal incidents for effects on facility risk; and (5) a commitment to continual evaluation and improvement. Risk management usually involves the following steps:

- understanding the risk (including identifying major contributors to risk)
- suggesting alternative ways to reduce risk
- evaluating alternatives for risk reduction
- selecting preferred alternatives (including implementing decisions)

facility risks.<sup>3</sup> The HRA for the TOCDF, completed by the Utah Department of Environmental Quality before the start of agent operations, showed that risks were well below regulatory thresholds. However, the data from the TOCDF trial burn indicate that a few compounds were measured at higher concentrations than were assumed in the HRA; the detection limits for others were too high to confirm the validity of the assumed HRA emission rates. Furthermore, a review of some of the models used in the HRA revealed that the HRA did not use the air-dispersion and deposition models and risk assessment methods then recommended by the EPA (i.e., all guidance and updates issued by the EPA through December 1994).

Now that the TOCDF trial burns have been completed, the State of Utah or the Army may wish to issue a brief update of the results of the HRA based on actual TOCDF emissions data and the original EPA guidance. Although the risks posed by individual compounds may change in the updated results, the overall estimate of risk is not likely to change significantly. The committee urges that the results of the revised HRA be made widely available.

Although higher emission rates were found during the trial burn, they would not necessarily significantly change the results of the HRA because the HRAs performed to meet regulatory compliance requirements and HRAs directed toward risk management have different focuses. The former use high-biased assumptions designed to provide realistic bounds but may significantly overstate anticipated effects. The latter use more realistic estimates as a basis for risk mitigation. Hence, significant changes in the emission rates of individual compounds, particularly those that do not contribute significantly to overall risk, may not significantly change HRA results.

The implementation of an effective risk management program at the TOCDF will have important implications for the CSDP as a whole. The Stockpile Committee has made several recommendations in previous NRC

reports for improving risk management. In both the 1996 report, *Review of Systemization at the Tooele Chemical Agent Disposal Facility*, and the 1997 report, *Risk Assessment and Management at Desert Chemical Depot and the Tooele Chemical Agent Disposal Facility*, the committee observed that certain aspects of risk assessment and risk management at DCD/TOCDF and throughout the CSDP program required further work and refinement. For example, based on experience from the TOCDF, the committee now recommends that Phase 2 QRAs<sup>4</sup> for chemical disposal facilities under development be performed as soon as feasible. This will allow risk mitigation measures to be implemented through design changes as necessary.

The committee is pleased with the manner in which the Army has responded to safety issues identified in QRAs. However, risk management continues to be an informal, albeit thorough, process. The committee is concerned that an informal process driven by key individuals in the office of the Program Manager for Chemical Demilitarization (PMCD) could break down with a change in personnel or that the risk management process might not be fully transferred to specific sites. Therefore, the committee urges the PMCD to consider the establishment of a formal management program for QRA-identified safety issues, including a tracking mechanism for identifying new issues and monitoring their resolution.

The committee concluded that another critical aspect of risk management is the change management process (CMP). In this process, effects on risk as measured by the HRA and QRA, as well as public input, are used to evaluate proposed system or operational changes. The PMCD claims that public involvement will be part of changes with a significant impact on risk or changes that are of public concern. The committee believes that public involvement is an important element in the timely disposal of the stockpile—including, but not limited to, the CMP.

The committee strongly believes that the Army should rapidly document and formalize the effective risk

<sup>3</sup>The TOCDF QRA estimates the risk to the public and workers from accidental releases of chemical agent associated with all activities during storage at DCD and throughout the disposal process at the TOCDF. The HRA is a screening analysis to estimate possible off-site human health risks associated with exposure to airborne emissions from the TOCDF under normal and upset conditions. The HRA also estimates risks to wildlife and the environment. Whereas the HRA is a screening tool using conservative

upper limit assumptions on releases of hazardous materials, the QRA is a more exhaustive and thorough analysis using actual data and addressing uncertainties.

<sup>4</sup>A Phase 1 QRA evaluates public risks from a proposed facility before it is constructed. A Phase 2 QRA is a detailed evaluation of the risks and consequences of accidental releases of agent to workers and the community based on the site-specific design and operations.

management programs being used on the site-specific and programmatic levels. Cross-communication, cooperation, and learning between sites has greatly enhanced the entire program. The Army must continue and strengthen this process to improve safety and environmental performance.

### Safety Programs and Performance

The Stockpile Committee has been monitoring the CSDP safety performance since its evaluations of operational verification testing at JACADS in 1993 and 1994 and has recommended improvements in the overall management of safety, particularly the development of a well qualified, well trained workforce that operates within an established safety culture. Safety at the TOCDF has also become a public issue because of detailed allegations by two former employees that safety programs and performance at the facility were deficient. As a result of these allegations, seven independent assessments of the safety program at the TOCDF have been conducted. All these assessments reached the same conclusion—that agent operations are being conducted safely.

The Stockpile Committee agrees that TOCDF agent operations are being conducted in a manner that protects the public. Nevertheless, instances of failure to wear required protective equipment, poor housekeeping, and some unsafe working conditions observed by the committee during site visits indicate that a total safety culture has yet to take root at the TOCDF. The recent spill of 140 gallons of nerve agent GB within the containment area caused by the improper reassembly of a filter following maintenance suggests that more training and emphasis on following procedures are needed for maintenance and other operations-related activities.

In response to the committee's observations and recommendations, and out of a stated desire to improve safety performance, TOCDF management has implemented several programs and initiatives to develop and maintain a "safety culture" at the site. Despite these efforts, safety performance has not improved significantly since the agent destruction operations began.

The formal and informal communications about safety that are now issued by TOCDF management on a regular basis have reinforced the commitment to safety and created an environment in which safety is valued. These communications should be continued. The committee is satisfied that some progress has

been made toward creating a better environment for the development of a safety culture at the TOCDF. Continued attention to balancing the safety of agent operations and traditional industrial safety issues, as well as continued management involvement and commitment, will be necessary.

### Public and Community Interactions

The Stockpile Committee's recommendations regarding public involvement in the CSDP and emergency management/preparedness in the 1996 *Systemization* report dealt only with activities at the TOCDF. The recommendations in the 1997 *Risk Assessment and Management* report were related to risk management in the overall disposal program.

Since 1996, important changes have been made in the PMCD management of the CSDP, especially in the Public Outreach and Information Office (POIO). After a comprehensive self-examination, the POIO redefined its mission and organization and is no longer the primary point of contact for local public involvement activities for specific sites. Much of the responsibility for site-specific public involvement activities has been delegated to on-site contractors. Although it is still too early to assess the impact of the reorganization and realignment of the POIO, the supporting documentation and goals are much improved.

Although reorganization of the POIO and its goals is important, as is the shift to developing strategies to increase public involvement, neither is a satisfactory substitute for an organizational culture that proactively seeks the involvement of stakeholders and the personnel of the local outreach office. Neither the personnel of the local outreach office nor the public had input into the draft CMP prior to the Army's first public presentation of the process. The committee was disappointed by the CSDP's failure to implement its CMP for any proposed change to the facility. The Army needs to engage the public, not only in changes to already established technology at baseline sites—a topic of limited interest as evidenced by poor public turnout—but also in pending decisions on topics of interest to neighboring communities, such as plans for decommissioning a facility.

Despite improvements in outreach at the local level and the reorganization of the POIO, the committee sees little evidence that stakeholder and public views have been incorporated into the decision-making process. The CSDP has clearly expanded its ability

and capacity for public outreach, but it has not yet achieved the meaningful public involvement the committee recommended.

The Chemical Stockpile Emergency Preparedness Program (CSEPP) has also been reorganized. The Army still controls on-site emergency preparedness, but all off-site responsibilities, including budgeting, have been assigned to the Federal Emergency Management Agency. Consequently, off-site preparations are no longer within the scope of the Stockpile Committee's oversight. The committee remains concerned

about CSEPP's relation to the CSDP and the horizontal fragmentation of responsibility at the federal level. Since the TOCDF became operational, local emergency preparedness activities have intensified and have resulted in some excellent preparedness exercises. The emergency communications system in Tooele County is nearly complete, the decontamination equipment is substantially in place, and tone alert radios are being distributed. At least at Tooele, indications are that the activities of on-site and off-site emergency managers are well coordinated.

## Introduction

### DESCRIPTION OF THE CHEMICAL AGENT AND MUNITIONS STOCKPILE

For more than 50 years, the United States has maintained a stockpile of chemical agents and munitions distributed among eight sites in the continental United States and at Johnston Atoll in the Pacific Ocean. Two basic types of chemical agents comprise the stockpile: neurotoxic (nerve) agents and mustard (blister) agents. Both types are frequently, and erroneously, referred to as "gases" even though they are liquids at normal temperature and pressure.<sup>1</sup>

The nerve agents include organic phosphorus compounds designated as VX, GB (sarin), and GA (tabun). These chemicals present a significant toxic hazard because of their action on the nervous systems of humans and animals through inhibition of the acetylcholinesterase enzyme. VX is more acutely toxic than GB, but the latter represents a greater potential hazard because of its higher volatility (about the same as water) and, thus, the greater likelihood of being inhaled. Chronic health effects and cancer from low-level exposures have not been associated with nerve agents or with chemically (and toxicologically) similar commercially available organic phosphorus insecticides (Leffingwell, 1993). Only short-term symptoms have been documented in individuals who have survived exposure to nerve agents.

The mustards (designated H [nondistilled mustard], HD [distilled mustard], and HT [thickened mustard]) do not present significant acute lethal hazards. Their principal effect is severe blistering of the skin and mucous membranes. They have been implicated as possible

carcinogens, however, and may present a cancer hazard to individuals suffering acute exposure (Leffingwell, 1993; IOM, 1993). Estimates of induced cancers from accidental agent exposures only apply to mustard agents.

Once chemical agents are fully dispersed, they do not tend to persist in the environment because of their high chemical reactivity, particularly with water. However, in extremely dry desert climates, they can persist for a considerable period of time (U.S. Army, 1988).

The chemical agents in the U.S. stockpile are stored in a variety of containers, including bulk (ton) containers, rockets, projectiles, mines, bombs, cartridges, and spray tanks. Figure 1-1 summarizes the stockpile configuration for the eight continental U.S. sites by agent, munition, and containment system prior to the start of agent destruction operations at the Tooele Chemical Agent Disposal Facility (TOCDF) (NRC, 1997).

### CALL FOR DISPOSAL

#### Chemical Stockpile Disposal Program

Because of the age of the stockpiled chemical weapons, their lack of utility as effective weapons or deterrents, the continuing costs of maintenance, and the potential for accidental release, the United States and other countries have strong incentives to dispose of them. In 1985, Congress enacted Public Law 99-145 to initiate the process of eliminating the U.S. chemical weapons stockpile with an expedited program to dispose of

<sup>1</sup>The *stockpile* (the subject of the Army's Chemical Stockpile Disposal Program) consists of both bulk containers of nerve and blister agents and munitions, including rockets, mines, bombs, cartridges, projectiles, and spray tanks loaded with nerve or blister agents. Buried chemical warfare materiel, recovered chemical warfare materiel, binary weapons (in which two non-lethal components are mixed after firing to yield a lethal nerve

agent), former production facilities, and miscellaneous chemical warfare materiel are not included in the stockpile. The disposition of these five classes of materials is the subject of the separate Non-Stockpile Chemical Materiel Program. Information on the Army's overall chemical materiel disposal programs is available at <http://www-pmcd.apgea.army.mil/>

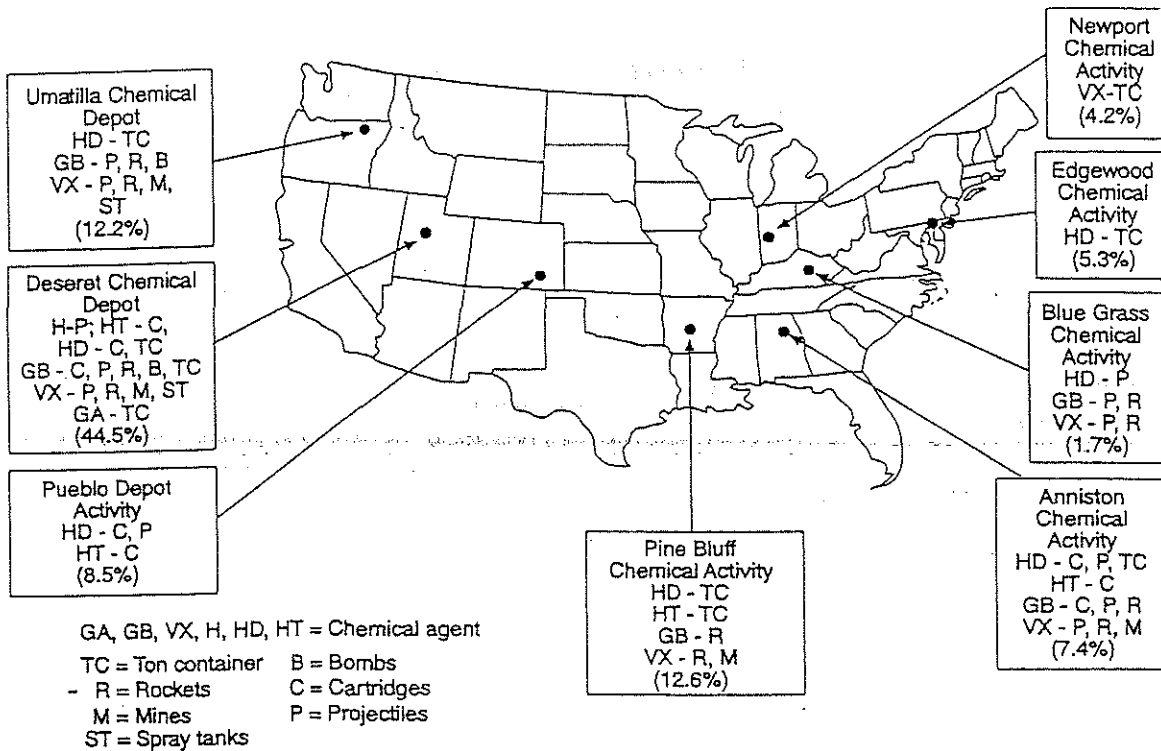


FIGURE 1-1 Location and size (percentage of original stockpile) of eight continental U.S. storage sites. Source: OTA, 1992; NRC, 1997.

M55 rockets. These munitions raise special concerns because they are aging and because they contain agent, explosives, and propellants in an integrated configuration (as propellants age, stabilizer components degrade—increasing the potential for autoignition). In 1992, Congress enacted Public Law 104-484, which directed the Army to dispose of the entire unitary<sup>2</sup> chemical agent and munitions stockpile by December 31, 2004. Congress also directed that the Chemical Stockpile Disposal Program (CSDP) be implemented in a manner that ensured maximum protection of workers, the public, and the environment.

### Chemical Weapons Convention

The CSDP has evolved in parallel with worldwide efforts to establish international control of chemical

agent precursors and eliminate chemical agents and munitions. Over the course of several decades, a broad and complex agreement known as the Chemical Weapons Convention (CWC) was negotiated. Since 1993, the CWC has been signed by 165 countries and ratified by more than 100. The convention went into effect on April 29, 1997, six months after 65 countries had ratified it. Since then, the United States, which was actively involved in negotiating the CWC agreement, and Russia, the world's largest holder of chemical agents and munitions, have also ratified it.

The CWC prohibits the development, production, acquisition, stockpiling, retention, transfer, or use of chemical weapons. Article IV requires that signatories destroy chemical weapons and any special facilities for their manufacture within 10 years, (by April 29, 2007). Destruction of chemical weapons is defined as "a process by which chemicals are converted in an essentially

<sup>2</sup>The term *unitary* refers to a single chemical loaded in munitions or stored as a lethal material. More recently *binary* munitions have been produced, in which two relatively safe chemicals are loaded into separate compartments to be mixed to form a lethal agent after the munition is fired or released. The components of

binary munitions are stockpiled separately, in separate states. They are not included in the present Chemical Stockpile Disposal Program. However, under the Chemical Weapons Convention of 1993, they are included in the munitions that will be destroyed.



reversible way to a form unsuitable for production of chemical weapons, and which, in an irreversible manner, renders munitions and other devices unusable as such" (Smithson, 1993). The method of destruction is to be determined by each country, but the manner of destruction must ensure public safety and protect the environment.

### Selection and Development of the Baseline Incineration System

In the early 1980s, the Army investigated a number of strategies and technologies for the destruction or disposal of chemical weapons. Among these were chemical destruction ("neutralization"), ocean disposal (now banned by federal law), stockpile consolidation with subsequent destruction, and disassembly followed by component incineration. The Army then selected incineration as the preferred technology for stockpile disposal. The National Research Council (NRC) Committee on Demilitarizing Chemical Munitions and Agents was formed in August 1983 to review the status of the stockpile and to assess the available disposal technologies. In that committee's final report in 1984, incineration was endorsed as an adequate technology for the safe disposal of chemical warfare agents and munitions (NRC, 1984).

Pursuant to the enactment of Public Law 99-145, the Army began the development of components of the baseline incineration system at the Chemical Agent Munitions Disposal System (CAMDS) facility at Desert Chemical Depot (DCD), formerly Tooele Army Depot, Utah. Construction and systemization of the first fully integrated baseline incineration system, the Johnston Atoll Chemical Agent Disposal System (JACADS), was completed in July 1990 on Johnston Island, located in the Pacific Ocean approximately 700 miles southwest of Hawaii. The JACADS facility has a two-fold mission:

- to destroy the chemical agents and munitions stored there

- to serve as a demonstration facility for the baseline incineration system

### INCINERATION SYSTEM AT THE TOOELE CHEMICAL AGENT DISPOSAL FACILITY

The incineration system at the TOCDF represents a second-generation baseline system that incorporates improvements based on operating experience at the JACADS facility, advances in technology, and recommendations by the Committee on the Review and Evaluation of the Army Chemical Stockpile Disposal Program (Stockpile Committee), the successor to the Committee on Demilitarizing Chemical Munitions and Agents. The design was also based on the concept that the performance and safety of disposal are greatly enhanced if stockpile feed materials are separated into distinct streams of agent, energetic materials, metal parts, and dunnage (packing, activated carbon, and other waste material) prior to disposal treatment. A schematic drawing of the TOCDF incineration system is shown in Figure 1-2 (see Appendix A for a description of specific features of the TOCDF incineration system). Systemization (preoperational) testing at TOCDF began in August 1993, and agent operations began on August 22, 1996. Prior to the start of agent operations, a quantitative risk assessment (QRA) and a health risk assessment (HRA) were conducted (U.S. Army, 1996a; Utah DSHW, 1996).<sup>3</sup>

In the TOCDF baseline system, feed materials are separated inside a building that has areas capable of withstanding explosions. The atmospheric pressure in these and other areas where agent may potentially be present is controlled to be lower than the ambient atmospheric pressure to prevent leakage from the building to the outside atmosphere. Agents are removed from munitions and containers via remote control by two methods. Most containers are simply mechanically punched open and drained. Munitions, which also contain energetics (explosives/propellants), are mechanically disassembled and drained. These processes yield three material streams: agent, energetics, and metal parts. Energetics and metal parts may be

<sup>3</sup>The TOCDF QRA estimates the risk to the public and to workers from accidental releases of chemical agent associated with all activities during storage at DCD and throughout the disposal process at the TOCDF. The HRA, which was conducted by the Utah Division of Solid and Hazardous Waste (Department

of Environmental Quality), was a screening analysis to estimate possible off-site human health risks associated with exposure to airborne emissions from the TOCDF under normal and upset conditions. The HRA also estimates risks to wildlife and the environment.

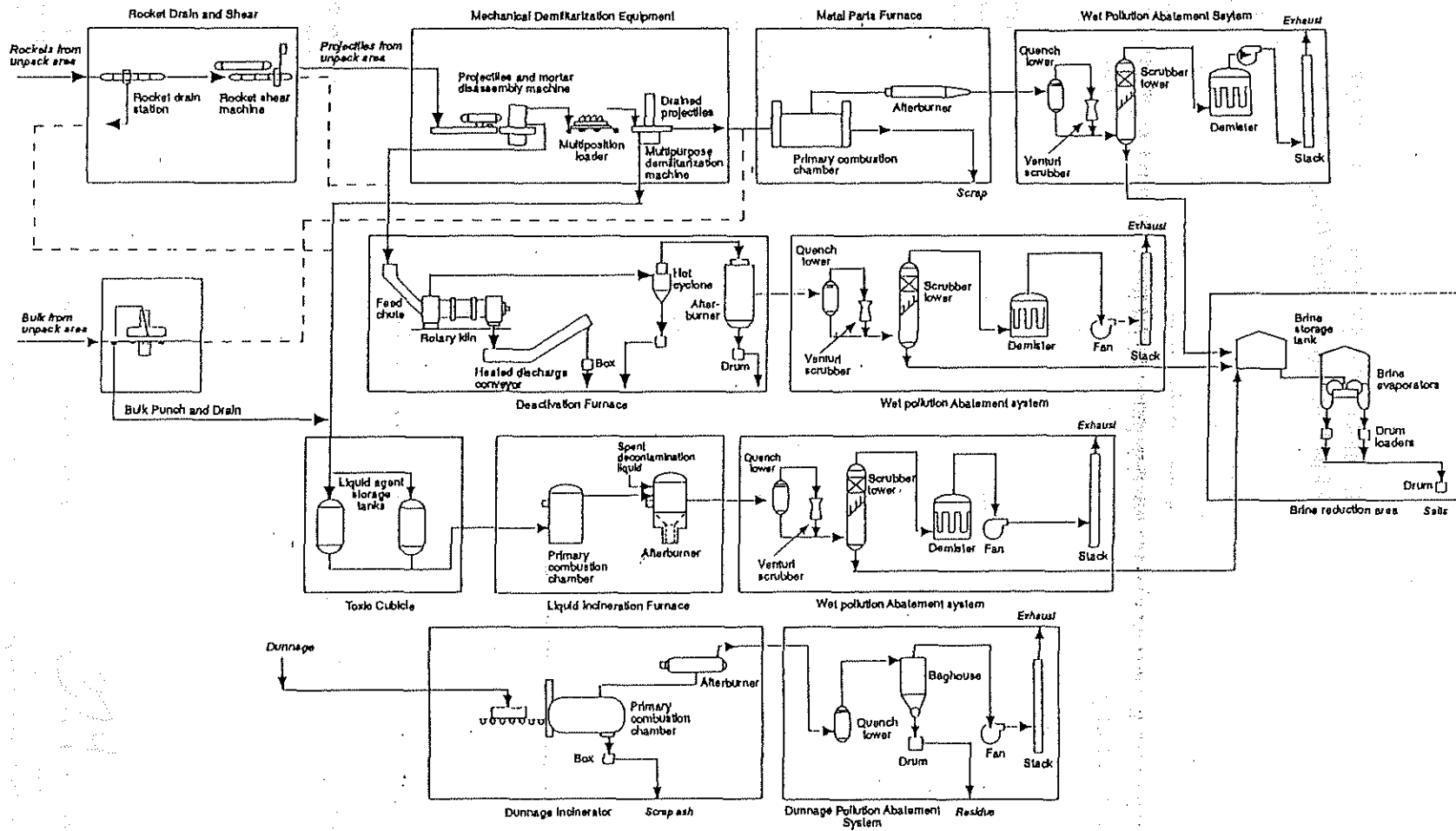


FIGURE 1-2 Schematic drawing of the TOCDF incineration system. Source: U.S. Army, 1988; NRC, 1994a, 1994b, 1994c.

contaminated by residual agent, but the vast majority of agent (95 percent or more) is usually recovered during the draining procedure. This material separation is a major safety feature of the TOCDF baseline system, which has parallel disposal systems for the treatment of these very different material streams.

At the TOCDF, agents are pumped to and destroyed in one of two specially designed liquid incinerators (LICs). Each LIC consists of a primary and secondary combustion chamber, and is followed by a pollution abatement system (PAS) consisting of a quick quench that saturates the gas stream, a venturi scrubber to control particulates, a tower scrubber to remove gaseous contaminants, and a demister to minimize water droplet carryover to the stack. Agent flow is stopped if the combustion chamber temperature drops below 2,550°F. Energetics are burned in a rotary kiln deactivation furnace system (DFS); exhaust gases are sent to an afterburner and then treated by a PAS before release to the atmosphere. Metal parts are decontaminated by heating in a metal parts furnace (MPF) to 1,000°F for a minimum of 15 minutes to vaporize and burn any residual agent; exhaust gases are sent to an afterburner and then to a PAS.

Agent compounds contain various inorganic elements that result in significant acid gas incineration products. Acidic gases in the discharge streams are scrubbed in the PAS of each furnace with alkali solutions to form salts. In the original plan, these wet salts, or brine, were to be processed in a brine reduction area (BRA) and the resultant dry salts stored for later disposal in hazardous-waste landfills. However, brine from the TOCDF is now shipped off site to a hazardous-waste disposal facility.

According to the original plan, contaminated and uncontaminated packing materials and miscellaneous waste, or dunnage, were to be burned in a dunnage furnace (DUN) and the exhaust gases discharged through a separate stack without acid gas scrubbing because only trace amounts of agent or other acid-producing species were expected to be present. Current practice at the TOCDF is to dispose of dunnage that is not contaminated with agent off site through normal waste-handling processes. Some agent-contaminated materials are decontaminated and disposed of as hazardous waste. Used activated carbon from the facility's air filtration system is a major waste component originally slated to be disposed of in the DUN. An alternate procedure for incinerating this material in the DFS is scheduled for testing in 2001.

Two auxiliary material streams are also processed: decontamination fluids are incinerated in the secondary

combustion chamber of the LIC; and ventilation air is passed through banks of activated carbon filters to remove any trace contaminants.

Baseline monitoring systems are used to detect agent release and to monitor adherence to environmental requirements. The agent monitoring system consists of a combination of the automatic continuous air monitoring system (ACAMS) and the depot area air monitoring system (DAAMS). The ACAMS detects immediate threats with a three- to eight-minute response time for agent levels at 20 percent of the permissible eight-hour exposure concentration for workers. The DAAMS, which provide a much more sensitive and definitive measurement, has a slower response time because it requires transporting collection tubes to a central laboratory for analysis. An ACAMS alarm from monitoring the exhaust flow through the PAS results in an immediate shutoff of agent feed. Because the less selective ACAMS field monitors sometimes produce false alarms for certain nonagent emissions, DAAMS laboratory analyses are used to confirm or disprove ACAMS alarms and to document environmental compliance.

## ROLE OF THE COMMITTEE ON REVIEW AND EVALUATION OF THE ARMY CHEMICAL STOCKPILE DISPOSAL PROGRAM

Concurrent with the beginning of construction of the baseline incineration facility at JACADS in 1987, the Army requested that the NRC review and evaluate the CSDP in order to provide advice and counsel. The NRC established the standing Stockpile Committee at that time to perform these tasks, beginning with a study of operational verification testing at JACADS, which was completed in March 1993. Several reports issued by the committee (e.g., *Recommendations for the Disposal of Chemical Agents and Munitions* [NRC, 1994a] and *Review of Systemization of the Tooele Chemical Agent Disposal Facility* [NRC, 1996a]) concluded that the baseline incineration system was an adequate and safe means of disposing of the chemical weapons stockpile (see Appendix B for a complete list of Stockpile Committee reports).

### Composition of the Stockpile Committee

Since its inception in 1987, the Stockpile Committee has exercised an advisory and oversight role over the Army's CSDP. Over the years, the Stockpile Committee has adjusted the composition of its membership to

maintain a balance of disciplines necessary to meet the task at hand. Current members have expertise in analytical chemistry; biochemical engineering; chemistry; chemical engineering; chemical industry management; combustion engineering; community health and urban studies; environmental health policy; environmental restoration; health risk assessment and environmental toxicology; mechanical engineering; monitoring and instrumentation; risk assessment, management, and communication; statistics and incinerator performance analysis; toxicology; and waste treatment and minimization.

## OVERVIEW OF RELEVANT NRC RECOMMENDATIONS

Table 1-1 is a summary of recommendations from past NRC reports that are relevant to the present study. In the 1994 NRC report, *Recommendations for the Disposal of Chemical Agents and Munitions* (*Recommendations* report), the Stockpile Committee established its general criterion for evaluating CSDP activities. This criterion is included in the first recommendation (subsequently referred to as [RC-1]: "The Chemical Stockpile Disposal Program should proceed expeditiously and with technology that will minimize total risk to the public at each site" (NRC, 1994a).

Although the minimization of public risk continues to be the committee's major concern, the total risk is dependent on a number of factors:

- integrity of facility design, construction, operation, and maintenance
- a safety culture throughout the organization
- qualified, well trained, highly motivated managers and workers
- current, detailed safety analyses
- positive working interactions with regulatory agencies, emergency response services, community groups, and the general public

The 1996 NRC report, *Review of Systemization of the Tooele Chemical Agent Disposal Facility* (*Systemization* report), which was published several months before the start of agent operations at the TOCDF, contained 18 specific recommendations organized by the timing of the start of agent operations (NRC, 1996a). However, for the purposes of the present report, they are considered topically. A 1996 letter report, *Public Involvement*

and the Army Chemical Stockpile Disposal Program, contained two recommendations (NRC, 1996b). In the 1997 NRC report, *Risk Assessment and Management at Deseret Chemical Depot and the Tooele Chemical Agent Disposal Facility* (*Risk Assessment and Management* report), 10 additional recommendations were made (NRC, 1997). In Table 1-1, the *Recommendations* report is designated [RC]; the *Systemization* report is designated [S]; the *Risk Assessment and Management* report [R]; and the *Public Involvement* report [PI]. A complete list of TOCDF-related recommendations is presented in Appendix C.

## PURPOSE OF THIS REPORT

This report reviews the status of the CSDP with respect to earlier recommendations made by the Stockpile Committee. The primary objectives of this report are to assess the Army's progress and to acknowledge actions that satisfy prior recommendations, to identify recommendations that require further action, and to provide additional recommendations for improving overall performance at the TOCDF after more than two years of agent disposal operations. Although the focus of this report is on the TOCDF, some findings and recommendations apply to other sites and the CSDP as a whole. The statement of task concerning this report follows:

### Statement of Task

The NRC study will accomplish the following:

- Gather and assess data and information from the Tooele Chemical Agent Disposal Facility (TOCDF) on systems performance and plant operations, e.g., incineration trial burns, brine reduction area testing and certification, slag removal system operations, monitoring systems operations, and other performance characteristics.
- Assess progress in the area of safety and risk management, e.g., establishment of a safety culture, establishment of safety performance goals, implementation of high quality, adequately staffed safety management systems, and implementation of other elements important to a sound risk management program.
- Evaluate and assess the Army's actions and programs designed to enhance public and community

TABLE 1-1 NRC Recommendations Addressed in This Report

Prior Recommendation	Area(s) Addressed by Recommendation	Chapter in Which Recommendation Is Discussed
RC-1	Program-wide risk reduction	2, 3, 4
S-1	Implementation of a safety program	3, 4
S-2	Incorporation of safety and environmental goals into award fees	4
S-3	Completion of QRA, resolution of safety-related issues	3
S-4	Improved public interactions and communications	5
S-5	Emergency preparedness training	5
S-6	Completion and practice of emergency preparedness plans	5
S-7	Completion of emergency-preparedness communications system for Tooele site	5
S-8	Completion of Army preoperational survey	2
S-9	Attainment of LIC 99.9999% DRE	2
S-10	Safety management	4
S-11	Completion of RCRA and TSCA trial burns	2
S-12	BRA certification; dunnage disposal	2
S-13	LIC slag removal	2
S-14	Completion of risk management plan (RMP)	3
S-15	Risk assessment integration	3
S-16	"Near misses" tracking and safety	3
S-17	Improvements in monitoring	2
R-1	Updating of QRA, HRA	3
R-2	Development and review of program-wide site-specific QRAs and HRAs	3
R-3	Update of QRA methodology manual	3
R-4	Inclusion of "safety culture" in <i>Guide</i>	4
R-5	Definitions of risk management roles and responsibilities in <i>Guide</i>	4
R-6	Inclusion of public involvement in RMP	5
R-7	Tracking of CMP performance	5
R-8	Understanding of risk assessment by workers, etc.	3
R-9	Implementation and updating of RMP	3, 4, 5
PI-1	Commitment of CSDP to public involvement	5
PI-2	Coordination of CSDP, CSEPP, public affairs, and RMP	3, 5

Legend: RC = Recommendations for the Disposal of Chemical Agents and Munitions (NRC, 1994a); S = Review of Systemization of the Tooele Chemical Agent Disposal Facility (NRC, 1996a); R = Risk Assessment and Management at Desert Chemical Depot and the Tooele Chemical Agent Disposal Facility (NRC 1997); and PI = Public Involvement and the Army Chemical Stockpile Disposal Program (NRC, 1996b). See Appendix B for a complete list of reports by the NRC Stockpile Committee.

interactions on issues of mutual concern, e.g., risk reduction, change management, emergency management, etc.

- Extract valuable lessons learned and their programmatic implications.
- Provide recommendations that the committee believes are needed to enhance the overall Chemical Stockpile Disposal Program at the TOCDF and at other sites.

In performing this assessment, the entire Stockpile Committee visited the TOCDF in March 1997 and met with TOCDF staff in Salt Lake City in February 1998 (see Table 1-2). A working group of the committee also visited the site on December 9, 1997, and March 11, 1999. This report is based on those visits, prior visits, a review of reports and briefings by the Army and other groups, and the committee's extensive knowledge of the CSDP and the construction and systemization of the TOCDF.

This chapter has provided a brief description of the TOCDF facilities and the CSDP. Chapter 2 assesses systems performance and plant operations. Chapters 3 and 4 discuss risk assessment and risk management and safety issues, respectively. Chapter 5 reviews the relationships between the TOCDF (which is operated by Edgerton, Germerhausen and Grier [EG&G] Defense Materials Incorporated, an Army contractor, and the

TABLE 1-2 Site Visits and Briefings

TOCDF Site Visits (1997-1999)	Committee Attendance
March 1997	full committee
July 1997	working group
December 1997	working group
February 1998	new members
TOCDF Briefings (1997-1999)	
March 6, 1997	full committee
June 19, 1997	full committee
September 18, 1997	full committee
February 26, 1998	full committee
June 25, 1998	full committee
September 24, 1998	full committee
January 7, 1999	full committee
March 18, 1999	full committee

office of the U.S. Army Program Manager for Chemical Demilitarization [PMCD]) and relevant government and community groups. Committee findings and recommendations are presented in Chapter 6.

## Systems Performance and Plant Operations

In the areas of systems performance and plant operations, the Stockpile Committee recommended that the following conditions be satisfied:

- mandatory Army Preoperational Survey requirements prior to the start of agent operations [S-8]
- all Resource Conservation and Recovery Act (RCRA) and Toxic Substance Control Act (TSCA) trial-burn requirements for the LICs and DFS [S-9, S-11]
- testing and certification of the BRA and DUN or implementation of a satisfactory alternative [S-12]
- demonstration of the slag-removal system for the LICs [S-13]
- active pursuit of continual improvements in monitoring systems [S-17]
- continued evaluation of the proposed addition of a carbon-bed filter to the PAS [S-18] (the subject of a separate NRC report, *Carbon Filtration for Reducing Emissions from Chemical Agent Incineration* [NRC, 1999])

### OVERVIEW

#### Activities since the Start of Agent Operations

The TOCDF began agent operations on August 22, 1996. As of May 19, 1999, 20,001 GB M55 rockets, 2,710 GB ton containers, 137,754 GB 105 mm projectiles, and 4,463 GB MC-1 bombs had been destroyed. The destruction schedule for M55 rockets had fallen behind the original timetable because of a delay in obtaining the TSCA permit; and more projectiles and fewer ton containers had been processed than was projected by the TOCDF QRA schedule. Approximately 51 tons of GB have been destroyed, more than 20 percent of the total DCD stockpile.

Every year the Army submits a report to Congress on the CSDP that includes a description of "other events"

and a summary of significant events that resulted in plant shutdowns, of which there have been two each year. The most recent shutdown, which occurred on December 13, 1998, was caused by improper reassembly of an in-line filter after maintenance that resulted in 140 gallons of GB leaking into the toxic cubicle sump. Although all agent was contained by the safeguards built into the facility, this significant maintenance error suggests that there are problems in training and the implementation of a safety culture throughout the organization. This event also suggests insufficient communication between control room operations and maintenance personnel. None of the events resulted in exposure of personnel to chemical agent or its release to the environment.

RCRA trial burns have been satisfactorily completed with GB for LIC-1 and LIC-2, the MPF, and the DFS. The TSCA trial burn for the DFS had to be redone, however, which delayed the processing of M55 rockets. The second TSCA trial burn was successful.

The BRA did not pass its initial compliance test because of excessive particulate emissions, but the probable cause of the problem was identified. However, because economics favor the off-site disposal of brine, the Army has decided not to retest the BRA at this time. This has raised concerns on the committee about what would happen if the off-site shipping of brine becomes unavailable. TOCDF site managers have discussed alternatives to the off-site disposal of brine, and the BRA is presently in a long-term lay-up configuration, which means the equipment will be protected while it is inactive. Approximately four weeks would be necessary for the equipment to be made operational. The state of Utah has verbally agreed that, in the event of a change to requirements for brine management, it would allow the Army time to effect the transition. This could include authorizing the temporary storage of brines in isolation containers (as is done at JACADS) until the equipment in the BRA can be brought on line and tested to demonstrate compliance with regulatory requirements.

The DUN at the TOCDF has not been used because contaminated wastes that were scheduled for destruction in the DUN are being disposed of at qualified hazardous-waste management facilities. Although off-site disposal was always an option, the DUN was originally designed as part of the overall waste-minimization program required by the Environmental Protection Agency (EPA) and endorsed by the committee. The major contaminated waste stream scheduled for destruction in the DUN is the activated carbon from the facility's ventilation system. As an alternative, the Army is studying the installation of a micronizer and burner designed to dispose of activated carbon in the DFS. A prototype unit will be tested at JACADS during the closure phase of that facility (calendar year 2001).

Modifications to improve the LIC slag-removal system have been successful. As of December 1998, slag had been tapped approximately 45 times, almost all from LIC-1, which has an improved slag-removal system. During a recent maintenance shutdown, the slag-removal system for LIC-2 was also upgraded, but LIC-2 has not been operated long enough since then to demonstrate the performance of the upgraded system. To date, a total of approximately 22,000 lbs of slag has been drained from both incinerators; this has avoided approximately three maintenance shutdowns that would have been necessary to remove slag manually. A recurrent problem in the slag-removal system has been the failure of the heater, and the Army is evaluating ways to extend heater life.

### Disposal Schedule

Because risk to the public is directly related to the existence of the stockpile, its rate of destruction is of key concern to the Stockpile Committee. The faster the stockpile can be safely destroyed, the lower the overall risk to the public becomes, and the Army has organized the disposal schedule to maximize risk reduction. The first campaigns, therefore, were focused on the disposal of M55 GB rockets, with co-processing of GB ton containers. At the start of agent processing, the expected

value of the public acute fatality risk as calculated in the QRA was  $1.4 \times 10^{-3}$  per year.<sup>1</sup>

According to the schedule issued at the start of agent destruction operations, all GB M55 rockets were to have been processed within the first nine months of operation. In actuality, after about one-third of the rockets (11,592 units) had been processed, rocket processing was stopped because some of the exhaust gas samples collected during the first TSCA trial burn contained a specific polychlorinated biphenyl (PCB) cogener that later proved to be a random sampling or analysis artifact. Thus, results of the first PCB destruction and removal efficiency test were ambiguous, and the TSCA permit for processing M55 rockets at the full rate was delayed pending a successful retest. The recovery efficiencies of surrogate spikes during the TSCA trial burns were low, which was probably due to the severe weather conditions during testing in January 1997. (Severe weather can affect the sampling procedures.) When the trial burns were repeated in November 1998, the results met regulatory requirements, and the processing of M55 rockets was resumed. In the interim, ton containers were processed, and GB MC-1 bombs and 105 mm projectiles were moved up in the schedule to make the most effective use of the facility.

At the end of calendar year 1998 (after 28 months of agent operations), the TOCDF had processed 71,771 items (rockets, bombs, projectiles, and ton containers) containing approximately 2,495 tons of agent. The public acute fatality risk calculated in the QRA for the condition at the end of 1998 was  $2.5 \times 10^{-4}$  expected fatalities per year. According to the operations schedule in the QRA, by this time 47,162 items were to have been processed containing approximately 4,004 tons of agent. In percentage terms, 52 percent more items had been processed by the end of calendar year 1998, but 37 percent less agent had been destroyed than originally scheduled. The difference reflects that more projectiles and fewer ton containers have actually been processed than were projected in the QRA schedule.

Thus, the TOCDF is ahead of the original QRA schedule in the number of items processed but behind in the tonnage of agent destroyed. The changes in the order of agent disposal operations have reduced the

<sup>1</sup>To understand the expected value (average number) of fatalities, imagine a large number of identical plants, each operating for an identical disposal mission. Most would have no accidents; some would have accidents involving one fatality, and some might have

accidents involving more than one fatality. The average number of fatalities for all of the plants is the expected value. See Appendix A of the *Risk Assessment and Management* report (NRC, 1997) for a more thorough discussion.



low risk and enabled efficient utilization of the facility, which is processing three munitions (GB-filled rockets, ton containers, and projectiles) at the same time. Because of the delay, the stacking height of stored VX rockets was lowered to reduce the storage risk. The current schedule allows for a constant rate of agent processing during the overall GB campaign, but the delay in processing GB-filled M55 rockets has slowed the rate of risk reduction. At the completion of the GB processing campaign (third quarter of calendar year 2001), the TOCDF is now projected to have destroyed 929,865 items containing approximately 6,097 tons of agent. At a similar point in the original schedule, the TOCDF was projected to have destroyed a total of 942,561 items containing approximately 6,683 tons of agent, including some non-GB agent.

At the start of agent processing, the public acute-fatality risk calculated in the QRA for accidental agent release was  $1.4 \times 10^{-3}$  per year. This was based on five phases of disposal: (1) disposal of GB rockets and ton containers; (2) disposal of VX rockets and spray tanks; (3) processing of remaining GB items; (4) processing of remaining VX items; and (5) disposal of HD. Because of the delay in the processing of GB rockets, the Army decided to complete disposal of all other GB items first, followed by all VX items. Thus, the public acute-fatality risk at the end of 1998 was  $2.5 \times 10^{-4}$  per year (18 percent of the original rate at the start of operations). This risk is based on the disposal of the GB munitions and ton containers and the reconfiguration (by reducing the stacking height and banding rockets together) of the stored VX rockets. At the same time in the original QRA schedule, the calculated public acute-fatality risk was to have been  $7.0 \times 10^{-5}$  per year, or 5 percent of the original risk at the start of operations, based on the assumption that all GB rockets, VX rockets, spray tanks, MC1 bombs, weteye bombs, and a little more than half of the GB ton containers had been processed.

The TOCDF destruction program was behind schedule by approximately one month (33 days) as of the end of calendar year 1998. Given the recent regulatory approvals for the operation of both of the LICs and the DFS at the full rate and the successful completion of the TSCA trial burn for the DFS, the committee believes that the current schedule delay can be made up. The processing of GB rockets is expected to resume after the disposal of the M360 projectiles (which are processed in the MPF) has been completed in the third quarter of calendar year 2001. The remaining GB ton containers and munitions can be coprocessed during this same

time, and GB rockets are being processed, as the system allows. Their disposal is expected to be completed in calendar year 1999. GB ton containers are processed whenever there is enough capacity in the LICs. This overall strategy is the shortest pathway through the TOCDF operations schedule that is consistent with the principle of processing the items with the highest storage risk as soon as practical.

At its meeting in September 1998, the committee was informed that the recent program-wide audit performed by the Arthur Anderson Company indicated that the present schedule and budget estimates were probably optimistic (Evans, 1998a; Arthur Anderson, 1998). Although safety is the committee's highest priority, the prompt destruction of the stockpile is the primary factor in risk reduction. A strong commitment program-wide and by site management to meeting schedules without compromising operational safety is essential to meeting the overall goal of safe and expeditious destruction of the stockpile.

## TRIAL BURNS

Trial burns are conducted to demonstrate that incinerator systems perform as designed and meet applicable state and federal regulations and permit restrictions. The specific purpose of a trial burn is to demonstrate permissible emissions while processing at maximum allowable chemical agent feed rates under projected worst-case operating conditions for both the combustion chamber(s) and the air-pollution control equipment. The demonstrated worst-case operating conditions then become the operating limits in the operating permit. The facility operator is allowed to operate the incinerators at conditions equal to or better than the worst-case conditions. Hence, normal incinerator performance should always be as good or better than the performance demonstrated during the trial burn.

The TOCDF's LICs, DFS, and MPF were first tested using agent surrogates (i.e., chemicals that behave similarly to agents in incinerators but are not nearly as toxic at the same concentration). Once the surrogate trial burns demonstrated that the incinerators met the Army's performance standards, chemical agent trial burns were conducted to satisfy RCRA and TSCA requirements.

The sections that follow summarize the results of the surrogate and agent trial burns, discuss the implications of the agent trial-burn data for the HRA, and describe the problem with the TSCA trial-burn data that delayed

the processing of M55 rockets. If compounds of concern were present in concentrations below the detection limits, the practical quantification limits (PQLs) were reported for most tests.<sup>2</sup> Consequently, the maximum amount of a compound of concern that might have been present is overstated by a factor of at least 3.3.

### Surrogate Trial Burns

The TOCDF DFS, MPF, and one of two identical LICs were tested using agent surrogates. The DUN was not tested because DUN operations are no longer planned. The purpose of a surrogate trial burn is to demonstrate that an incinerator system (combustor plus air-pollution control system) can efficiently destroy and remove typically hard-to-burn compounds. The Army set a target destruction and removal efficiency (DRE) of 99.9999 percent, which is more stringent than the federal DRE requirement for all substances that do not contain polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/F). Surrogates were selected to meet the Utah Division of Solid and Hazardous Waste criteria. The surrogate trial burn for LIC-1 was successfully conducted between June 30 and July 7, 1995 (the results are summarized in NRC, 1996a). The results of the other three surrogate trial burns are summarized below.

### Results of Surrogate Trial Burns

The TOCDF operates under RCRA permit UT5210090002 issued by the state of Utah. Under the requirements of this permit, the incinerator systems must demonstrate that they meet performance standards that ensure effective and safe destruction of chemical agents before beginning routine operations. The primary objective of the surrogate trial burns was to demonstrate that the incinerators meet the following performance criteria:

- DRE of at least 99.9999 percent for the surrogates, also known as principal organic hazardous constituents
- emissions of total particulate matter lower than the federal requirement of 180 milligrams per dry standard cubic meter (mg/dscm), which is equivalent to 0.08 grains per dry standard cubic foot (gr/dscf) at 7 percent oxygen (O<sub>2</sub>); and the state requirement of 0.016 gr/dscf at 7 percent O<sub>2</sub> for particulate matter smaller than 10 microns<sup>3</sup> (PM<sub>10</sub>)
- hydrogen chloride (HCl) emissions, measured downstream of the pollution control equipment, less than four pounds per hour (lbs/hr) or less than 1 percent of the total organically-bound chlorine input to the furnace (i.e., chlorine in the surrogate, not salts that might contaminate the fuels)
- minimal emissions of products of incomplete combustion evidenced by 60-minute moving average carbon monoxide (CO) concentrations of less than 100 parts per million (ppm) on a dry, volumetric basis corrected to 7 percent O<sub>2</sub>

### Liquid Incinerator #2

LIC-2 surrogate trial burns were conducted on January 29 and 30, 1996. The surrogates selected to simulate the chemical agents were 1,2,4-trichlorobenzene and tetrachloroethylene (also known as perchloroethylene), which contain a lot of organically bound chlorine to challenge the PAS and have chemical bonds similar to those in the agents. The results should be reasonably representative of chemical agent operations.

Table 2-1 is a summary of the particulate matter, HCl, and CO emissions and DREs for the LIC-2 surrogate trial burns. Total particulate emissions were significantly lower than the PM<sub>10</sub> requirement, showing that the fraction of emissions of sub-10 micron particulates was lower than the requirement. A greater than 99.9999 percent DRE was

<sup>2</sup>Footnotes in some test reports (see, for example, Tables 5-9 and 5-19 in EG&G, 1997b) state that practical quantification limits (PQLs) were reported when results were below the detection limit. When the concentration of a sample with 3 to 5 times the estimated detection limit was repeatedly measured, the replicates show some scatter, which typically follows a bell-shaped, Gaussian distribution. The standard deviation of this distribution ( $S_0$ ) is used to define the detection limit as three times  $S_0$  (EPA, 1997). For measurements at the detection limit, the analyst can be confident

that the analyte is present but cannot make a firm statement about the amount. At or above the PQL, however, the analyst can be confident about the quantity. The PQL is defined as 10 times  $S_0$  for air pollution control measurements, but in 1999 this unique definition was termed inappropriate (EPA, 1999). Based on these definitions, the PQL is 3.3 times the detection limit. Consequently, by reporting the PQL for results that are below detection limits, the maximum amount of pollutant is overstated by a factor of at least 3.3.

<sup>3</sup>A micron is a millionth of a meter, so 10 microns is  $10^{-5}$  meters.

TABLE 2-1 Surrogate Trial Burns for LIC-2 in January 1996

Parameter	Requirement	Test Run Results		
		1	2	3
PM concentration <sup>a</sup> (gr/dscf)	< 0.08 <sup>b</sup>	0.0040	0.0040	0.0017
HCl emission rate (lb/hr)	4 <sup>c</sup>	< 0.003	< 0.003	< 0.003
CO Concentration <sup>d</sup> (ppm)	100	10.0	9.1	14.5
1,2,4-Trichlorobenzene DRE (%)	> 99.9999	> 99.999973	> 99.999973	> 99.999973
Perchloroethylene DRE (%)	> 99.9999	> 99.999983	> 99.999984	> 99.999991

<sup>a</sup>PM = particulate matter, corrected to 7 percent oxygen, dry basis.

<sup>b</sup>< 0.016 gr/dscf for particulate matter with a size  $\leq$  10 microns ( $PM_{10}$ ).

<sup>c</sup>Or less than 1 percent of organically bound chlorine in exhaust gas prior to entering pollution control equipment, which averaged 8.7 lb/hr for all three test runs.

<sup>d</sup>Corrected to 7 percent oxygen, dry basis.

Source: Adapted from EG&G, 1996a.

demonstrated. Limitations for particulate matter, HCl, and CO emissions were met during the test.

#### Metal Parts Furnace

MPF surrogate trial burns were conducted on June 4, 5, and 6, 1996. The surrogates selected to simulate the chemical agents were a combination of monochlorobenzene and hexachloroethane. This combination was recommended by the Utah DSHW as one that would be more difficult to destroy than the chemical agents and would provide a maximum challenge to the PAS.

Six of the first seven runs were invalidated because of sampling and analytical problems, such as the inadvertent use of an incorrectly spiked resin or a sampling system leak. Another run, Run 6, was aborted because of operating difficulties with the MPF. Because the sampling problems are not associated with the ability of the incinerator to meet performance standards, and because the operating difficulty during Run 6 involved ancillary equipment that was not likely to affect emissions, the Utah DSHW, with the guidance of the EPA, agreed that additional performance runs could be conducted. The next few runs, Runs 8 through 10, were completed without incident.

Table 2-2 summarizes the particulate matter, HCl, and CO emissions and DREs for the MPF surrogate trial

burns. The particle-size distribution was not measured so no information is available on the amount of  $PM_{10}$  actually emitted, but compliance with the  $PM_{10}$  standard (see performance criteria given earlier) was demonstrated because the total particulate emissions were less than the  $PM_{10}$  performance standard. The Army 99.9999 percent DRE requirement was also demonstrated. Hence, the MPF surrogate trial burns demonstrated that the system could safely proceed to the second phase of the RCRA demonstration and testing requirements—the chemical agent trial burn (ATB).

#### Deactivation Furnace System

The DFS surrogate trial burns were conducted between September 30, 1995, and October 6, 1995. The tests included one run using only supplementary fuel and five performance runs with surrogates. The surrogate compounds selected by the Utah DSHW were monochlorobenzene and hexachloroethane. An error in sample recovery voided run 1. Run 2 was not completed because of a mechanical failure in a feed chute that interrupted incinerator operations. Incinerator performance was assessed using runs 3, 4, and 5.

Table 2-3 summarizes the particulate matter, HCl, and CO emissions and DREs for the DFS surrogate trial burns. Although particulate size was not measured, to

TABLE 2-2 Surrogate Trial Burns for the MPF in June 1996

Parameter	Requirement	Test Run Results		
		8	9	10
PM concentration <sup>a</sup> (gr/dscf)	PM < 0.08 <sup>b</sup>	0.0018	0.0015	0.0038
HCl Emission Rate (lb/hr)	< 4 <sup>c</sup>	< 0.016	< 0.009	< 0.009
CO concentration <sup>d</sup> (ppm)	< 100 <sup>e</sup>	7.9 7.2	8.3 6	8.4 7.3
Monochlorobenzene DRE (%)	> 99.9999	> 99.999966	> 99.999975	> 99.999976
Hexachloroethane DRE (%)	> 99.9999	> 99.999955	> 99.999955	> 99.999956

<sup>a</sup>PM = particulate matter, corrected to 7 percent oxygen, dry basis.

<sup>b</sup>< 0.016 gr/dscf for particulate matter with a size ≤ 10 microns (*PM*<sub>10</sub>).

<sup>c</sup>The 4 lb/hr emissions standard is greater than 1 percent of organically bound chlorine input to the furnace (1.05, 1.06, and 1.07 lb/hr for runs 8, 9, and 10, respectively).

<sup>d</sup>Corrected to 7 percent oxygen, dry basis.

<sup>e</sup>Standard is based on 60-minute moving average. The average of the one-minute moving averages recorded by two different continuous emission-monitoring system analyzers were reported to provide a more representative value over the feed time.

Source: Adapted from EG&G, 1996b.

TABLE 2-3 Surrogate Trial Burns for the DFS in September 1995

Parameter	Requirement	Test Results		
		3	4	5
PM concentration <sup>a</sup> (gr/dscf)	< 0.08 <sup>b</sup>	0.0043	0.0048	0.0049
HCl emission rate (lb/hr)	< 4 <sup>c</sup>	< 0.0183	< 0.0532	< 0.0040
CO concentration <sup>d</sup> (ppm)	100	10	10	10
Monochlorobenzene DRE (%)	> 99.9999	> 99.999990	> 99.999967	> 99.999999
Hexachloroethane DRE (%)	> 99.9999	> 99.999989	> 99.999988	> 99.999991

<sup>a</sup>PM equals particulate matter, corrected to 7 percent oxygen, dry basis.

<sup>b</sup>< 0.016 gr/dscf for particulate matter with a size ≤ 10 microns (*PM*<sub>10</sub>).

<sup>c</sup>Or less than 1 percent of organically bound chlorine in exhaust gas prior to entering any pollution control equipment (0.40, 0.39, and 0.40 lbs/hr for runs 3, 4, and 5, respectively).

<sup>d</sup>Corrected to 7 percent oxygen, dry basis.

Source: Adapted from EG&G, 1995.

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Particulate emissions were less than the  $PM_{10}$  emissions standard. Therefore, the fraction of emissions smaller than 10 microns ( $10^{-6}$  m) meets the requirement. The Army's 99.9999 percent DRE requirement was also demonstrated. Hence, the DFS surrogate trial burns demonstrated that the system could proceed to the second phase of the RCRA demonstration and testing requirements—the ATBs.

### Agent Trial Burns

The agent trial burns (ATBs) at the TOCDF site demonstrated that the incineration systems meet emissions requirements when burning chemical munitions. The ATBs are conducted (1) to demonstrate a DRE requirement for agent in accordance with the state of Utah permit, the Code of Federal Regulations (Title 40 Part 264), and RCRA regulations, and (2) to demonstrate system performance and the control of emissions. The results of the ATBs conducted to date for LIC-1, LIC-2, the DFS, and the MPF using agent GB are summarized below.<sup>4</sup> The following performance standards were characterized:

- DRE for the incinerator using agent GB as the principal organic hazardous constituent for fulfillment of RCRA requirements (i.e., 99.99 percent)
- compliance with the particulate-matter emission-rate limits in both the RCRA permit UT5210090002 and the Approval Order issued by the state of Utah
- compliance with the HCl emission-rate limits in the RCRA permit
- emission rates for phosphorus and the 20 metals estimated by the state of Utah for the screening HRA conducted by the Department of Environmental Quality DSHW (Utah DSHW, 1996)
- emissions of PCDD/F
- emissions of certain semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs)
- exhaust gas concentrations of  $O_2$  and CO using the TOCDF continuous emission-monitoring systems

(CEMS) to document one aspect of combustion conditions in the system and show compliance with the CO concentration limits in the RCRA permit

### Liquid Incinerators

LIC-1 ATBs were conducted on February 26, 27, and 28, 1997, and LIC-2 ATBs, on August 20, 22, and 23, 1997 (EG&G, 1997a, 1997b). During these performance trials, agent GB was processed. The results presented in Table 2-4 show that emissions of particulate matter, HCl, agent GB, and CO were within the permit limits established by the state of Utah for liquid incinerator systems. Agent destruction was better than the minimum DRE requirement of 99.99 percent.

Emission rates of VOCs, SVOCs, PCDD/F, phosphorus, and metals were compared to the emission rates used in the HRA (Utah DSHW, 1996). The results of this comparison are summarized below and shown in Table 2-5:

- Emission rates for 20 of the metals were below the rates used in the screening HRA. The highest measurement for LIC-1 lead is a statistical outlier indicating a potential sampling problem (which, had it been confirmed prior to the publication of the test report, would have invalidated that particular run and indicated compliance). The phosphorus concentration measured for LIC-1 was above the HRA estimated rate. Mercury was not detected, but the detection limit was above the rate used in the HRA.
- The international toxic equivalent concentration (ITEQ) for the PCDD/F averaged 0.00034 ng/dscm and 0.00053 ng/dscm (at 7 percent  $O_2$ ) for LIC-1 and LIC-2, respectively. These are lower than the federal hazardous-waste incinerator regulatory limit of 0.2 ng/dscm (at 7 percent  $O_2$ ) for new sources.
- Emission rates for two VOCs, ethylbenzene and m,p-xylene, were above the emission rates used in the HRA in at least one run on LIC-1. The other VOCs were either not detected or their emission rates were below the emission rates used in the HRA.
- The majority of the 141 target SVOCs were below measurement method detection limits. The measured emission rate for one SVOC, bis(2-ethylhexyl)phthalate, was above the assumed HRA

<sup>4</sup>See Chapter 2 of the 1999 NRC report, *Carbon Filtration for Reducing Emissions from Chemical Agent Incineration*, for a thorough discussion of measuring trace emissions, sampling and analysis methodologies, and the characteristics of exhaust gas emissions at the TOCDF and JACADS.

Table 2-4 Agent Trial Burns of LIC-1 and LIC-2

Emissions Parameter	State of Utah Permit Limit	LIC-1 Results	LIC-2 Results
Maximum concentration of agent GB <sup>a</sup>	0.3 µg/m <sup>3</sup>	< 0.0037 µ/m <sup>3</sup>	< 0.0034 µg/m <sup>3</sup>
Minimum DRE for GB	99.99%	> 99.999999969%	> 99.999999973%
Maximum concentration of particulate matter	0.016 gr/dscf @ 7% O <sub>2</sub> <sup>b</sup> 0.08 gr/dscf @ 7% O <sub>2</sub> <sup>c</sup>	0.0023 gr/dscf, @ 7% O <sub>2</sub>	0.0016 gr/dscf, @ 7% O <sub>2</sub>
Maximum emission rate of HCl	4 lbs/hr or 1% of total HCl prior to PAS	0.009 lbs/hr	< 0.016 lbs/hr
Maximum concentration of CO <sup>d</sup>	100 ppm @ 7% O <sub>2</sub>	16 ppm @ 7% O <sub>2</sub>	50 ppm @ 7% O <sub>2</sub>
Maximum concentration of CEMS O <sub>2</sub>	15%	9.2%	9.8%
Minimum concentration of CEMS O <sub>2</sub>	3%	6.7%	6.7%
Maximum concentration dioxin ITEQ <sup>e</sup>	0.2 ng/dscm @ 7% O <sub>2</sub> <sup>e</sup>	0.00046 ng/dscm @ 7% O <sub>2</sub>	0.00093 ng/dscm @ 7% O <sub>2</sub>
Average concentration dioxin ITEQ <sup>e</sup>	0.2 ng/dscm @ 7% O <sub>2</sub> <sup>e</sup>	0.00034 ng/dscm @ 7% O <sub>2</sub>	0.00053 ng/dscm @ 7% O <sub>2</sub>

<sup>a</sup>Determined from analysis of DAAMS sorbent tubes (Station PAS 704 - LIC-1; 705 - LIC-2).  
<sup>b</sup>Limit set by Air Approval Order for PM<sub>10</sub> (i.e., particulate matter with a size of ≤ 10 microns).  
<sup>c</sup>Limit set by RCRA Permit.  
<sup>d</sup>Maximum one hour moving average.  
<sup>e</sup>Proposed EPA limit; there is no state limit.

ITEQ (international toxic equivalency) dioxin is 2,3,7,8 TCDD (2,3,7,8-tetrachlorodibenzo-p-dioxin), with toxicity equivalent to the complex mixture of 10 dioxin and furan isomers (with 4 through 8 chlorine atoms). This equivalency is based on the ITEQ scheme adopted by the United States and most other countries to simplify the reporting of dioxin emissions.

Source: Adapted from EG&G 1997a, 1997b.

emission rate. Measurement method detection limits were above the equivalent HRA emission rates for dimethylphthalate, however, so conclusions cannot be drawn about the relation of actual and projected emissions for this SVOC.

rockets were processed at an average rate of 35 rockets per hour. The rockets were punched and drained of GB prior to entering the DFS, although some residual agent remained after the draining operation. The test results are summarized below and in Tables 2-6 and 2-7:

The list in Table 2-5 includes compounds for which a measured emission rate from LIC-1 or LIC-2 was higher than the value used in the HRA or for which the detection limit was too high to draw a meaningful conclusion.

- Emissions of particulate matter, HCl, GB, and CO were below the state of Utah permit limits established for the DFS.
- The measured 99.999981 percent DRE was better than the minimum 99.99 percent DRE requirement.
- Emission rates for 16 metals were below the HRA estimated values. Cadmium, lead, zinc, and phosphorus were higher than the HRA estimated emission rates. The detection limit for mercury was too

Deactivation Furnace System

DFS ATBs with GB were conducted on January 7, 10, and 11, 1997. During these performance runs, M55

TABLE 2-5 Measured LIC-1 and LIC-2 Emissions or Reported Upper Limits That Exceed Values Estimated in the HRA

	Maximum Emission <sup>a</sup> (g/sec)	HRA Estimated Rate (g/sec) <sup>b</sup>	Source
Metals and Phosphorus			
Lead	4.0 E-04	6.01 E-05	EG&G, 1997a, Table 5-18
Mercury	< 1.1 E-05	2.44 E-06	EG&G, 1997a, Table 5-18
	< 5.7 E-06	2.44 E-06	EG&G, 1997b, Table 1-1
Phosphorus	1.9 E-03	1.18 E-03	EG&G, 1997a, Table 5-18
VOCs			
Vinyl chloride	< 3.6 E-06	4.07 E-07	EG&G, 1997a, Table 5-7
	< 6.7 E-06	4.07 E-07	EG&G, 1997b, Table 5-7
Chloroform	< 3.8 E-06	4.07 E-07	EG&G, 1997a, Table 5-7
	< 1.3 E-05	4.07 E-07	EG&G, 1997b, Table 5-7
Carbon tetrachloride	< 3.3 E-06	4.07 E-07	EG&G, 1997a, Table 5-7
Bromodichloromethane	< 5.2 E-06	4.07 E-07	EG&G, 1997a, Table 5-7
	< 1.7 E-05	4.07 E-07	EG&G, 1997b, Table 5-7
Dibromochloromethane	< 6.4 E-06	4.07 E-07	EG&G, 1997a, Table 5-7
	< 1.7 E-05	4.07 E-07	EG&G, 1997b, Table 5-7
Ethylbenzene	4.5 E-06	4.07 E-07	EG&G, 1997a, Table 5-7
	< 6.4 E-06	4.07 E-07	EG&G, 1997b, Table 5-7
m,p-xylene	6.1 E-06	3.98 E-06 <sup>c</sup>	EG&G, 1997a, Table 5-7
	< 7.7 E-06	3.98 E-06	EG&G, 1997b, Table 5-7
Styrene	< 2.5 E-05	1.39 E-05	EG&G, 1997b, Table 5-7
	< 2.1 E-05	1.39 E-05	EG&G, 1997a, Table 5-7
Bromoform	< 1.3 E-05	1.19 E-05	EG&G, 1997b, Table 5-7
SVOCs			
Dimethyl phthalate	< 1.2 E-04	8.18 E-05	EG&G, 1997a, Table 5-9
	< 1.5 E-04	8.18 E-05	EG&G, 1997b, Table 5-9
Bis (2-ethylhexyl) phthalate	< 3.2 E-04	4.79 E-05	EG&G, 1997a, Table 5-9
	2.2 E-04	4.79 E-05	EG&G, 1997b, Table 5-9

<sup>a</sup>For the emissions of VOCs and SVOCs reported as "<" the PQL is reported. The PQL is 3.3 times the detection limit.

<sup>b</sup>The highest concentrations measured during the initial JACADS trial burns were used by the State of Utah DSHW to estimate TOCDF emissions.

<sup>c</sup>HRA value is for total xylene.

Source: Adapted from EG&G 1997a, 1997b.

TABLE 2-6 Agent Trial Burns for the DFS in January 1997

Emissions Parameter	State of Utah Permit Limit	DFS ATB Results
Maximum concentration of agent GB <sup>a</sup>	0.3 µg/m <sup>3</sup>	< 0.0117 µg/m <sup>3</sup>
Minimum DRE for GB	99.99%	> 99.999981%
Maximum concentration of particulate matter	0.016 gr/dscf @ 7% O <sub>2</sub> <sup>b</sup> 0.08 gr/dscf @ 7% O <sub>2</sub> <sup>c</sup>	0.0053 g/dscf, @ 7% O <sub>2</sub>
Maximum emission rate of HCl	4 lbs/hr or 1% of total HCl prior to PAS	< 0.040 lbs/hr
Maximum concentration of CO <sup>d</sup>	100 ppm @ 7% O <sub>2</sub>	8 ppm @ 7% O <sub>2</sub>
Maximum concentration of CEMS O <sub>2</sub>	15%	9.6%
Minimum concentration of CEMS O <sub>2</sub>	3%	9.0%
Maximum concentration of dioxin ITEQ <sup>e</sup>	0.2 ng/dscm @ 7% O <sub>2</sub>	0.00061 ng/dscm @ 7% O <sub>2</sub>
Average concentration of dioxin ITEQ <sup>e</sup>	0.2 ng/dscm @ 7% O <sub>2</sub>	0.00055 ng/dscm @ 7% O <sub>2</sub>

<sup>a</sup>Determined from analysis of DAAMS sorbent tubes (Station PAS 702).

<sup>b</sup>Limit set by Air Approval Order for PM<sub>10</sub>, (i.e. particulate matter with a size of ≤ 10 microns).

<sup>c</sup>Limit set by RCRA Permit.

<sup>d</sup>Maximum one hour moving average.

<sup>e</sup>Proposed EPA limit; there is no state limit.

<sup>f</sup>ITEQ (international toxic equivalency) dioxin is 2,3,7,8 TCDD (2,3,7,8-tetrachlorodibenzo-p-dioxin), with toxicity equivalent to the complex mixture of 210 dioxin and furan isomers (with 4 through 8 chlorine atoms). This equivalency is based on the ITEQ scheme adopted by the United States and most other countries to simplify the reporting of dioxin emissions.

Source: Adapted from EG&G, 1998.

high to make a definitive statement. The measured concentration for lead plus cadmium was less than 20 percent of the 24 µg/dsm<sup>3</sup> corrected to 7 percent O<sub>2</sub> limit for hazardous waste incinerators.

- The ITEQ concentrations for the PCDD/F emissions averaged 0.00055 ng/dscm (at 7 percent O<sub>2</sub>), compared to the new source performance standard of 0.2 ng/dscm for hazardous waste incinerators.
- Detection limits for seven VOCs and three SVOCs were higher than the estimated values in the HRA in at least one sample set. The measured emission rates or detection limits for the other VOCs and SVOCs were below those used in the HRA or were not detected at all.

Table 2-7 lists compounds for which measured emission rates or detection limits from the DFS were higher than the value used in the HRA.

### Metal Parts Furnace

ATBs of GB in the MPF were conducted on April 4, 15, and 17, 1997. During these performance runs, ton containers with residual GB were spiked with metals to represent the worst case of munitions feed containing heavy metals and agent-contaminated dunnage. In addition, 75 pounds of GB were added to each ton container. The agent feed rate for the MPF was nominally 110 lbs/hr, including both undrained heels (of gelled agent) and added agent. Packages of metal spiking compounds were placed on the feed cradle adjacent to each ton container. The results shown in Tables 2-8 and 2-9 are summarized below:

- Emissions of particulate matter, HCl, GB, and CO were within the state of Utah permit limits established for the MPF



TABLE 2-7 Measured DFS Emissions or Reported Upper Limits That Exceed Values Estimated in the HRA

	Maximum Emission (g/sec)	HRA Estimated Rate (g/sec) <sup>a</sup>
Metals and Phosphorus		
Cadmium	1.8 E-04	1.83 E-05
Lead	7.3 E-03	4.32 E-04
Mercury	< 1.1 E-05	5.15 E-06
Zinc	1.3 E-03	8.23 E-04
Phosphorus	2.5 E-03	9.14 E-04
VOCs <sup>b</sup>		
Bromodichloromethane	< 1.5 E-05	1.15 E-06
Mono-chlorobenzene	< 9.9 E-06	3.77 E-06
Chloroform	< 1.1 E-05	7.84 E-06
Dibromochloromethane	< 2.3 E-05	1.15 E-06
Ethylbenzene	< 1.0 E-05	2.88 E-06
4-methyl-2-pentanone (MIBK)	< 5.0 E-05	1.15 E-06
Tetrachloroethene	< 2.2 E-05	1.15 E-06
SVOCs <sup>b</sup>		
di-n-butyl phthalate	< 2.6 E-05	2.24 E-05
Dimethyl phthalate	< 1.6 E-04	8.18 E-05
Bis (2-Ethylhexyl) phthalate	< 8.6 E-04	4.79 E-05

<sup>a</sup>The highest concentrations measured during the initial JACADS trial burns were used by the state of Utah DSHW to estimate TOCDF emissions.

<sup>b</sup>For emissions of VOCs and SVOCs reported as "<," the PQL is reported. The PQL is 3.3 times the detection limit.

Source: Adapted from EG&G, 1998.

- The measured DRE was 99.9999 percent, which is better than the required minimum 99.99 percent DRE.
- Metals emission rates were below the rates used in the HRA. Phosphorus emission rates were higher than the HRA estimates.
- Emission rates for the PCDDs were below used in the HRA. Emission rates for tetra- and hexa-chlorodibenzofurans in two runs were higher than the HRA rates for these homologs. However, the ITEQ concentrations for the PCDDs emissions averaged 0.025 ng/dscm (corrected to 10% O<sub>2</sub>).

TABLE 2-8 Agent Trial Burns for the MPF in April 1997

Emissions Parameter	State of Utah Permit Limit	Results
Maximum concentration of agent GB <sup>a</sup>	0.3 mg/m <sup>3</sup>	< 0.0046 mg/m <sup>3</sup>
Minimum for DRE	99.99%	> 99.99999972%
Maximum concentration of particulate matter	0.016 gr/dscf @ 7% O <sub>2</sub> <sup>b</sup> 0.08 gr/dscf @ 7% O <sub>2</sub> <sup>c</sup>	0.0097 g/dscf, @ 7% O <sub>2</sub>
Maximum emission rate for HCl	4 lbs/hr or 1% of total HCl prior to PAS	< 0.015 lbs/hr
Maximum concentration of CO <sup>d</sup>	100 ppm @ 7% O <sub>2</sub>	12 ppm @ 7% O <sub>2</sub>
Maximum concentration of CEMS O <sub>2</sub>	15%	13.9%
Minimum concentration of CEMS O <sub>2</sub>	3%	12.6%
Maximum concentration of dioxin ITEQ <sup>f</sup>	0.2 ng/dscm @ 7% O <sub>2</sub> <sup>e</sup>	0.042 ng/dscm @ 7% O <sub>2</sub>
Average concentration of dioxin ITEQ <sup>f</sup>	0.2 ng/dscm @ 7% O <sub>2</sub> <sup>e</sup>	0.025 ng/dscm @ 7% O <sub>2</sub>

<sup>a</sup>Determined from analysis of DAAMS sorbent tubes.

<sup>b</sup>Limit set by Air Approval Order for PM<sub>10</sub>, i.e. particulate matter with a size of ≤ 10 microns.

<sup>c</sup>Limit set by RCRA Permit.

<sup>d</sup>Maximum one hour moving average.

<sup>e</sup>Proposed EPA limit; there is no state limit.

<sup>f</sup>ITEQ (international toxic equivalency) dioxin is 2,3,7,8 TCDD (2,3,7,8-tetrachlorodibenzo-p-dioxin), with toxicity equivalent to the complex mixture of 210 dioxin and furan isomers (with 4 through 8 chlorine atoms). This equivalency is based on the ITEQ scheme adopted by the United States and most other countries to simplify the reporting of dioxin emissions.

Source: Adapted from EG&G, 1997c.

7 percent oxygen), which is well below the new source performance standard for hazardous waste incinerators of 0.2 ng/dscm corrected to 7 percent oxygen.

- Two VOCs, m,p-xylene and o-xylene, were measured at levels slightly above the HRA estimated emission rate.
- The detection limits for four SVOCs and 12 VOCs were too high to verify that the maximum emission rates were lower than the assumed HRA emission rate.

Table 2-9 lists compounds for which measured emission rates or detection limits from the MPF were higher than the values used in the HRA.

### Implications of the Trial Burn Data for the Health Risk Assessment

The purpose of a screening HRA is to estimate an upper bound of health risks to people outside the facility fence-line who could be exposed to facility emissions under worst-case conditions. The HRA is not intended to represent actual risk but to indicate whether risk thresholds have been exceeded and further investigation is warranted. Because the estimated emission rates generated by the Utah Department of Environmental Quality and used in the HRA (Utah DSHW, 1996) differ from several of the actual emission rates, the risks in the HRA would certainly be different if they were recalculated today. Many of the measured emission rates are lower

TABLE 2-9 Measured MPF Emissions or Reported Upper Limits Higher Than Values Estimated in the HRA

	Maximum Emission Rate <sup>a</sup> (g/sec)	HRA Estimated Rate (g/sec) <sup>b</sup>
Phosphorus		
Phosphorus	6.9 E-3	1.16 E-03
VOCs		
Bromodichloromethane	< 8.1 E-06	1.15 E-06
Chlorobenzene	< 5.3 E-06	3.77 E-06
Dibromochloromethane	< 1.2 E-05	1.15 E-06
1,1-dichloroethane	< 5.3 E-06	1.15 E-06
1,2-dichloropropane	< 5.3 E-06	1.15 E-06
Cis-1,3-dichloropropene	< 5.3 E-06	1.15 E-06
Trans-1,3-dichloropropene	< 5.3 E-06	1.15 E-06
Ethylbenzene	< 5.3 E-06	2.88 E-06
2-hexanone	< 2.7 E-05	1.15 E-06
4-methyl-2-pentanone	< 2.7 E-05	1.15 E-06
1,1,2,2-tetrachloroethane	< 5.3 E-06	1.15 E-06
Tetrachloroethene	< 5.3 E-06	1.15 E-06
M,p-xylene	4.8 E-06	1.15 E-06
O-xylene	4.8 E-06	3.98 E-06
SVOCs		
Diethylphthalate	< 4.7 E-05	3.21 E-06
Dimethylphthalate	< 4.7 E-05	4.45 E-06
Di-n-octylphthalate	< 4.7 E-05	3.21 E-06
3/4-methylphenol	< 4.7 E-05	3.60 E-06
Napthalene	< 4.7 E-05	3.21 E-06

<sup>a</sup>For emission values reported as "<," the PQL is reported. The PQL is 3.3 times the detection limit.

<sup>b</sup>The highest concentrations measured during the initial JACADS trial burns were used by the state of Utah DSHW to estimate TOCDF emissions.

Source: Adapted from EG&G, 1997c.

than those used in the HRA—particularly for major risk contributors, such as dioxins, furans, arsenic, and hexavalent chromium. A few are either higher than the estimated values or are measured with a technique whose detection limits are too high to determine that actual emission rates were below the estimated values. Therefore, to determine the net effect, the calculations will have to be revised using the original HRA model and actual emissions. To assess the potential effect of revised emission rates on the HRA, the committee members made preliminary computations based on the human health medium-specific screening levels established by the EPA (EPA, 1998). The committee found that the revised risk estimates would probably be lower than the original HRA values. Thus, the committee believes that the Army could facilitate use of the measured emission rates in HRAs in the following ways:

- The Army does not have jurisdictional authority for the TOCDF HRA, which was performed by the state of Utah. However, the committee believes the Army, which provided the initial trial burn data (from JACADS), should take the initiative in revising the HRA by issuing a brief update of HRA results based on measured emissions concentrations/upper limits. If and when these revisions are made, the committee urges that the revised figures be widely distributed to the public.
- Emissions estimates for future incineration facilities should take into consideration data from all existing facilities and not just JACADS, which was the only operating facility when the TOCDF emission rate estimates were prepared. New estimates should be based on appropriate statistical bounds scaled to the feed rates of the new facilities and should take into account differences in air pollution control technologies and measurement techniques. Upper confidence limits should be used for assessing latent risks; tolerance limits should be used for assessing acute risks.<sup>5</sup>
- Every effort should be made to ensure that the trial burn conditions and measurement techniques are consistent with the assumptions used for developing the emissions estimates and preliminary operating plans.

<sup>5</sup>Confidence limits set the bounds of expected long-term emissions performance; tolerance limits set the bounds of selected future emission rates.

TABLE 2-10 Trial Burn Results for DFS PCB DREs

Run Number	PCB Train	PCDD/F Train
January 1997		
1	> 99.999973	> 99.999950
3	> 99.999596	> 99.999949
4	> 99.999795	> 99.999940
Average	> 99.999783	> 99.999946
November 1998		
1	> 99.999986	_____
2	> 99.999986	_____
3	> 99.999984	_____
Average	> 99.999985	_____

Source: Adapted from EG&G, 1997d; Holmes, 1999.

Public confidence in the risk estimates is eroded when actual emission rates are higher than those used in the initial assessment. Consequently, every effort should be made to use reasonable upper-bound emissions estimates at the outset of the HRA process, and the consequences of deviations should be explained in the HRA, not after the fact. In addition to design differences, estimates must account for differences in testing techniques and laboratory detection limits between the data used to prepare the projections and the testing procedures that will be used to demonstrate compliance and establish actual emissions rates.

### Toxic Substances Control Act (TSCA) Trial Burns

A TSCA trial burn was required for the DFS because PCBs were used as lubricants inside the shipping and firing tubes of M55 rockets. During these trial burns, M55 rockets were processed at an average rate of 35 rockets per hour. The first TSCA trial burn was conducted in January 1997 and the second in November 1998. Results from both agent trial burns are presented in Table 2-10.

Analyses of some of the January 1997 trial burn samples found a tetra-chlorinated PCB congener (four

oxygen atoms in the PCB molecule) in Runs 3 and 4. The tetra-chlorinated congener peak was not present in the samples for Run 1 or in one of the two scrubber liquor samples taken during Run 3. The tetra-chlorinated PCB congener appeared *randomly* throughout other process samples.

The PCB test series from the January 1997 trial burn resulted in calculated DREs that were better than 99.9995 but averaged slightly below the required 99.9999 regulatory limit for dioxin-containing wastes. During the trial burn, PCDD/F and PCB samples were taken simultaneously using the same sampling, recovery, and cleanup and analysis procedures. The PCDD/F sampling train was spiked with PCDD/F field and recovery surrogates, but not with PCB surrogates, and vice versa. Therefore, quality assurance indicators for the PCB test method cannot be calculated for PCB analyses performed on the archived portion of the PCDD/F samples. Archived PCDD/F samples were analyzed for PCBs and did not exhibit the tetra-chlorinated PCB congener peak. Because the tetra-chlorinated PCB congener only appeared randomly in the first PCB test series and was not found in the simultaneous PCDD/F sampling train, it is probably a sampling or analysis artifact that invalidates the PCB sampling train results. Consequently, the actual DRE for PCBs using the complete required methodology is unknown. PCB DRE results calculated from the PCDD/F samples (better than 99.99994 percent) are probably more representative of actual incinerator performance.

A second TSCA ATB with GB was conducted November 17 to 21, 1998. The uncertified November 1998 test results (the final report was not available when this report was prepared) showed no detectable dioxins, and only near-detection-limit values of dichlorobiphenyls (1.2 to 4.6 ng versus a 1 ng detection limit). Trichlorobiphenyls (2.1 to 2.7 ng versus a 1 ng detection limit) were also observed. The reported concentrations were lower than the concentrations found in the field-blank train (11 ng<sup>6</sup> and 2.7 ng<sup>7</sup> for dichlorobiphenyls and trichlorobiphenyls, respectively); however, regulatory practice prohibits deducting field-blank train results from sample measurements to correct for contamination

(a common practice for analytical chemists). Consequently, the reported concentrations are likely too large. If these reported concentrations are simply extreme realizations of measurement uncertainty (i.e., data noise) or the result of undetected sample contamination, real PCB emissions may be zero and the calculated DREs significantly understated. The resulting PCB DREs (shown in Table 2-10) calculated from these test results range from 99.999984 to 99.999986 percent, all better than the 99.9999 percent DRE requirement for PCDD/F-contaminated wastes. Consequently, on December 23, 1998, the facility was authorized to process rockets at a rate equal to one-half the rate demonstrated during the November trial burn.

## IMPROVING MONITORING SYSTEMS FOR AGENTS AND NONAGENTS

### Background

In 1994, after reviewing monitoring systems for the detection and quantification of chemical agents and the by-products of agent and nonagent destruction at JACADS and proposed for the TOCDF, the Stockpile Committee issued the *Review of Monitoring Activities Within the Army Chemical Stockpile Disposal Program* (NRC, 1994b). This report included a wide range of recommendations for supplementing the ACAMS active alarms and passive DAAMS sampling systems routinely used at chemical demilitarization facilities for agent detection. It also recommended revising the operating procedures of on-site chemical laboratories that analyze DAAMS sample tubes for agent on a daily basis, as well as an aggressive program of the monitoring and analysis of stack emissions for a wide range of products of incomplete combustion at the TOCDF.

Progress made by the CSDP in addressing those recommendations was reviewed in the *Systemization* report (NRC, 1996a), which generally endorsed the Army's ongoing efforts to improve monitoring instruments and procedures at the TOCDF. The following additional recommendation was made in the *Systemization* report: "An active program for continual improvement of monitoring instrumentation, including techniques for more rapid recognition of significant levels of agent release, should be pursued" [S-17].

This section reviews the experience at the TOCDF with agent and nonagent (i.e., products of incomplete combustion) monitoring since the beginning of agent

<sup>6</sup>11 ng is 11 times the detection limit. This is a real analytic response and indicates the existence of a procedural (contamination) problem.

<sup>7</sup>2.7 ng is less than 3 times the detection limit. This value is lower than the quantification limit and could be data noise.

operations and the Army's progress in improving agent monitoring technology. EG&G and the Army have responded to the issue of monitoring products of incomplete combustion by installing a reasonable suite of CEMS on the common stack and feed ducts and have provided an active stack-sampling protocol for ongoing analysis of a wide range of SVOCs (EG&G, 1994).<sup>8</sup>

The major issues that required attention were both agent related: (1) the problem of sporadic, but too frequent, false positive ACAMS alarms; and (2) the selection, testing, and eventual deployment of advanced technology capable of more rapid (< 10 sec) detection of the release of significant levels of agent in the plant or through the common stack.

### False Positive ACAMS Alarms

The problem of sporadic false positive alarms from plant and exhaust stack ACAMS monitors is apparent in operational data from the TOCDF (Holmes, 1998a). Between August 22, 1996, when agent operations began, and October 20, 1998, the seven ACAMS monitors associated with the PAS, including those sampling the common stack (PAS701A,B,C) and those sampling the ducts between individual furnaces and the common PAS (PAS702-PAS705), registered 98 false positive alarms. (In a false positive alarm, an ACAMS response indicates the possible presence of agent above threshold values although no agent is subsequently detected in the much more sensitive and discriminating analyses of material desorbed from the associated DAAMS tubes.) Of these, 39 were attributed to probable interference compounds, 35 were attributed to furnace upsets (which may include responses to odorant compounds in unburned natural gas), 18 were attributed to alarm malfunctions, and 6 were attributed to operator error (Holmes, 1998a). (False positive responses to sulfur-based natural gas odorant compounds may become more frequent when the ACAMS are switched from their current phosphorus-

detection mode to the sulfur-detection mode used for mustard agent operation.)

Twenty-two of these PAS ACAMS false alarms automatically shut down agent feed to the LIC, interrupting operations for about an hour each time. Although the false alarm rate was lower than the rate during early JACADS operation, the committee believes that these disruptions are unnecessary and that the Army should continue to improve the instrument specificity and robustness of the monitoring systems.

The committee notes with approval the steps taken by the Army in response to this problem. First, they have defined specifications for an improved ACAMS instrument, which includes improved chromatography to increase specificity, better quantification algorithms to improve accuracy, and more modern electronics to improve signal processing. A competitive procurement for the development and demonstration of this improved ACAMS is planned. Second, the Army has instituted a parallel effort to upgrade the microprocessor and signal processing software of the existing ACAMS and has initiated plans to test a prototype of the enhanced ACAMS at the TOCDF. Finally, the Army is investigating enhancements to the commercial gas chromatograph-mass spectrometric detector (GC-MSD) units deployed in the laboratories at CAMDS, JACADS, and TOCDF. These units are currently being used to identify interferant compounds that trigger false positive ACAMS alarms so that they can be eliminated from the plant and/or exhaust stream.

A GC-MSD unit with a parallel atomic emission detector designed to recognize phosphorus and sulfur-containing compounds that can trigger the ACAMS flame photometric detectors has been developed and is being tested at CAMDS. In addition, laboratory GC units, with and without MSDs, are being equipped and tested with recently developed pulsed-flame photometric detectors (PFPDs), which promise better, more reliable performance than the flame photometric detectors currently used (DAAMS tube analysis) (Amirav and Jing, 1996). These GC-PFPD and GC-MSD-PFPD units

<sup>8</sup> Agent emissions are the only highly toxic compounds monitored continuously. Although ACAMS alarms have a three to eight minute response time, emissions are continuously sampled by DAAMS tubes, which are analyzed daily or more often. Carbon monoxide concentration and system temperature are frequently used as continuously monitorable surrogate parameters for other hazardous compounds that might be emitted from the combustion

zone under poor burning conditions or that might be formed between the flame of the incinerator and the downstream air pollution control equipment. These parameters have been incorporated into the TOCDF operating procedures and operating permit. Therefore, being unable to monitor trace pollutants directly and continuously is an intellectual concern for which a practical solution has already been implemented.

and also be used to identify interferant species that lead to ACAMS false positive alarms.

### Real-Time Detection of Significant Agent Releases

The desirability of real-time or near real-time (< 10 sec) detection of significant agent releases from the viewpoint of both worker and resident safety has been discussed in two previous NRC reports (1994b, 1996a). The Army has responded to the Stockpile Committee's concerns in several ways. First, it has installed multiple ACAMS units on the common stack at the TOCDF. By phasing the sampling and chromatography cycles of these units, the intrinsic response time of the ACAMS has been cut from about eight to ten minutes to four to five minutes, providing significantly shorter response times for most releases. The Army has also made shorter intrinsic ACAMS response times a design specification for the improved ACAMS system.

Finally, the Army is supporting a project contracted to the University of Denver to investigate using Fourier transform infrared (FTIR) spectrometers as true real-time detectors. The initial FTIR project by the University of Denver investigated agent-detection limits of a commercial FTIR spectrometer with a conventional open-path, multipass absorption cell and spectral signal-processing techniques. The prototype unit was calibrated for GB and HD and tested at CAMDS. Under laboratory conditions, the system demonstrated an absolute detection limit for GB of  $-0.005 \text{ mg/m}^3$  (Stedman and McLaren, 1996). Detection limits in the initial field trial at CAMDS, which were affected by the cleanliness of the multipass mirrors and their alignment, were significantly worse than the laboratory values. A second field trial designed to test the feasibility of detecting both agent and products of incomplete combustion in exhaust gases from the CAMDS incinerator stack was unsuccessful because of spectral interference from the high concentration of water vapor in the exhaust samples (Stedman and McLaren, 1996). Further field trials of the FTIR technology at CAMDS are planned.

The committee believes that the theoretical one to ten second FTIR spectral measurement times are encouraging enough that further development and testing of this technology for high-risk venues, such as the munitions packing area and the common stack, are warranted. The committee also encourages the Army to monitor published research that may result in new methods of fast-response agent detection.

### Summary of the Monitoring Issues

The Stockpile Committee believes that the Army is pursuing a wise course in upgrading the current ACAMS monitors and simultaneously funding the development of a faster, more specific, more reliable ACAMS. In addition, the promise of combined GCMSD-atomic emission detector, GC-PFPD, and GC-MSD-PFPD for improving the laboratory identification and quantification of both agents and interferants is encouraging and should be vigorously pursued. Finally, FTIR spectroscopy, coupled with state-of-the-art multipass absorption cells and spectral signal-processing algorithms, is a promising technology for real-time monitoring of higher agent concentrations. The committee urges the Army to continue to support its development.

### OVERALL ASSESSMENT

Although the Army has not fulfilled *all* of the Stockpile Committee's recommendations related to system performance and plant operations, it has completed the period of start-up operations, and its operating mode indicates that program destruction goals will be met (Holmes, 1998b). However, the delay in the processing of M55 rockets has significantly slowed the rate of risk reduction from stockpile storage. Some of the problems in early operation linked to safety management are addressed in Chapters 3 and 4. Although these problems, and the investigations that were necessary to follow up on them, have taken time and management resources that might otherwise have been applied to improving operations, the committee believes the management problems were of much higher priority.

LIC-1, LIC-2, MPF, and DFS RCRA trial burns have been passed satisfactorily, and the DFS TSCA permit is expected in 1999. Unresolved issues involving the management of dunnage, the slag-removal heater, and the need for a BRA are not critical to safe plant performance, although their prompt resolution remains a priority. The renewal application for the RCRA permit was submitted in late 1998. Thus, regulatory authorities had at least six months for review before the permit expired in June 1999.

The Army appears to be making progress in addressing the committee's previous recommendations for upgrading the ACAMS and DAAMS agent-monitoring systems and developing new technologies for real-time detection of agent release

## Risk Management

### COMMITTEE OVERSIGHT

In keeping with the governing recommendation that the CSDP should proceed expeditiously and with technology that minimizes total risk to the public at each site [RC-1], the Stockpile Committee has continued to evaluate the risk assessment<sup>1</sup> and risk management<sup>2</sup> practices at the TOCDF and throughout the CSDP. The *Risk Assessment and Management* report provided a detailed overview of the status of risk evaluation and management as of September 1997 at the TOCDF (NRC, 1997). The present report concerns how the results of risk assessments; screening health, safety, and environmental evaluations; and other information have been used (from the Programmatic Lessons Learned [PLL] and other programs) to implement a sound risk management program. Recommendations are focused

<sup>1</sup>As described in the *Systemization and Risk Assessment and Management* reports, the risk assessment of the TOCDF was performed in two separate studies, called by the Army the quantitative risk assessment (QRA) and the health risk assessment (HRA) and used consistently throughout the CSDP and in its public statements. The committee has adopted the Army's usage to avoid confusion, although the terms are not standard in the wider risk assessment community. (The Army's HRA is, however, consistent with a screening-level HRA completed for other RCRA facilities.) In fact, both assessments look at impacts on human health, although from different perspectives.

The TOCDF QRA evaluated fatality risk to workers and the public from accidents involving agent due to all identifiable causes in the TOCDF and the associated DCD storage facility. Its purpose was to assist the Army in the management of the stockpile destruction process. The QRA analysis is intended to be realistic and current, with a realistic treatment of uncertainty. It was performed under the control of CSDP personnel by an Army contractor. Risk methodologies were developed for this particular application and extensively reviewed by an independent scientific peer review panel.

The TOCDF HRA is a screening assessment of the risk to the public associated with stack releases during routine operations and is performed in accordance with EPA guidance, the development of which is ongoing. The HRA evaluates normal operations under defined worst-case emissions and conservative upset conditions. It

on the following areas: overall safety, risk assessment, and risk management. The recommendations in each of these areas are summarized below.<sup>3</sup>

### Overall Safety

The development and implementation of the overall safety program at the TOCDF must be given a high priority [S-1]. Safety and environmental goals should be given at least equal weight with production goals in establishing contractor award fees [S-2]. Applicable portions of the QRAs (quantitative risk assessments) must be completed for all safety-related concerns before the start of agent destruction campaigns [S-3]. High-quality, well staffed safety management systems must be completely implemented prior to the start of agent

does not attempt to be realistic or to evaluate uncertainty. By agreement between the Army and the state of Utah, the TOCDF HRA was performed under state control, by the state's contractor. The assessment, which was not independently reviewed, was reportedly prepared according to guidance provided by the permitting agency and demonstrated that risk for particular individuals at particular locations would be below the regulatory thresholds.

<sup>2</sup>Risk management is a decision-making process focused on balancing alternative strategies and consequences associated with risk reduction and a process for implementing those decisions. It is based on: (1) a thorough assessment of performance and the full spectrum of risks to the public, workers, the environment, and property; (2) the ranking of risks so they can be addressed in order of their seriousness; (3) assessments of the impact on risk of proposed changes in procedures, management, or equipment; (4) evaluation of abnormal incidents for their effects on risk; and (5) a commitment to continual evaluation and improvement.

<sup>3</sup>Bracketed alpha-numeric designations refer to specific prior NRC recommendations. The full text of these recommendations appears in Appendix A. [RC] = *Recommendations for the Disposal of Chemical Agents and Munitions*. [S] = *Review of Systemization of the Tooele Chemical Agent Disposal Facility*. [R] = *Risk Assessment and Management at Desert Chemical Depot and the Tooele Chemical Agent Disposal Facility*. [PI] = *Public Involvement and the Army Chemical Stockpile Disposal Program*.



operations [S-10]. The risk management plan (RMP) must be fully implemented during the first year of agent operations [S-14].

### Risk Assessment

During the first year of agent operations, a comprehensive, integrated TOCDF risk assessment, including a full description of all significant, acute, and latent agent and nonagent risks (QRA and HRA) associated with disposal operations, as well as with the continued maintenance of the DCD stockpile, should be completed. A full explanation of the uncertainties associated with the various estimates should be included [S-15]. A system for tracking "near-misses" during operation should be developed and integrated into a plan for continual safety improvements at the TOCDF [S-16]. In addition, the Army should update both the QRA and the HRA at the TOCDF whenever system or operational changes occur that could significantly affect the risk estimates and should document the changes in *A Guide to Risk Management Policy and Activities* (the draft *Guide*) [R-1]. The Army should continue the site-specific QRA and HRA processes at all PMCD sites and heed the lessons learned from development of the TOCDF QRA [R-2]. If the QRA methodology is changed, the methodology manual should be updated [R-3].

### Risk Management

The Army should expand its draft *Guide* to encourage the establishment of a "safety culture," including industrial safety, in all groups involved in the program and develop a management program (and include it in the *Guide*) that defines the integration of management roles, responsibilities, and communications across activities by risk management functions (e.g., operations, safety, environmental protection, emergency preparedness, and public outreach) [R-4]. The CMP

<sup>4</sup>The *Risk Assessment and Management* report characterized the Army's CMP as "a process for managing changes that may affect the risk associated with PMCD activities" (NRC, 1997, p. 41). The CMP was conceived as a means of distinguishing risk assessment issues (the science) from risk management issues (policy and value judgments). The CMP attempts to establish an approach to integrating these issues in a process that involves the public.

(change management process)<sup>4</sup> developed in the *Guide* should be institutionalized and improved [R-5]. The Army should expand the implementation of RMP to ensure that workers and emergency preparedness officials understand it and the QRA, as well as how their activities might affect risk [R-8]. The HRA should be implemented and updated as necessary to ensure that it reflects current practices and lessons learned [R-9].

### OVERVIEW

Risk management at the DCD/TOCDF involves a number of activities intended to control the risks to the public and workers from potential releases of agent products of incomplete combustion and to reduce the incidence of worker injuries during normal industrial operations (NRC, 1997). There are four steps to risk management:

- understanding the risk
- suggesting alternative ways to reduce risk
- evaluating risk-reduction alternatives
- selecting and implementing preferred alternatives

These steps must be tailored to address site-specific factors. A number of very diverse groups affected by DCD/TOCDF operations must be involved in the risk management process to ensure its effectiveness. Each group must understand the risk assessment process, the results of the assessments, and the significance of the results; each group must also participate in the process of resolving issues of interest. The Stockpile Committee has made several recommendations in previous NRC reports for improving risk management. Recommendations related to worker safety (industrial safety) are considered in Chapter 4. Recommendations related to public and community interactions are considered in Chapter 5. The recommendations related to chemical releases and general risk management policies are considered in this chapter.

In the *Systemization and Risk Assessment and Management* reports (NRC, 1996a, 1997), the committee reviewed the DCD/TOCDF risk assessments and the risk management program. Findings in these reports indicated that the QRA was well done and that the HRA had satisfied most of the committee's previous recommendations (NRC, 1996a). These two reports also include extensive information about the risks

DCD/TOCDF and the quality of the risk assessments. The committee concluded that certain aspects of risk assessment and risk management at DCD/TOCDF, and throughout the CSDP program, required refinement. Therefore, both reports also included additional risk-related recommendations.

## RECOMMENDATIONS FROM THE SYSTEMIZATION REPORT

In the *Systemization* [S] report (NRC, 1996a), the committee endorsed the approach developed for the DCD/TOCDF QRA and initial risk management activities. To ensure continued application of these analytic methods and further development of the risk management processes, the committee recommended that the QRA be completed for all campaigns [S-3] and that the approach to risk assessment and risk management be formally established [S-14, 15, 16] (see Appendix C). As the committee noted in the *Risk Assessment and Management* report, the TOCDF Phase 2 QRA<sup>5</sup> was completed before the start of agent operations at the TOCDF. To date, all safety-related concerns identified in the Phase 2 QRA have been addressed before the start of each campaign.

Several of the issues identified in the *Systemization* report have been the subject of discussions between representatives of the Army and the Stockpile Committee, and the committee commends the Army for its proactive response. Nevertheless, risk management continues to be an informal, albeit thorough, process. The committee is concerned that an informal process directed by key individuals in the PMCD could break down if there are changes in personnel or that the process might not be fully transferred to the specific sites. Therefore, the committee urges the PMCD to order that a formal RMP be established for QRA-identified safety issues, including a tracking mechanism for identifying and compiling new issues as they arise and for monitoring their resolution.

In the *Risk Assessment and Management* report, the committee described the Army's draft *Guide and Chemical Agent Disposal Facility Risk Management Program Requirements* (U.S. Army, 1996b), which

were developed during the first year of agent operations at the TOCDF. Unfortunately, significant gaps in the draft *Guide* still must be resolved [R-4, 5, 6, 7].

The two studies, the QRA and the HRA, that make up the complete DCD/TOCDF risk assessment are based on different methodologies for reasons documented in the *Risk Assessment and Management* report. Both the QRA and HRA were completed before the start of agent operations. The QRA provided a full analysis of the uncertainties, while the HRA calculated only an upper limit of risk. Therefore, it would be extremely difficult to integrate their data. Consequently, although the Army has not developed a single integrated risk report as recommended by the committee in the *Systemization* report [S-15], the committee believes that the Army has met the functional requirements of the recommendation.

In several cases, the HRA emissions estimates turned out to be lower than actual emissions in the subsequent trial burns. Therefore, the Army should provide a brief update of the HRA as necessary to reflect the trial-burn results. As discussed in Chapter 2, the overall results and conclusions of the HRA are not expected to change because of these higher measured emissions.

The PMCD collects key information on problems encountered through the PLL and publishes the information on a regular basis in a newsletter distributed to all sites. The PMCD has also held regular program-wide meetings at which Army and contractor managers from each site can share information. Managers at individual sites are responsible for disseminating the information to site employees.

The PLL programs have gone a long way toward providing a system for documenting and tracking unexpected upsets, errors, failures, and other concerns during operation of the facilities. The PLL programs have also provided a means of disseminating this information with the aim of promoting continual safety improvements at the TOCDF, as the committee had recommended [S-16], and at all other CSDP sites. However, at the site level, implementation is informally directed by certain individuals. The committee believes the Army should make PLL programs formal requirements for all CSDP organizations to ensure that this information is disseminated to employees at all sites.

<sup>5</sup>A Phase 1 QRA evaluates public risks for a proposed facility before it is constructed. A Phase 2 QRA is a detailed evaluation of the risks and consequences of accidental releases of agent to

workers and the community based on the site-specific design and operations.

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## RECOMMENDATIONS FROM THE RISK ASSESSMENT AND MANAGEMENT REPORT

In the *Risk Assessment and Management* [R] report, the committee evaluated the QRA and HRA, as well as the independent Expert Panel review process for the QRA. The committee found that the QRA was performed to standards that met or exceeded the previous state of the art and appropriately modeled a wide variety of potential accidents involving the release of agent. The results and insights of the QRA were endorsed by the Expert Panel and the committee and were directly useful to PMCD and TOCDF personnel in managing the facility and developing practices to reduce risk to the surrounding population. The committee attributes the high quality of the assessment to the competence of the QRA team, the strength of the Expert Panel and other reviewers, and the responsiveness of the PMCD and the QRA team to comments and questions from reviewers.

The committee also evaluated the HRA in the *Risk Assessment and Management* report.

The HRA performed by the Utah DSHW, which is based on many assumptions and follows EPA-mandated protocols, is appropriate at this stage of TOCDF operations because it approximates a worst case for all evaluated parameters . . . The HRA screens latent cancer risk to "maximally exposed" individuals, imposes an acceptability criterion ( $1 \times 10^{-5}$  carcinogenic risk level over a 70-year lifetime), and infers that the exposure to multiple individuals at or below the screening level is acceptable.

The EPA screening approach defines a plausible "worst-case" scenario that is evaluated using a point-estimate HRA. This is not the realistic, integrated analysis (including uncertainty parameters) that the committee had recommended. However, the state of Utah's HRA, a "screening risk assessment," found the public risk from routine operations (normal operations with defined worst-case emissions and conservative upset conditions)<sup>6</sup> to be much lower than the risk from accidents determined by the QRA. Therefore, because the risk is dominated by the accidents modeled in the QRA, the committee agreed that Army funding of a more realistic analysis of the risk of routine operations was not necessary.

<sup>6</sup>Conservative in this sense means intentionally overestimating operating time under upset conditions and overestimating emissions during upsets.

The data from the TOCDF trial burns showed that emissions of several compounds were actually higher than the estimated emissions in the HRA, indicating that some of the assumptions in the HRA were not as conservative as the state of Utah had intended (although the overall results and conclusions of the risk assessment are not expected to change). In subsequent reviews, the committee found that neither the most current risk assessment methods nor the air-dispersion and deposition models recommended by EPA at the time (e.g., guidance issued through December 1994) had been used in the HRA. The committee concluded that the Army should issue a brief update of HRA results using the measured trial-burn emission rates. To be comparable, the Army should follow the same guidance used in the original HRA.

For QRAs, continuing interactive review by an Expert Panel (whereby new methods were being developed as the TOCDF QRA progressed) may not be necessary. But before detailed analysis proceeds, the protocols, input data, calculations, and results should be reviewed.

In the *Risk Assessment and Management* report, the committee expressed its satisfaction with the risk assessment process at DCD/TOCDF. The committee included a number of recommendations related to risk management [R-1, 2, 3, 7, 8, 9, 10] to ensure that the lessons learned in the DCD/TOCDF risk assessment process would be applied at all CSDP sites and that the developing RMP would be strengthened. An analysis of the status of these recommendations follows.

**Recommendation 1.** The Army should update both the QRA and HRA at the TOCDF whenever changes to system design or operations occur that could affect QRA or HRA calculations to ensure that estimates of risk are current and reflect changes in operating conditions and experience, assumptions, and program status (current Established Configuration). The process for updating the QRA and HRA should be included in the *Guide*. [R-1]

The Army has the overall responsibility for the safe operation of the TOCDF and must be in compliance with regulatory requirements in order to operate. The HRA is vital for understanding potential off-site health effects and for meeting regulatory requirements. Thus, the HRA has at least two uses: (1) off-site risk management, and (2) permit acquisition. The characteristics of a "good" or "correct" assessment vary, depending on whether the HRA is considered a compliance instrument or a risk management tool. As a tool used to manage risk on a continuing basis, the models must be applicable to

the current conditions at the facility and, therefore, the HRA should have the following characteristics:

- It should be realistic and include a thorough exposition of uncertainty.
- It should be a living analysis maintained on site and continually updated and recalculated to guide risk management decisions.
- It should be done early enough for the results to affect design and operating decisions.

An HRA for regulatory compliance is designed to show one-time permitting compliance and, therefore, should have the following characteristics:

- It should conform to guidance provided by the permitting agency, which will necessitate it being conservatively biased. This is particularly true for screening-level HRAs.
- It should show that the maximum plausible risk for particular individuals at particular locations is less than regulatory thresholds, reflecting design or operational changes if necessary.
- It should be a one-time analysis, possibly supplemented with letter reports on particular issues (e.g., actual emissions data that are higher than estimates in the original HRA).

An HRA based on a conservative analysis acceptable for regulatory decision making, such as whether to grant a permit, lacks many essential details. If efforts to control risk are based on an HRA, they could mistakenly be focused on areas that have been artificially inflated in terms of frequency or consequences for the purposes of the conservative analysis. Problems that could arise from using an HRA performed for regulatory compliance in communicating with other interested parties are listed below:

- The HRA may be assumed to describe actual releases rather than upper-bound results. Thus, the Army could be accused of releasing more agent and products of incomplete combustion than are actually being released.
- Attempts to correct "conservative" assumptions could be interpreted as a cover-up.
- Risk management is likely to be focused on aspects of the HRA with the most pessimistic assumptions, rather than those with the most impact.

- The scenarios required for the HRA may not reflect the most serious facility risks.

Problems could also arise from using an HRA intended to be a risk management tool in communicating with other interested parties for the following reasons:

- It contains complex results that acknowledge uncertainties.
- It does not include simple worst-case scenarios based on point-estimate analyses, and results may be more difficult to interpret and explain.
- Because it is site-specific, it does not necessarily follow established generic screening guidance for compliance-oriented HRAs, which may compromise the credibility of the results.

The draft *Guide* requires that the QRA and HRA be updated to include significant changes to the facility (U.S. Army, 1997a). However, the process for updating analyses when plant changes are planned has not yet been incorporated into the *Guide*. All plant changes require some review of risk management. The procedure for determining the appropriate level of review, the review process, and whether or not the change may affect the QRA or HRA has not been described. For example, a change in paperwork that has no health or safety impacts may require minimal review. Major changes that could impact the QRA, or, in rare cases, the HRA, would require thorough review. Changes that may affect worker safety and health but do not involve any agent release would not be part of the QRA and might require an intermediate level of review.

The *Guide* should also outline the procedures for performing the health, safety, and environmental evaluations (e.g., hazard analyses, job activity analyses, training requirements) to assess whether a proposed change could affect worker safety, for reviewing options for mitigating increases in worker risk, and for deciding whether a change is justified. If PLL programs identify ways to reduce worker risk, mechanisms for incorporating these recommendations into the change management process should be described.

Another problem is that no requirements for updating the analyses based on new information (new emissions measurements or lessons learned) have been promulgated. It is particularly important that the QRA be updated because it can be significantly affected by plant changes. In addition, although Army plans call for

updating QRAs at each site on an ongoing basis, the QRA at the TOCDF has yet to be updated (Holmes, 1998b).

**Recommendation 2.** The Army should continue the site-specific QRA and HRA processes at all PMCD sites. The development of assessments for sites other than the DCD will be greatly simplified because much of the QRA methodology has already been established. The Army should continue to obtain interactive, independent expert reviews of all site-specific assessments. The Army should heed the lessons learned from development of the TOCDF QRA and should incorporate the changes recommended by the Expert Panel. [R-2]

The Army has continued site-specific QRA processes at other CSDP sites and has issued Phase 1 QRA reports for the Anniston, Pine Bluff, and Umatilla sites. It is important that the Phase 2 QRAs be initiated while construction at these sites is in the early stages so that the results can be used to implement necessary changes to the design or operations. The Army has stated that it intends to continue independent expert reviews for all site-specific risk assessments and is incorporating the lessons learned from the TOCDF QRA, including the recommendations by the Expert Panel that were adopted for the TOCDF QRA. The ongoing QRAs for the other sites have not yet progressed far enough to determine whether other recommendations by the Expert Panel will be adopted. The independent reviews of the QRAs for these sites have not yet begun. The committee believes these reviews should be in progress by the time the Phase 2 QRA process begins. Otherwise, the kind of productive, interactive process that resulted at the TOCDF will be impossible.

The committee has not been asked to review HRA studies for the other sites, all of which are now completed and show that the HRA risks are largely secondary to QRA risks at each site. In accordance with current EPA guidelines, however, uncertainty analyses (as part of HRAs) at future sites may not be necessary for screening-level HRAs if the risks are well below regulatory thresholds.

**Recommendation 3.** The QRA methodology manual should be updated to reflect the significant improvements that have been made. [R-3]

The QRA methodology manual has not been revised. Extensive improvements to the methodology evolved during the DCD/TOCDF QRA. Although members of the QRA team are aware of the lessons

learned, there is no guarantee that experienced individuals will not leave the team. In fact, several already have. The committee hopes the Army will capture their expertise while it still can.

**Recommendation 7.** The Army should institutionalize the management of change process developed in the *Guide*. The Army should track performance of the change process and document public involvement and public responses to decisions. The Army should use this experience to improve the change process. [R-7]

Public input in the CMP was supposed to begin with a series of workshops to discuss and refine the process. After that, a revised draft of the *Guide* was expected to address the issues raised in the *Risk Assessment and Management* report. The revision to the *Guide* is not yet complete, and the entire process is far off schedule. (The public involvement aspects of this recommendation are discussed further in Chapter 5.)

**Recommendation 8.** The Army should expand implementation of the risk management program to ensure that workers understand the results of the risk assessments and risk management decisions. The Army should also ensure that CSEPP and other emergency preparedness officials understand the QRA and how their activities might affect risk. CSEPP activities should be tracked by the Army as part of their risk management program. [R-8]

The RMP at DCD/TOCDF has been effective in dealing with technical issues related to risk. The draft *Guide* was issued by CSDP managers at the PMCD, and, more recently, *The Change Management Process to Accompany the Guide to Risk Management Policy and Activities* was issued (U.S. Army, 1997a; 1998b). Together, they have begun to define the CSDP's overall approach to risk management. In addition, CSDP managers have provided briefings on the HRA and QRA (which are both publicly available) to the communities near the TOCDF. However, in discussions with DCD/TOCDF workers and the public, it has become apparent that neither has a real understanding of the risks portrayed in these analyses. The CSDP will have to redouble its efforts to ensure that the information is understood. (The aspects of this recommendation that deal with the Chemical Stockpile Emergency Preparedness Program [CSEPP] are discussed in Chapter 5.)

**Recommendation 9.** The Army should implement risk management plans and update them whenever necessary to ensure that they reflect current practices and lessons learned. [R-9]

At the time of the *Risk Assessment and Management* report, the Army had implemented a successful *ad hoc* risk management approach for the TOCDF, established preliminary RMPs, and issued the draft *Guide* and its companion volume. However, the recommended updates to the *Guide* have not yet been completed.

The committee strongly believes that the Army should rapidly document and formalize the RMPs that are presently being used effectively on site-specific and programmatic levels. Cross-communication, cooperation, and learning between sites has greatly enhanced the entire program and should be continued.

Recommendation 10. The Army should proceed with the application of its proposed methodology for evaluating the use of PAS carbon filters on a site-specific basis. For consistency with the HRA assumptions, the QRA should take into account the possible sudden release of agent that may have accumulated on the filter at a gas concentration equal to the lower detection limit. [R-10]

The PAS carbon bed filter technology and risk management is the subject of another NRC report that was not available at the time of this writing (NRC, 1999).

## Safety Programs and Performance

The Stockpile Committee has been concerned with the CSDP's safety performance since its early evaluations of operational verification testing (OVT) at JACADS and has made many recommendations for improving safety, including the development of a well qualified and trained workforce and the establishment of a safety culture. This chapter revisits the recommendations discussed in Chapter 3 that pertain to worker safety and the implementation of sound industrial safety practices. These include: (1) putting a high priority on the development and implementation of the overall safety program [S-1]; (2) setting management goals for high levels of safety and environmental performance in all work areas and giving these goals at least equal weight with production goals [S-2]; and (3) developing strong safety management systems [S-10].

### OVERSIGHT

When Congress authorized the destruction of the chemical agent and munitions stockpile in 1985 (PL 99-145), the law specified that destruction should be accomplished in a way that ensured the safety of the public, workers, and the environment. As part of its oversight responsibility, the Stockpile Committee has expressed continuing concerns over safety and has made many observations and recommendations in several reports for improving safety at specific sites and at the programmatic level. A summary of relevant observations and recommendations follows.

In an NRC letter report, *Evaluation of the Johnston Atoll Chemical Agent Disposal System Operational Verification Testing: Part I*, issued in July 1993, the committee made the following recommendation:

The Army should use systemization of the Tooele Chemical disposal facility to implement improvements relating to safety, environmental performance, and plant efficiency. These improvements should be made at Tooele prior to

initiating the destruction of agents and munitions (NRC, 1993).

In April 1994, the Stockpile Committee completed its evaluation of OVT at JACADS and issued *Evaluation of the Johnston Atoll Chemical Agent Disposal System Operational Verification Testing: Part II*, which contained the following findings and recommendations (NRC, 1994b):

*Overall safety management.* Many OVT incidents [observed failure events] involved human error indicative of deficiencies in procedures, training, or management priorities.

*Enforcement of safety requirements.* Safety violations observed during OVT, . . . are serious problems that require changes in training, job priorities, and management accountability.

**Recommendation 1.** Give safety considerations priority over production goals.

**Recommendation 5.** Develop systems to improve overall management of safety.

In March 1996, the committee issued *Review of Systemization of the Tooele Chemical Agent Disposal Facility*, the continuation of several earlier NRC reports, with the intention of (1) reviewing the completion of testing of certain secondary systems that had not been completely tested at JACADS, (2) reviewing the changes implemented by the Army in response to earlier recommendations pertaining to the TOCDF, and (3) providing an overview of the status of the facility at the end of the systemization period (NRC, 1996a). The following excerpts from this report are related to safety issues:

*Personnel Issues (Recruitment, Training, Turnover).* Training in process operations and agent operations appears to be thorough, but training in general safety practices requires improvement.

*A General Observation.* There appears to be a general belief at the TOCDF that safety practices are primarily for agent

operations. As a result, the emphasis on safety has been focused on agent-related issues with less emphasis being given to industrial safety practices.

**Recommendation 1.** Development and implementation of the overall safety program at the TOCDF must be given high priority.

**Recommendation 2.** Safety and environmental performance goals should be given at least equal weight with production goals in establishing award fee criteria.

**Recommendation 10.** High quality, adequately staffed management systems must be completely implemented (including procedures for testing critical equipment; all necessary operating, maintenance, and emergency procedures; management of change procedures; training and cross-training programs; programmatic lessons learned activities; subject area reviews; and other safety oversight activities).

Safety at the TOCDF became a public issue when two former employees released detailed allegations that safety programs and performance were deficient. As a result of these allegations, seven independent assessments of the safety program at the TOCDF have been conducted:

- a courtesy chemical surety inspection by the U.S. Army Inspector General Agency, August 15-18, 1994 (U.S. Army, 1994a)<sup>1</sup>
- an investigation by the Army Safety Office into 119 safety-related deficiencies alleged by a former EG&G safety and security manager (U.S. Army, 1994b)
- a review of the 119 alleged safety-related deficiencies by the Army Chief of Engineers for design implications (U.S. Army, 1994c)
- a report by an independent evaluation team led by the Director of Army Safety (U.S. Army, 1997b)
- a joint review by the PMCD and EG&G Management Assessment Team (U.S. Army, 1997c)
- a report by AMH Consulting (commissioned by EG&G) (AMH Consulting, 1996)
- a report by IHI Environmental and Ralston Consulting Group (commissioned by the Utah Citizens Advisory Commission) (IHI, 1997)

<sup>1</sup>The term "courtesy chemical surety inspection" means that the U.S. Army Inspector General Agency conducts an informal inspection. Any deficiencies found at that time can be remedied without prejudice.

## ASSESSMENT OF PROGRESS AND CURRENT STATUS

In general, the Stockpile Committee believes that TOCDF operations are being conducted in a way that protects the public. All of the independent assessments conducted at the site reached the same basic conclusion. The following discussion points out opportunities for further improvement.

The committee began its ongoing dialogue with TOCDF management and the Army regarding safety performance at the site before the commencement of agent destruction. Numerous site visits by the Stockpile Committee, its subgroups, and individual committee members have focused on safety and the Army's progress in developing a safety culture. Several visits included meetings with employees and representatives of the Employee Safety Committee. The Stockpile Committee has systematically communicated its safety concerns to both the site management and the Army through recommendations in its reports.

In response to the committee's observations and recommendations, and out of desire to improve safety performance, management personnel at the TOCDF have developed a *TOCDF Safety Culture Plan* and have implemented several programs and initiatives to ensure that a "safety culture" is developed and sustained at the site (U.S. Army, 1997d). The safety culture plan includes comprehensive timelines and milestones, as well as interim goals and objectives. Key elements of the plan are described below.

### Implementation of the Safety Training Observation Program

TOCDF management has purchased (from DuPont) and begun the implementation of the Safety Training Observation Program. This program focuses on training managers, supervisors, and employees to observe people and their work environments in terms of safety in order to identify and correct unsafe practices and conditions. The Safety Training Observation Program emphasizes the positive aspects of safety training and behavior and has been used successfully by many companies as a tool for driving behavioral change.

### Occupational Safety and Health Administration Voluntary Protection Program

The Voluntary Protection Program developed by the Occupational Safety and Health Administration



(OSHA) is a performance-oriented program that identifies the key elements of safety and health programs and provides measurement criteria for assessing them. The primary elements of this OSHA program are: management leadership, employee involvement, work site analysis, hazard prevention and control, and safety and health training. Each of these elements has a number of associated sub-elements. The Voluntary Protection Program is largely a self-assessment program, but it does provide for external audits. The TOCDF has completed its assessment of current status, and plans for corrective action have been generated. The TOCDF management has submitted an application for the facility to obtain Voluntary Protection Program status.

**Safety Metrics**

*Recordable Injury Rate*

The recordable injury rate (RIR), which can be used for comparisons with other industries, represents injuries and illnesses per 200,000 hours worked as defined by OSHA. The TOCDF management uses a 12-month moving ("rolling") average as its primary metric for tracking RIR (see Figures 4-1 and 4-2). The RIR is also

tracked monthly and on a trimester basis, with the latter used to determine award fees. Since the commencement of agent operations, the rolling RIR at the TOCDF has been consistently higher than 3.0 and in some instances has exceeded 4.0. These values are within the range of the chemical industry as a whole but are not close to the best in the industry (< 1.0). Nor are they the best in the CSDP (the rate at JACADS was less than 2.0 during the same time period).

In keeping with its mandate to provide maximum protection, and with effective utilization of lessons learned and successful implementation of Safety Training Observation Program and Voluntary Protection Program, the management and staff at the TOCDF should strive to achieve a rolling RIR comparable to the best performing companies in the chemical industry.

*Lost Workday Cases*

TOCDF management tracks *hours since last lost workday case* as a measure of performance. This measure can also be tracked as *cases with days away*. The record through December 1998 was 478 days worked without a lost workday case. The 1998 lost workday case rate was zero.

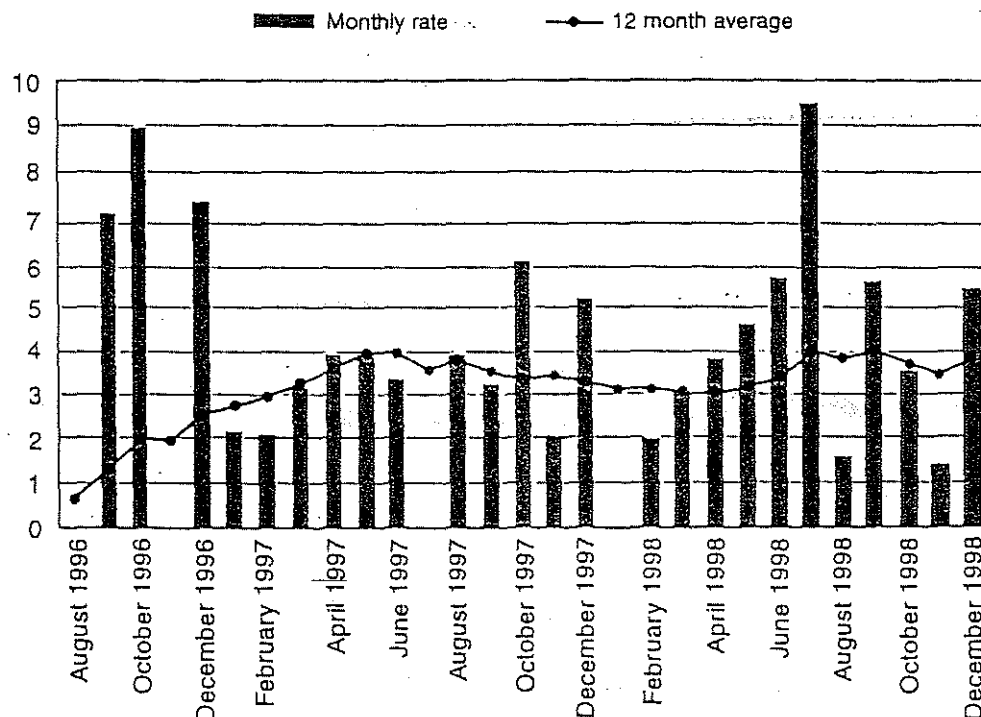


FIGURE 4-1 TOCDF recordable injury rate (RIR) 12-month rolling average since the start of agent operations. Source. Evans, 1998b.

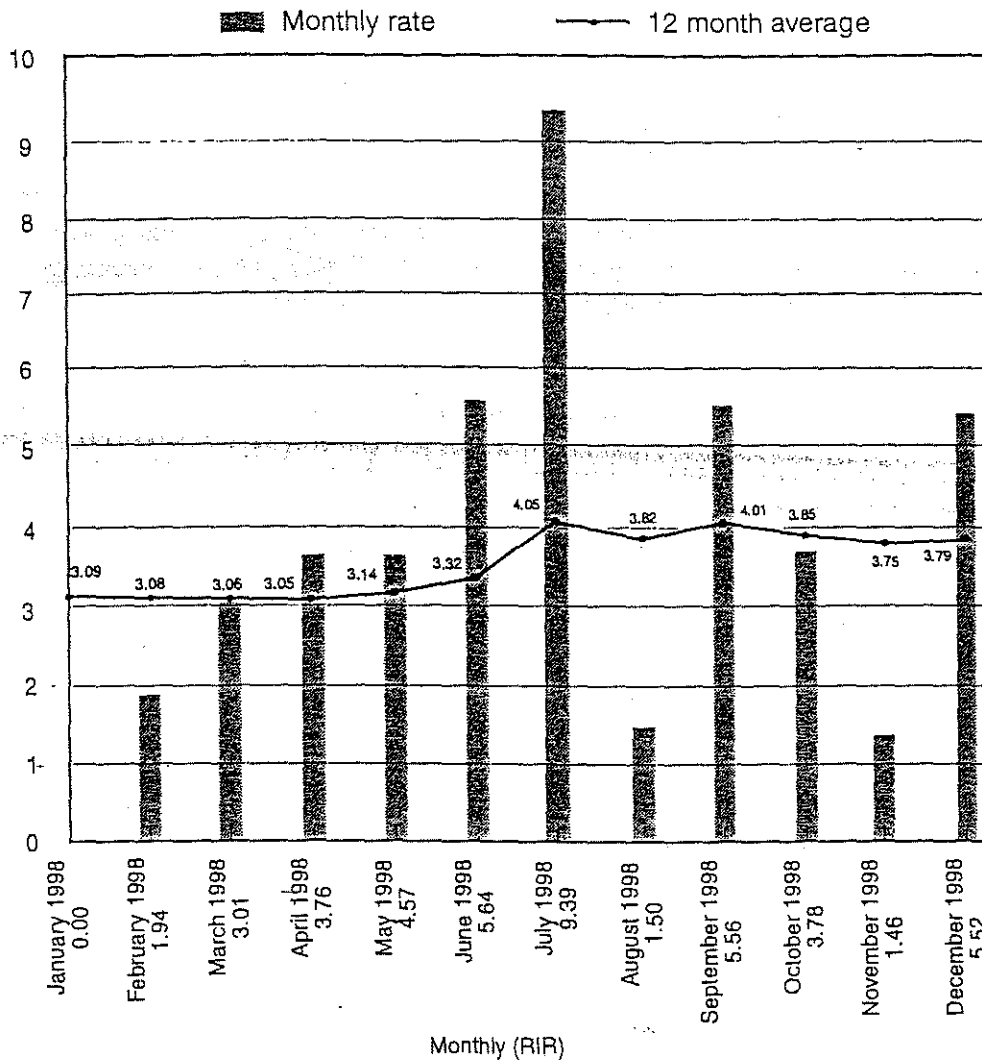


FIGURE 4-2 TOCDF 12-month recordable injury rate (RIR) rolling average and monthly RIRs from January 1998 to December 1998. Source: Evans, 1998b.

### Total Number of Injuries

This measure is documented monthly by type—lost workday injury, recordable injury, and first-aid injury; the total for all three types is also tracked. Figure 4-3 shows the 12-month rolling average for all injuries. Although the trend for total injuries has been generally downward, this is largely because there have been fewer first-aid cases. The number of more serious recordable injuries has not decreased.

### Safety Training Observation Program

Observations from the Safety Training Observation Program are tracked as the *overall safe percent* of total observations during each month. This metric, which was

initiated at the TOCDF in late 1997, has averaged about 86 percent.

### Other Metrics

The top five unsafe acts or conditions identified via the Safety Training Observation Program are tracked monthly. This metric is very useful for identifying areas that require more training, corrective action, or changes in procedures.

In general, the Stockpile Committee believes that the current metrics used at the TOCDF are all relevant and appropriate. As safety performance improves, some of them will become less meaningful; at that point they should be complemented with additional metrics relevant to the stage of development of the TOCDF safety culture.

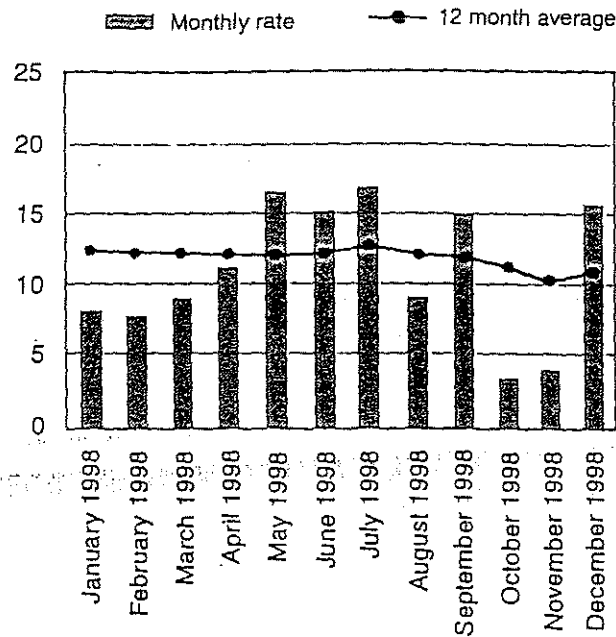


FIGURE 4-3 Total injury 12-month rolling average for the TOCDF.  
Source: Evans, 1998b.

### Employee Involvement

A key feature of a safety culture is the active involvement and commitment of all employees. The TOCDF management has established an Employee Safety Committee and has involved all employees in the Safety Training Observation Program and Voluntary Protection Program. Safety has also been included in job descriptions, and safety responsibilities, including training, are clearly defined. Management has also established reward and recognition programs for contributions to safety by employees. Safety messages and news are also included in employee communications, such as the "DEMIL-TRIB" newsletter. These regular formal and informal communications about safety can help to create an environment in which safety is highly valued.

### Management Involvement and Commitment

After persistent urging from the Stockpile Committee and in the aftermath of allegations of poor safety practices by two former employees, management at the TOCDF has implemented a number of programs and procedures to improve safety. These activities are intended to establish a safety culture with equal emphasis on agent-related safety and general industrial safety and to balance production goals with safety goals.

One of the committee's continuing concerns has been that safety at the TOCDF has been primarily focused on agent-related issues and that traditional industrial safety practices and procedures have been neglected (NRC, 1996a). During visits to the TOCDF, the committee noted some improvements in this area, but progress has been slow. Many unsafe conditions and actions have been documented through the Safety Training Observation Program and observed by committee members during site visits. Failure to wear required protective equipment, poor housekeeping, and the existence of other unsafe conditions may be considered minor infractions, but the committee believes that they indicate the lack of an established safety mindset at the TOCDF and reflect negatively on management's commitment to establishing a true safety culture.

Although the absence of a pervasive safety culture with equal emphasis on agent-related and nonagent-related safety matters is unlikely to change public risk estimates, it could significantly increase worker risk. The establishment of a safety culture at the TOCDF will require continuous active involvement, knowledge, awareness, and a highly visible commitment by management to all aspects of the safety program—including management training and development. The committee notes that safety is included in all job descriptions and is clearly identified as an expectation for all managers and supervisors. Although progress in this area is diffi-

cult to assess, the committee believes that sustained improvement will only be possible with strong management involvement and commitment.

### Criteria for Award Fees<sup>2</sup>

A growing body of evidence shows that chemical operations with a strong safety culture also have the highest productivity. The committee's recommendation that safety be given at least equal weight with production in establishing criteria for award fees has been satisfactorily addressed at the TOCDF and JACADS. However, considering that baseline incineration system facilities are currently under construction at three additional sites, the committee believes that modifying the criteria for award fees to include programmatic safety performance would enhance the overall CSDP and facilitate communications among disposal sites. Also, the committee believes that as new facilities are brought on line, their safety performance should reflect the lessons learned from other facilities. That is, at the start of operations, the performance metrics of the new facility should be equal to or better than those at operating facilities.

<sup>2</sup>The term "award fees" refers to contractual payments provided to a contract facility operator for meeting predetermined performance criteria or milestones.

### Programmatic Lessons Learned Program

In 1995, the Army implemented the PLL Program to facilitate the transfer of information from one site to another. Although TOCDF safety lessons learned are frequently included in PLL communications, a review of incidents in 1997 revealed that only about 27 percent of safety incidents (most of which were agent-related) were included in the PLL. In contrast, about 70 percent of operating and permit incidents were included. The committee reiterates its prior recommendation that agent and industrial safety be given equal emphasis.

### SUMMARY

Overall, the committee is satisfied that its recommendations are being addressed and that progress has been made toward creating an environment conducive to the development of a safety culture at the TOCDF. Nevertheless, the committee also notes that safety performance at the TOCDF (as measured by RIRs, the frequency of unsafe actions identified by the Safety Training Observation Program, and such occurrences as the error in maintenance that resulted in a contained GB spill) has not improved significantly. A better balance between agent and industrial safety and strong management involvement and commitment will be necessary to meet the goals of the *Safety Culture Plan* (U.S. Army, 1997d).

## Public and Community Interactions

### INTRODUCTION

The Stockpile Committee has made several recommendations related to both public involvement in the CSDP and emergency management and preparedness. In the *Systemization* report (NRC, 1996a), the recommendations dealt explicitly with activities at the TOCDF. In the *Risk Assessment and Management* report (NRC 1997), the recommendations were addressed to the overall disposal program as it relates to risk management and the involvement of the public in risk management decisions. The *Public Involvement* report (NRC, 1996b), a letter report issued subsequent to the *Systemization* report, focused on institutionalizing public involvement within the CSDP.

On the subject of public and community interactions for the duration of TOCDF operations, the Stockpile Committee recommended that the Army make a substantial effort to increase and improve communications with the host community and the Utah State Citizens Advisory Commission (CAC) on issues of mutual concern (e.g., the CSEPP, decommissioning of the facility, its future use, and risk reduction) [S-4]. The committee also recommended that the Army review and expand its draft RMP (risk management plan) to include public involvement in more areas than the CMP [R-6].

The Stockpile Committee recommended that at the start of agent operations the Army increase its efforts to work with the Utah Division of Comprehensive Emergency Management to ensure that: (1) first responders are properly trained and well equipped [S-5]; (2) local and state CSEPP plans are complete and have been practiced [S-6]; and (3) resources are provided in coordination with the Federal Emergency Management Agency (FEMA) to complete the emergency communications system for the Tooele County Department of Emergency Management [S-7]. The committee also recommended that the Army ensure that CSEPP and other emergency preparedness officials understand the QRA and its implications for emergency management and that the Army track CSEPP activities as part of its RMP [R-8].

The Stockpile Committee has repeatedly recommended that the Army and CSDP management at all levels make a strong commitment to public involvement throughout the entire program [PI-1]. Also, public affairs programs for all Army activities at stockpile locations and the CSEPP (now managed by FEMA), should be closely coordinated, which should be reflected in the RMP at each site [PI-2].

This chapter reviews the Army's responses to these recommendations, which are all concerned with emergency management or preparedness, public involvement, and the intersection of the CMP and public involvement. The following discussion is based on direct observations by committee members, briefings by the Army, and telephone interviews with key community personnel, local officials, county personnel, and CAC members. Either the full committee or a subgroup has visited the TOCDF and the Tooele community six times since the Systemization report was issued. In addition, members of the committee have been briefed by local officials on a regular basis on measures undertaken in Tooele County related to CSEPP. The following discussion focuses on: (1) public involvement, (2) surveys of public opinion, (3) emergency management and preparedness, and (4) the CMP.

### PUBLIC INVOLVEMENT

The PMCD's past attempts at developing a national public outreach (i.e., public involvement) plan, as well as some site-specific plans, have not been successful. The Stockpile Committee has repeatedly emphasized the importance of "community involvement in decisions regarding the technology selection process, oversight of operations, and plans for decommissioning the facilities" [RC-6] (NRC, 1994a). Meaningful public involvement was also the subject of the *Public Involvement* letter report and a topic in the *Risk Assessment and Management* report.

The committee strongly believes that meaningful public involvement would enable the Army to respond

to the concerns of local communities, thereby building trust and minimizing impediments to the timely disposal of the stockpile. The committee also addressed the importance of public involvement in a recommendation in the *Systemization* report:

**Recommendation 4.** A substantial effort should be made by the Army to enhance interactive communications with the host community and the Utah Citizens Advisory Commission on issues of mutual concern (e.g., various elements of the Chemical Stockpile Emergency Preparedness Program, decontamination and decommissioning, future use of the facility, and risk reduction. [S-4])

The committee has monitored the development of the Army's public outreach programs through briefings by the Army, meetings with the Utah CAC, and public meetings. Since 1996, important changes have been made in the PMCD's management of the CSDP, specifically in the Public Outreach and Information Office (POIO) (U.S. Army, 1998a).

The PMCD's overarching strategy has shifted the POIO's mission from an "operational emphasis providing site-specific support to providing public involvement support on the program level" (U.S. Army, 1998d). Since 1998, the director of the POIO has been responsible for providing staff liaisons and some staffing for outreach activities at specific sites and other related programs. Two contractors were hired to help the Army: SAIC assisted in establishing public involvement (storefront) offices in major towns and communities near each site; Booz-Allen & Hamilton assisted the Army in developing both the *PMCD Overarching Public Involvement Strategy* (U.S. Army, 1998b) and the *Public Involvement Strategy for the CSDP* (U.S. Army 1998c). The POIO office now has the following responsibilities:

- public outreach at the baseline incineration sites at Tooele, Utah; Umatilla, Oregon; Anniston, Alabama; Pine Bluff, Arkansas; and Johnston Atoll (U.S. Army, 1998b)
- public outreach and public involvement in the selection and implementation of alternative disposal technologies for the bulk storage sites at Aberdeen, Maryland, and Newport, Indiana<sup>1</sup>

- public outreach in the nonstockpile program (i.e., the disposal of buried chemical warfare materials and binary chemical weapons, the cleanup of former production sites, etc.)
- outreach in the Army's cooperative threat-reduction program for assisting the Russian Federation with its disposal program (U.S. Army, 1998b).

The POIO will also provide legislative support, media relations, training, and crisis communication to the CSDP. Perhaps more importantly, the POIO now has a clearly stated mission (to provide "a public involvement program that supports meaningful public participation and dialogue") and a clearly stated vision ("to gain public acceptance of the need for the safe expeditious disposal of chemical materiel") (U.S. Army, 1998b). The *PMCD Overarching Public Involvement Strategy* is the first document that clearly indicates the direction of PMCD's public outreach.

Booz-Allen & Hamilton also helped the Army develop a public-involvement strategy document for the CSDP, the *Public Involvement Strategy for the CSDP* (U.S. Army, 1998c). This document outlines the "objectives, key messages, and operational framework" for the CSDP's public information and public involvement program. The document is designed to be continually updated and provides specific guidelines for public involvement programs at storage and disposal sites. The updated (September 1998) *Umatilla Chemical Agent Disposal Facility Public Involvement Implementation Plan* was reviewed by the committee for this report (U.S. Army, 1998d). Implementation plans for Anniston, Pine Bluff, Tooele, Aberdeen, and Newport, which are in various stages of development, will also be constantly updated as circumstances and resources change.

It is still too early to assess the impact of the reorganization and realignment of the POIO. Nevertheless, both the *PMCD Overarching Public Involvement Strategy* document and the *Umatilla Chemical Agent Disposal Facility Public Involvement Implementation Plan* represent significant improvements over previous efforts. Moreover, the new strategy seems to have encouraged the site outreach offices, which are closest to the local communities, to take the initiative in developing their

<sup>1</sup>The two remaining stockpile storage sites at Pueblo, Colorado, and Blue Grass, Kentucky, are no longer the responsibility of the PMCD but are currently under review in conjunction with the

Assembled Chemical Weapons Assessment program of the Department of Defense to investigate alternative technologies.

own strategies within the context of the mission, vision, and programs of the POIO. All elements of the program organization are now united by a common mission and appear to have received strong leadership from the POIO (Campbell, 1998).

If the other site-implementation plans are of the same high quality as the plan prepared for the Umatilla site, then significant improvements have been made. For example, the Umatilla plan attempts to relate future activities to both past efforts at public involvement by the Army and present sentiments in the community, which were expressed in surveys (see below) (U.S. Army, 1998d). Perhaps even more important is the description of opportunities for public involvement, which reflects a substantial step in the right direction.

For public involvement to be meaningful, it must come when stakeholders believe that what they have said or contributed has been heard, understood and incorporated into the decision-making process (U.S. Army, 1998d, p. 11).

Since the start of operations at the TOCDF, public outreach has been less than successful. First, involvement of the public and the CAC in several important developments could have improved communications and meaningful public involvement by the local community. For example, the committee learned that the Tooele public outreach office did not involve the public or the CAC in the development of its draft public-involvement implementation plan. A few CAC members were involved informally, but the Army made no formal attempt to obtain input from the CAC or the public. In the future, the Army should obtain public input before any plan (or substantive modification) is finalized.

Second, a public meeting sponsored by the Army on July 14, 1997, to discuss the proposed CMP (change management process) was not successful. Neither the personnel of the local outreach office nor the public had been involved in the development of the draft CMP prior to the meeting (Campbell, 1998). As a result, only a few members of the public and the CAC were present at the meeting, along with about 30 personnel associated with the Army and the TOCDF. This lack of public interest reflects both the past lack of communication between the community and the Army and the fact that the public has little interest in changes to the established technology. Based on this experience, the committee concluded that at sites where the technology is already established,

the Army should expand the CMP to include other topics of interest to the public, such as plans for decommissioning the facilities.

Although reorganization of the POIO and the development of strategies for obtaining public involvement are important, neither is a substitute for an organizational culture that proactively seeks the involvement of not only the public, but also personnel of the local outreach office, who are best informed about local interests and issues.

In the 1996 *Systemization* report, the committee noted that the Army had missed an excellent opportunity by not making a concerted effort to involve the public in the development of the risk assessments for the TOCDF. The drafting of the CMP appears to be another lost opportunity, and as the committee notes in the recent report, *Carbon Filtration for Reducing Emissions from Chemical Agent Incineration*, the CMP has yet to be linked to issues that could arouse public interest (NRC, 1999).

In 1997, the Tooele outreach office had 575 visitors, participated in 35 speaking engagements attended by 2,800 people, and conducted 380 tours of the facility (U.S. Army, 1998e). The local outreach office at Tooele has since improved its tracking capability and expanded its staff and office space to three times its original size. The CAC meeting at the opening of this new office on April 16, 1998, was attended by more than 50 people involved in emergency management operations (Campbell, 1998; Sagers, 1998a). The office is now staffed by four Booz-Allen & Hamilton employees. In addition, it now maintains its own mailing lists. All of these changes are consistent with the new expanded mission for local offices and should provide local citizens with better information and more accessibility to the CSDP.

Nevertheless, despite these improved outreach capabilities at the local level and the reorganization of the POIO, this site has a long way to go to reach the level of public involvement in the decision-making process the committee recommended in the *Systemization* report [S-4] and again in the *Public Involvement* letter report [PI-1]. The sooner the public becomes meaningfully involved, the more widely accepted program decisions will be.

## COMMUNITY SURVEY RESEARCH PLANS

In the past, the Stockpile Committee has been critical of the POIO's efforts to ascertain public views and

attitudes, as well as to provide relevant information about the disposal program (NRC, 1996b). In June 1998, and again in December 1998, the POIO provided the committee with an overview of its preparations for conducting a stakeholder survey and incorporating the survey results into a database and tracking system (Williams, 1998; U.S. Army, 1998f). The survey plan indicates that local outreach offices will be involved in developing the surveys, and as of mid-April 1998, the Tooele County outreach office had already convened a meeting of various stakeholders to identify issues to be included in the survey (Campbell, 1998). One of the first decisions made by this local group was to invite some of the leaders or representatives of groups interested in the TOCDF, or incineration generally, to participate (Campbell, 1998). A consultant has informed the committee that similar stakeholder meetings have been held at the other sites and that additional efforts are under way to ensure the participation of a broad spectrum of stakeholders, including opponents of the baseline incineration system (Williams, 1998).

The committee is encouraged that the Delphi survey technique is being used to identify important issues that should be included in the survey. The extremely ambitious survey plan raises concerns, however, that the large number of responses necessary at each site to produce generalizable results may not be received. Therefore, the Army must seek the cooperation of *all* stakeholder groups at each site. The committee urges the Army and its contractor to build on this excellent beginning and take the necessary steps to obtain the cooperation from these groups.

## EMERGENCY MANAGEMENT AND PREPAREDNESS

In the 1996 *Systemization* report, the Stockpile Committee made three recommendations concerning the coordination of emergency management, response, and preparedness with the start of agent operations. These recommendations are discussed below. In addition to these recommendations, part of another recommendation [S-4] called upon the Army to enhance its interactive communications with the host community on issues involving the CSEPP.

Recommendation 6. The Army, and where appropriate the Federal Emergency Management Agency (FEMA), should ensure that local and state Chemical Stockpile Emergency

Preparedness Program Plans for responding to potential chemical events are complete and well exercised as soon as possible. [S-6]

Since this recommendation was made, the CSEPP has been reorganized. The Army has retained control of on-site emergency preparedness, but all off-site responsibilities, including budgeting, have now been assigned to FEMA. Consequently, off-site emergency preparedness is no longer within the scope of the Stockpile Committee's oversight. Nevertheless, the committee has made several observations based on its oversight experience.

The General Accounting Office has prepared at least seven reports citing problems in the CSEPP (GAO 1993, 1994, 1995a, 1995b, 1995c, 1996, 1997). The committee is also concerned about the CSEPP and about the horizontal fragmentation of responsibility at the federal level. Previous briefings by directors (both Army and FEMA) of the CSEPP, as well as discussions with directors of state emergency management agencies, have all stressed the importance of a well coordinated response-management capability with the technical capacity to respond effectively to a chemical event. The recent reorganization will require excellent coordination and communication to overcome the barriers of separate organizational responsibilities. In fact, the committee is not convinced that the reorganization will improve the capacity for responding to an emergency.

The committee strongly recommended that the Tooele County Emergency Management Plan be completed and that the Army ensure that training exercises be carried out. Two issues underlie this recommendation. First, the committee's initial review in 1996 of the Tooele County Emergency Operations Plan and the functional appendices on chemical hazard/agent response revealed that several components of the plan and appendices were still in draft form. Second, the committee determined that, because of the disagreements over issues pertaining to the procurement of personal protective equipment, Utah County had not participated in the latest training exercise at that time. Moreover, for some time, both Salt Lake and Utah counties participated only minimally in these exercises. Both Army and FEMA guidelines state that all plans must be completed and that personnel must be trained to carry them out in order to ensure a comprehensive emergency-response capability to a chemical event (FEMA and Department of the Army, 1994).

In mid-1998, committee members were able to review the completed and updated Tooele County Emergency



Operations Plan (and the functional appendices pertaining to a chemical agent event). The Tooele County director of the Department of Emergency Management informed the committee that DCD, county, and state personnel had participated in a successful exercise of the Emergency Operations Plan (Sagers, 1998a). In September 1998, another exercise was held in which both Salt Lake and Utah counties participated. Observers from several FEMA regions, as well as FEMA headquarters personnel, also attended. In fact, more than 300 evaluators or observers were present (Sagers, 1998b). The increased interest in the September exercise was partly due to the Army's Integrated Process Teams' attempts to develop better exercises for CSEPP (Sagers, 1998b). At the time of this report, there were no negative findings on the exercise, and the basic response activities were positive (Sagers, 1998b). Thus, it appears that the committee's concerns in this area have been adequately addressed.

**Recommendation 5.** The Army should increase its efforts to work with the Utah Division of Comprehensive Emergency Management to ensure that first-responders have been adequately trained to use personal protective equipment approved by the Occupational Safety and Health Administration. [S-5]

The committee recommended that the Army provide OSHA-approved personal protective equipment to local first-responders and train them in its use. In interviews with the director of the Tooele County Department of Emergency Management, the committee was assured that the equipment had been provided and that 250 local first-responders had been trained (Sagers, 1997, 1998a).

The committee had also been concerned about the delegation of responsibility for determining when an area was safe for reentry and whether adequate decontamination equipment was available for local emergency medical personnel. The committee has learned that three mobile decontamination units (to decontaminate patients prior to treatment) have been deployed in Tooele County, one of them stationed at the Tooele Valley Regional Medical Center. The adequacy of the decontamination capacity in Rush Valley is still being assessed by Tooele County (Sagers, 1998b). The reentry issue has been resolved through cooperation between local officials and DCD personnel. Emergency preparedness exercises have been planned and implemented for both decontamination and evacuation scenarios (Sagers, 1997, 1998a).

Two different emergency-management software packages are being used in Utah: FEMIS and EMIS. The Tooele County Department of Emergency Management now has the capacity to interface between the two so that it can work with the Army, which uses EMIS, and the state, which uses FEMIS. The committee commends the cooperative efforts of Army, state, and county emergency-management personnel. However, the committee notes that the use of different software packages is evidence of the lack of cooperative planning.

**Recommendation 7.** The Army/FEMA should provide the necessary resources for completing the communications system planned by the Tooele County Department of Emergency Management. [S-7]

In 1994, the committee found that both the Army and FEMA recognized the importance of a highly reliable, highly redundant communications system that would serve the following functions (FEMA and the Department of the Army, 1994):

- issue notifications and warnings
- serve as incident command center
- function as emergency operations center
- establish and maintain links to state, county, and Army emergency operations centers
- maintain communications with local officials
- maintain links to all first responders, as well as various sheltering, medical, and decontamination sites

As of early 1996, however, Tooele County had still not completed its communication system.

Interviews in 1997 and 1998 with the Utah Department of Emergency Management showed that the communication system was almost completed. The Tooele County Department of Emergency Management's Communication Plan has been revised, and the system is now both highly reliable and highly redundant. Virtually the entire county is now covered by some type of communication band (microwave, 400 MHz, 800 MHz, or 900 MHz) (Sagers, 1998a). Although there are still some dead spots in Rush Valley, three critical links in the system have now been funded and are being phased into place. The communications system thus appears to be adequate to handle an incident. Most of Tooele County is covered by an 800-MHz band, except for police, fire, and emergency medical agencies (Sagers,

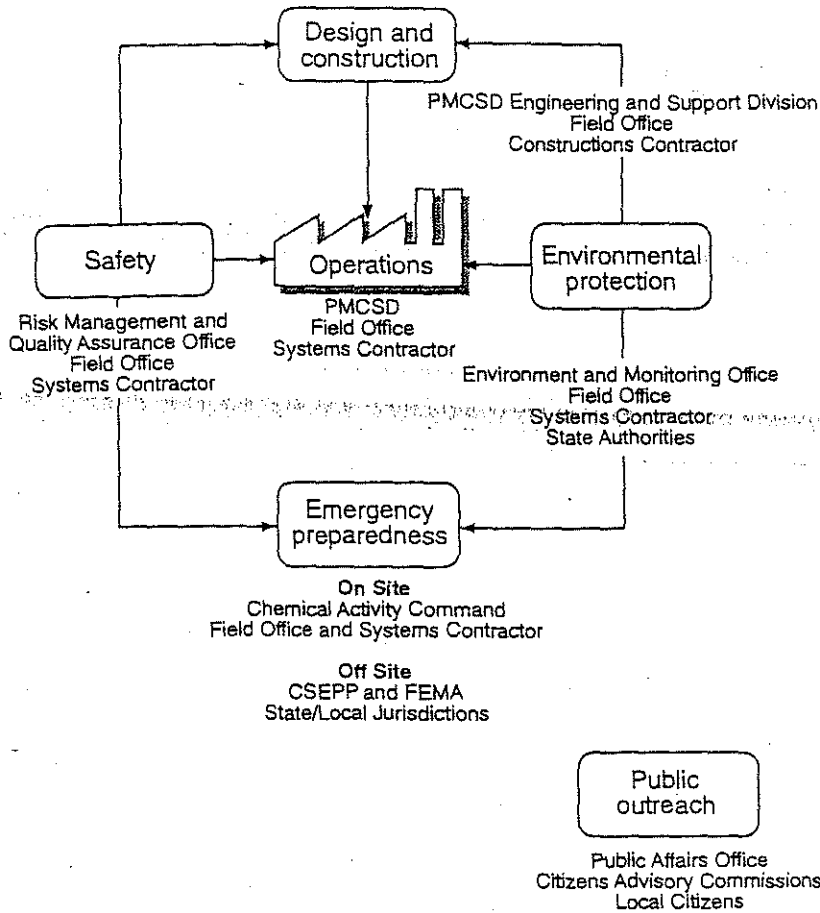


FIGURE 5-1 PMCD's organizational elements directly related to risk management (p. 63 in the *Guide*). Source: U.S. Army, 1997a.

1998c). However, the county can interface with all relevant response agencies.

The communications system can now notify and warn residents. Originally, Tooele County had planned to use tone-alert radios (indoor alert notification system 990-MHz radios), which had been funded but had not been distributed when the *Systemization* report was issued. The current notification system relies on National Weather Service radios (through an agreement concluded in 1994-1995). These radios have been widely distributed and can be activated in the event of an incident by either the National Weather Service or the operations center of the Department of Emergency Management (Sagers, 1998a). A small part of Rush Valley is without these radios because of difficulties

with distribution or resident preferences. The Department of Emergency Management, in cooperation with other Tooele County departments and the local Army POIO outreach office, has devised and implemented a plan for distributing radios to new residents. (Warning sirens are included in the plan but were not evaluated for this report.) It is clear that substantial progress has been made in the critical area of communications and that the system is almost complete.

### CHANGE MANAGEMENT PROCESS

The *Risk Assessment and Management* report included several recommendations ([R-5] through [R-8])

concerning the integration of the public-involvement and emergency-management functions (CSEPP) into the Army's draft Guide and RMP (risk management plan):

**Recommendation 5.** The Army should develop a management plan (and include it in the Guide) that defines the integration of management roles, responsibilities, and communications across activities by risk management functions (e.g., operations, safety, environmental protection, emergency preparedness, and public outreach). [R-5]

**Recommendation 6.** The Army should review and expand the current draft risk management plan to include public involvement in appropriate areas beyond the management of change process. [R-6]

**Recommendation 7.** The Army should institutionalize the management of change process developed in the *Guide*. The Army should track performance of the change process and document public involvement and public responses to decisions. The Army should use this experience to improve the change process. [R-7]

**Recommendation 8.** The Army should expand implementation of the risk management program to ensure that workers understand the results of risk assessments and risk management decisions. The Army should also ensure that CSEPP and other emergency preparedness officials understand the QRA and how their activities might affect risk. CSEPP activities should be tracked by the Army as part of its management program. [R-8]

These recommendations clearly reflect the committee's conviction of the importance of integrating both the public-outreach and the emergency-preparedness programs into the Army's draft *Guide*, as well as the CMP (which was planned as the last chapter of the *Guide*). The committee was convinced that the development of a CMP and its inclusion in the *Guide* would break new

ground. The CMP would be "a process for managing changes that may affect the risk associated with PMCD activities" (NRC, 1997, p. 41), would distinguish matters of risk assessment (the science) from matters of risk management (policy and value judgments), and would establish an approach for integrating them that involved the public. In addition, the *Guide* would define and integrate management functions as they relate to risk management (Holmes, 1998c). The committee concluded that the development of an institutionalized CMP would be critical to comprehensive risk management. At the same time, the committee noted with concern that public involvement, as reflected in the draft *Guide's* organizational components, was not being integrated with risk management (see Figure 5-1). Nevertheless, the committee encouraged the completion of the draft *Guide*, especially Chapter 7, which focused on public involvement, so that the *Guide* could become policy.

Since the *Risk Assessment and Management* report was issued, the committee has monitored the Army's efforts to complete the draft *Guide*, especially the CMP and the public involvement components, and has documented its disappointment with the slow development of the CMP. (The lack of implementation of the CMP in the carbon filtration issue is discussed in the recent *Carbon Filtration for Reducing Emissions from Chemical Agent Incineration* [NRC, 1999]). The committee continues to be concerned that the results of both the QRA and HRA may still not be well understood by CSEPP and other emergency-management personnel, or by the public. The absence of a CMP that includes meaningful public and stakeholder involvement in the Army's risk management decisions is a notable lapse in the program. The Army has failed to use the CMP as a way of initiating two way communication and providing a mechanism for the public to participate in decision making.

## Findings and Recommendations

In this report, the Stockpile Committee has reviewed the operations at DCD/TOCDF in terms of previous NRC recommendations. Table 6-1 summarizes these recommendations, indicates the chapter of this report where they are discussed, notes the committee's evaluation of the Army's response, and enumerates related new recommendations (presented below). If the committee found that a prior recommendation had been satisfied, the issue was considered closed. The new findings and recommendations in this chapter reflect the remaining and new issues that require further attention by the Army. Some of the new recommendations also have implications for future CSDP sites.

**Finding 1.** The committee considers the quantitative risk assessment (QRA) and the evolving risk management plan (RMP) as effective steps toward meeting the objective of minimizing public and worker risk.

**Recommendation 1.** The Stockpile Committee reiterates its earlier recommendation that the Chemical Stockpile Disposal Program should proceed expeditiously and should use technology that will minimize overall risk to the public and to the workers at each site.

**Finding 2.** The initial disposal campaigns at the Tooele Chemical Agent Disposal Facility (TOCDF) have destroyed a significant quantity of GB nerve agent, although the delay in the issuance of the Toxic Substances Control Act permit caused an interruption in the processing of GB M55 rockets. As a consequence, risk-reduction is well behind the original schedule. Although the Army seems confident that it can overcome this schedule slippage, a recent audit by the Arthur Andersen Company raises questions about the likelihood of meeting the disposal schedule. Extending the schedule will have adverse risk and cost implications.

**Recommendation 2.** The Army should process M55 GB rockets as soon as possible. The Army should also

maintain a strong management commitment and close and effective working relationships with the relevant regulatory agencies to avoid future schedule slippages with their associated adverse risk and cost implications.

**Finding 3.** Several waste-handling aspects of TOCDF operations have not been resolved. These include performance in the brine reduction area (although the Army now plans to continue to treat brine off site), and plans to replace the dunnage furnace with an alternative method for the disposal of activated carbon. A micronizer and burner for activated-carbon disposal will be tested in the deactivation furnace system at the Johnston Atoll Chemical Agent Disposal System (JACADS) in 2001.

**Recommendation 3.** The Army should expedite the resolution of issues associated with the disposal of brine and dunnage in the interest of minimizing landfill disposal and minimizing overall waste as additional sites become operational.

**Finding 4.** The Army is pursuing a wise course in upgrading current automatic continuous air monitoring system (ACAMS) monitors while simultaneously funding the development of a faster, more reliable ACAMS. The Army has also significantly upgraded laboratory analysis tools for identifying species adsorbed on depot area air monitoring system (DAAMS) tubes that may trigger ACAMS false alarms. Infrared technology that may provide real-time detection of agent release is being investigated, and some progress has been made.

**Recommendation 4.** The Army should take the following steps to improve its monitoring systems:

- continue its vigorous efforts to improve the response times, agent specificity, and overall reliability of the ACAMS alarms
- continue to test and introduce improved laboratory instruments that can identify and quantify

TABLE 6-1 Summary of Prior and New NRC Recommendations

Prior Recommendation	Area(s) Addressed by Recommendation	Chapter in Which Recommendation Is Discussed	Response to Date	New Recommendation
RC-1	Program-wide risk reduction	2,3,4	Ongoing process	1
S-1	Implementation of a safety program	3,4	Ongoing process	1, 5, 6, 7, 9, 11
S-2	Incorporation of safety and environmental goals into award fees	4	Satisfied at the TOCDF and JACADS, but not program-wide	8
S-3	Completion of QRA and resolution of QRA safety-related issues	3	Good implementation at the TOCDF to date, but incomplete program-wide	5, 6, 7
S-4	Improved public interactions and communications	5	Ongoing process	10
S-5	Emergency-preparedness training	5	Satisfactory cooperative effort at the TOCDF, but ongoing concern about federal coordination at other sites	11
S-6	Completion and practice of emergency-preparedness plans	5	Satisfactory ongoing process	11
S-7	Completion of emergency-preparedness communications system for Tooele site	5	Significant progress and essentially complete	
S-8	Completion of Army preoperational survey	2	Completed	
S-9	Attainment of LIC 99.9999% DRE	2	Accomplished	
S-10	Safety management	4	Progress, but continuing concerns	5, 6, 7, 9
S-11	Completion of RCRA and TSCA trial burns	2	Completed	
S-12	BRA certification; dunnage disposal	2	Off-site disposal alternatives implemented; BRA certification on hold; DFS alternative to DUN to be investigated	3
S-13	LIC slag removal	2	Satisfactory performance of equipment	
S-14	Completion of risk management plan (RMP)	3	Progress but not complete	7

Prior Recommendation	Area(s) Addressed by Recommendation	Chapter in Which Recommendation Is Discussed	Response to Date	New Recommendation
S-15	Risk assessment integration	3	Satisfied in principle	
S-16	Near-misses, tracking and safety	3	Progress but not complete	6
S-17	Improvements in monitoring	2	Progress but continuing effort required	4
R-1	Updating of QRA, HRA	3	Documentation of updating process pending	6
R-2	Development and review of program-wide site-specific QRAs and HRAs	3	Ongoing process	6
R-3	Update of QRA methodology manual	3	Still pending	7
R-4	Inclusion of "safety culture" in <i>Guide</i>	4	Progress but not complete	9
R-5	Definitions of risk management roles and responsibilities in <i>Guide</i>	4	Progress but not complete	7, 8, 9
R-6	Inclusion of public involvement in RMP	5	Further refinement necessary	10
R-7	Tracking of CMP performance	5	Disappointing performance to date on carbon-filter issue	10
R-8	Understanding of risk assessment by workers, etc.	3	Progress but not complete	5
R-9	Implementation and updating of RMP	3, 4, 5	Progress but not complete	5, 6, 7
PI-1	Commitment of CSDP to public involvement	5	Recent indications of improved strategy but commitment yet to be demonstrated	10
PI-2	Coordination of CSDP, CSEPP, public affairs, and RMP	3, 5	RMP not complete	7, 10

Code Legend: RC = Recommendations for the Disposal of Chemical Agents and Munitions report; S = Review of Systemization of the Tooele Chemical Agent Disposal Facility report; R = Risk Assessment and Management at Desert Chemical Depot and the Tooele Chemical Agent Disposal Facility report; and PI = Public Involvement and the Army Chemical Stockpile Disposal Program report. See Appendix B for a complete list of reports by the NRC Stockpile Committee.

interference species to minimize false positive ACAMS alarms

- continue to sponsor the development, testing, and potential deployment of new analytical instrumen-

tation capable of providing real-time or near real-time (< 10 s) detection of significant levels of agent release and keep abreast of research in the area of rapid-response agent detection

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**Finding 5.** No comprehensive, integrated program for managing risks or communicating them to workers and nearby residents has been established or implemented.

**Recommendation 5.** The Risk Management Program at stockpile storage and disposal facilities must be comprehensive and integrated to protect workers, the public, and the environment. The Army should incorporate current and planned risk management tools (quantitative risk assessments [QRAs]; health, safety, and environmental evaluations; health risk assessments [HRAs], etc.) into a comprehensive, integrated risk-reduction program to identify, prioritize, and reduce any (as yet undetermined) residual risks to workers and the public at Tooele and other disposal sites. The risk management program should be updated in response to experience and new information and should be a living, ongoing process that is integral to facility operations and adequately communicated. When used iteratively, it can help to identify and manage on-site and off-site risks. For example, lessons learned from Phase 2 QRAs can be incorporated into facility designs. Risk management decisions and HRA results should be used to determine if other mitigation measures are required.

**Finding 6.** The Army has briefed the committee on how various issues related to the QRA have been resolved, but no formal process has been established for identifying and tracking QRA issues that must be resolved before the beginning of each campaign. The committee was briefed on the Programmatic Lessons Learned (PLL) program and concluded that two aspects of the program require additional work: (1) formal specification of the lessons-learned program, including site responsibilities in responding to lessons learned, and (2) the dissemination of lessons learned among the personnel at each site. Moreover, procedures for updating the QRA, and when necessary the HRA, based on new information (as identified in the PLL) have not been established, and the process for updating them when plant configuration or operational changes are planned has not yet been incorporated into the *Guide*. The committee notes that the Army has fallen significantly behind schedule in implementing major elements of the RMP at the TOCDF.

**Recommendation 6.** As a formal process for each site, a list of outstanding issues related to the QRA for each campaign should be prepared and the resolution of each issue documented before the campaign begins. The Army

should provide a formal specification for the lessons-learned programs, including individual responsibilities and definitions of how safety improvements at each site will be developed based on the lessons learned. The *Guide to Risk Management Policy and Activities* should be revised to include the process for updating the QRA and/or the HRA when significant new information is identified through the lessons-learned programs, or when significant plant, processing, or scheduling changes are planned. Based on its experience at the TOCDF, the Army should initiate Phase 2 QRAs for the chemical disposal facilities under development as soon as feasible, preferably while the risk information can still be used to improve the design and construction of the facility.

**Finding 7.** The Army has successfully implemented an informal risk management process for DCD/TOCDF, but has not finalized a formal plan or institutionalized programmatic lessons learned for the risk management process or for other informal cross-site risk communication programs. The QRA methodology manual has not been revised to reflect recent improvements.

**Recommendation 7.** The Army should formally and expeditiously implement risk management practices at site and programmatic levels into coordinated, well-documented plans and update them whenever necessary to ensure that they reflect current practices and lessons learned. The methodology manual for the quantitative risk assessment should be updated to reflect the significant improvements that have been made.

**Finding 8.** At the start-up of operations, industrial safety performance was poor at both of the currently operating facilities (JACADS and the TOCDF). The committee believes this reflects a disproportionate focus on chemical agent and a failure of management to build a total safety culture prior to plant start-up. Sharing of lessons learned among sites will be critical for improving CSDP-wide safety performance.

**Recommendation 8.** The Army should consider adding a Chemical Stockpile Disposal Program (CSDP)-wide factor for safety into the criteria for award fees at each site. This factor should be based on the safety performance at all CSDP sites. Operating sites should be required to demonstrate continued improvements in key safety metrics with "best of industry" standards, rather than "industry averages," as the target goal. The Army should insist that the safety performance of new

ilities be comparable to the best safety performance operating facilities.

inding 9. After public allegations of safety deficiencies at the TOCDF by two employees, seven independent safety investigations at the site, and previous stockpile Committee recommendations, TOCDF management implemented programs to improve safety performance and to lay the foundations of safety culture at the site. However, safety metrics do not yet indicate that performance has improved.

**Recommendation 9.** The Army should continue the rigorous implementation of all elements of the *Safety Culture Plan*, with visible commitment and involvement by management.

**Finding 10.** Recent efforts by the Army to improve public outreach are listed below:

- the reorganization of the Public Outreach and Information Office
- the development of the *PMCD* [Program Manager for Chemical Demilitarization] *Overarching Public Involvement Strategy*
- the publication of *Public Involvement Strategy for the CSDP*
- the publication of *Umatilla Chemical Agent Disposal Facility Public Involvement Implementation Plan*
- plans for a CSDP stakeholder survey
- the significant expansion of the capacity of the local Tooele public outreach office

The Army has not, however, increased the opportunities for meaningful public input and review of CSDP activities and plans. Furthermore, a component of meaningful public involvement, which is recognized in the *Umatilla Chemical Agent Disposal Facility Public Involvement Implementation Plan*, is still missing at the TOCDF. Public involvement has not come at a point in time "when stakeholders believe that what they have said or contributed has been heard, understood, and incorporated into the decision-making process." The change management process will be a major step forward, but public involvement should not be limited to the *CMP*.

**Recommendation 10.** The Army should continue to increase the involvement of local Citizens Advisory Commissions (CACs), stakeholder groups, and the public in the

development of future CSDP planning, implementation, and public outreach activities (e.g., surveys). The public outreach activities should be integrated with other CSDP activities, and the committee again recommends that the public, CACs, and stakeholder groups play early and meaningful roles in the implementation of significant operational changes and in planning for the decontamination and decommissioning of disposal facilities. The integration of the Army's public outreach program and the *CMP* should be the first step in the development of a coordinated, efficient, effective, and meaningful public involvement program. Once the criteria are finalized for using the *CMP* and involving the public, the Army should actively expedite implementation of the process.

**Finding 11.** Most of the committee's recommendations concerning emergency management and preparedness at the TOCDF have been addressed. First responders have been well trained in the use of personal protective equipment. Emergency preparedness plans for Tooele County for incidents involving chemical agent have been completed, and training exercises are continuing. Efforts are being made to coordinate responses by the Army with state and local emergency management agencies. Although these efforts are being hampered by the use of different software packages, significant improvements in preparedness and planning have been made. Significant improvements have also been made toward completing the communications system in Tooele County, and radios for using the National Weather Service as a notification system are being distributed.

The committee is concerned that the current reorganization of the Chemical Stockpile Emergency Preparedness Program, under which FEMA now has responsibility for off-site plans and activities, may fragment authority and interfere with a well coordinated emergency management program.

**Recommendation 11.** The Army and the Federal Emergency Management Agency should work together to ensure that preparedness and planning, warning, response, and mitigation activities of the emergency management program for the TOCDF are well coordinated. Informal relationships and agreements among state, local, and federal personnel should be formalized to ensure a permanent emergency preparedness capacity. Interfaces for emergency management software should be provided as soon as possible.



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Appendices

## Appendix A

# Specific Design Features of the Tooele Chemical Agent Disposal Facility Baseline Incineration System

### PROCESS DESCRIPTION

The Tooele Chemical Agent Disposal Facility (TOCDF) consists of five interconnected process systems:

1. The unloading and unpack system for receiving munitions from the Deseret Chemical Depot.
2. The demilitarization processing systems for handling rockets, containers, mines, and projectiles separately.
3. The furnace and incinerator systems, which include a deactivation furnace system, a metal parts furnace, two liquid incinerators, and a dunnage incinerator.
4. Various safety systems, including explosive containment, ventilation and filtering, fire protection, agent monitoring, and door monitoring.
5. Various support systems, including electric, fuel gas, instrumentation, compressed air, hydraulics, cooling, and the very important pollution abatement systems.

These systems are linked, monitored, and controlled through an advanced process management system operated from a central control room.

For practical purposes, the TOCDF is a scaled up and updated version of the Johnston Atoll Chemical Agent Disposal System (JACADS), which has been operating for nine years. Although JACADS was the first chemical agent disposal facility, its design was based on pre-existing commercial incinerators, as well as years of development and testing of special munitions-handling machinery. Very little new technology was incorporated into the TOCDF. The layout of the TOCDF is shown in Figure A-1.

### Loading and Unpack System

Munitions are brought by truck in sealed containers from the storage area in Deseret Chemical Depot into

the container-handling building along dedicated and highly secure roads. The containers are lifted to the second floor of the building into the unpack area where they are opened, and the munitions are conveyed into the munition demilitarization building. No human contact with the munitions occurs after the munitions leave the unpack area.

### Demilitarization Processing Systems

The purpose of demilitarization processing is to separate the components of munitions into separate streams that can be handled safely in the downstream furnace and incinerator systems. Each type of munition is unique and must be processed separately. Rockets, for example, contain agent, propellant, and burster energetics, which must be separated for processing. The rocket-handling system feeds rockets into an explosion-containment room through a rotating vestibule. In the explosion-containment room, the agent cavity is punched open, and the agent is drained into a separate holding tank. Eventually, the agent is fed into a liquid incinerator (LIC) and burned. The drained rocket proceeds to a shearing device where the fuse is sheared off, the burster is sheared off, and finally the propellant-containing motor is sheared off. The fuse, burster, and motor fall into a hopper that discharges them into the deactivation furnace system (DFS). The rocket-handling system is shown in Figure A-2.

Bulk munitions contain agent but no energetics. Therefore, they bypass the explosion-containment room and are conveyed into the upper portion of the munitions processing building to a bulk handling station. Bulk containers are hydraulically opened so that agent can be drained into a holding tank for incineration in a LIC. The drained containers and debris that was on or in them are conveyed to the metal parts furnace (MPF) for cleanup. The bulk handling system is shown in Figure A-3.

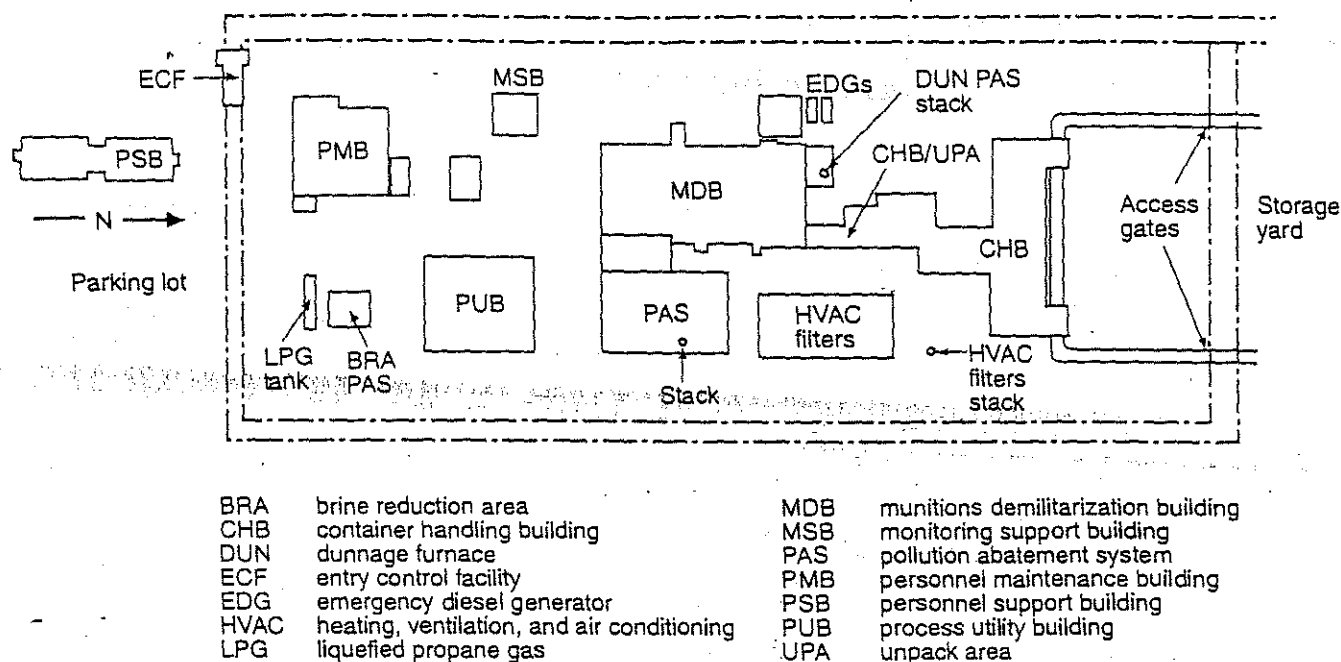


FIGURE A-1 Layout of the TOCDF. Source: Adapted from U.S. Army, 1996.

Projectiles are processed in a system similar to the rocket-handling system. Projectiles, either artillery shells or mortar shells, contain both agent and energetics. Projectiles enter the explosion-containment room by conveyor and are fed mechanically onto a projectile/mortar disassembly table. The table rotates so that nose closures (fuses or lifting lugs) can be mechanically removed. At another stop, burster material is removed. The shells are then placed in an egg-crate metal tray and conveyed into the munitions processing bay located in the upper munitions corridor. A robot unloads the shells onto another rotating table called the multi-purpose demilitarization machine, where they are milled to cut through burster tube welds, if necessary. Then the burster tubes are removed, and the agent is drained. Finally, the burster tube is crimped and reinserted, and the projectile is sent through the MPF. The projectile-handling system is shown in Figure A-4.

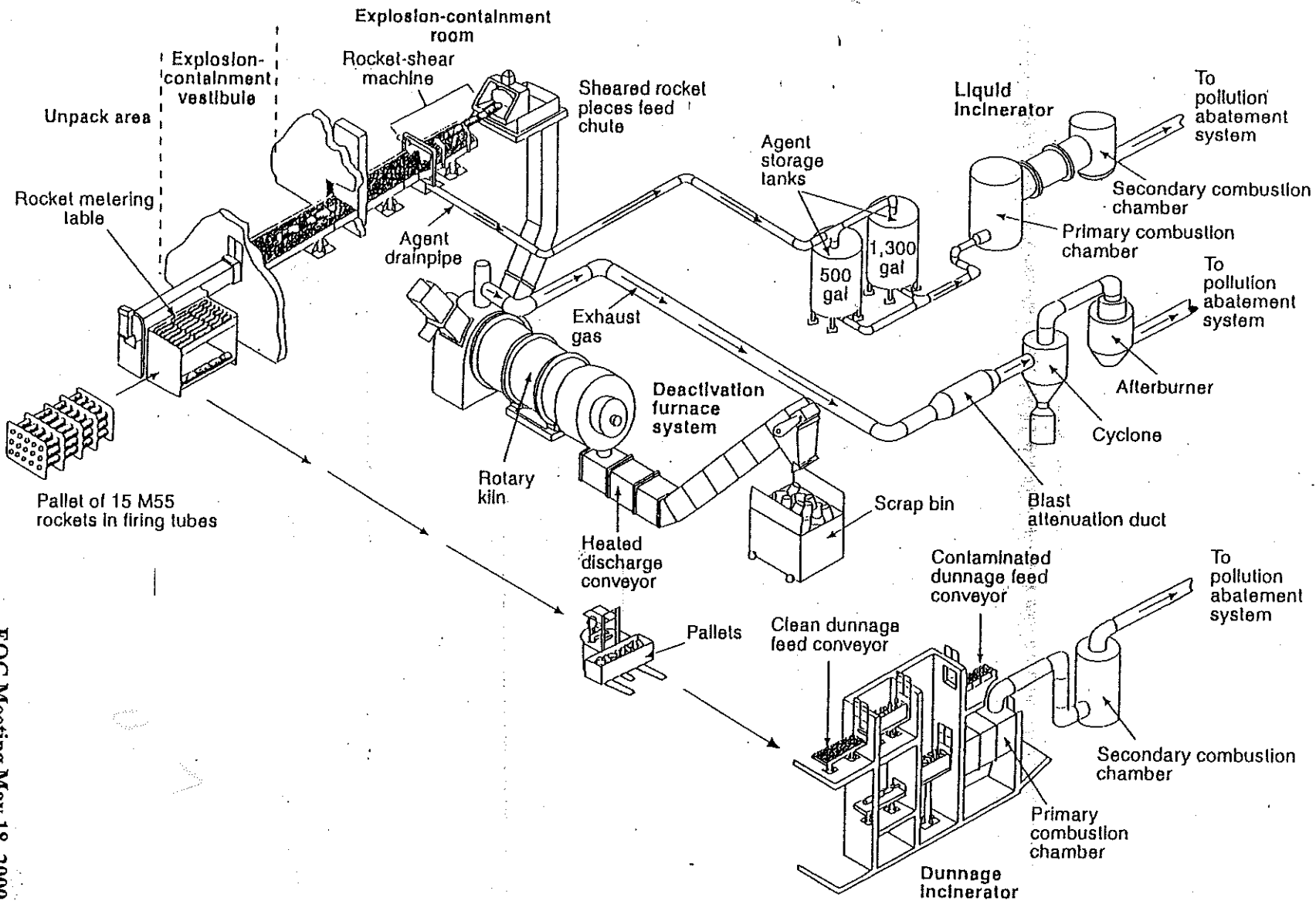
The mine-handling system is the last demilitarization processing system. Operators unpack mines from their drum containers in the unpack area. Each mine is then cycled through a glove box onto a conveyor in the explosion-containment vestibule. This conveyor takes them to a workstation where the arming plugs, fuses, and activators are removed and placed in a fuse box. The fuse box and the mine are then transported to the explosion-containment room, where a mine machine punches the mine and drains the agent. A burster punch

machine removes the burster from the mine. The remnants of the mine and the fuse box are then sent to the DFS. Figure A-5 depicts the mine-handling system.

### Furnaces and Incinerators

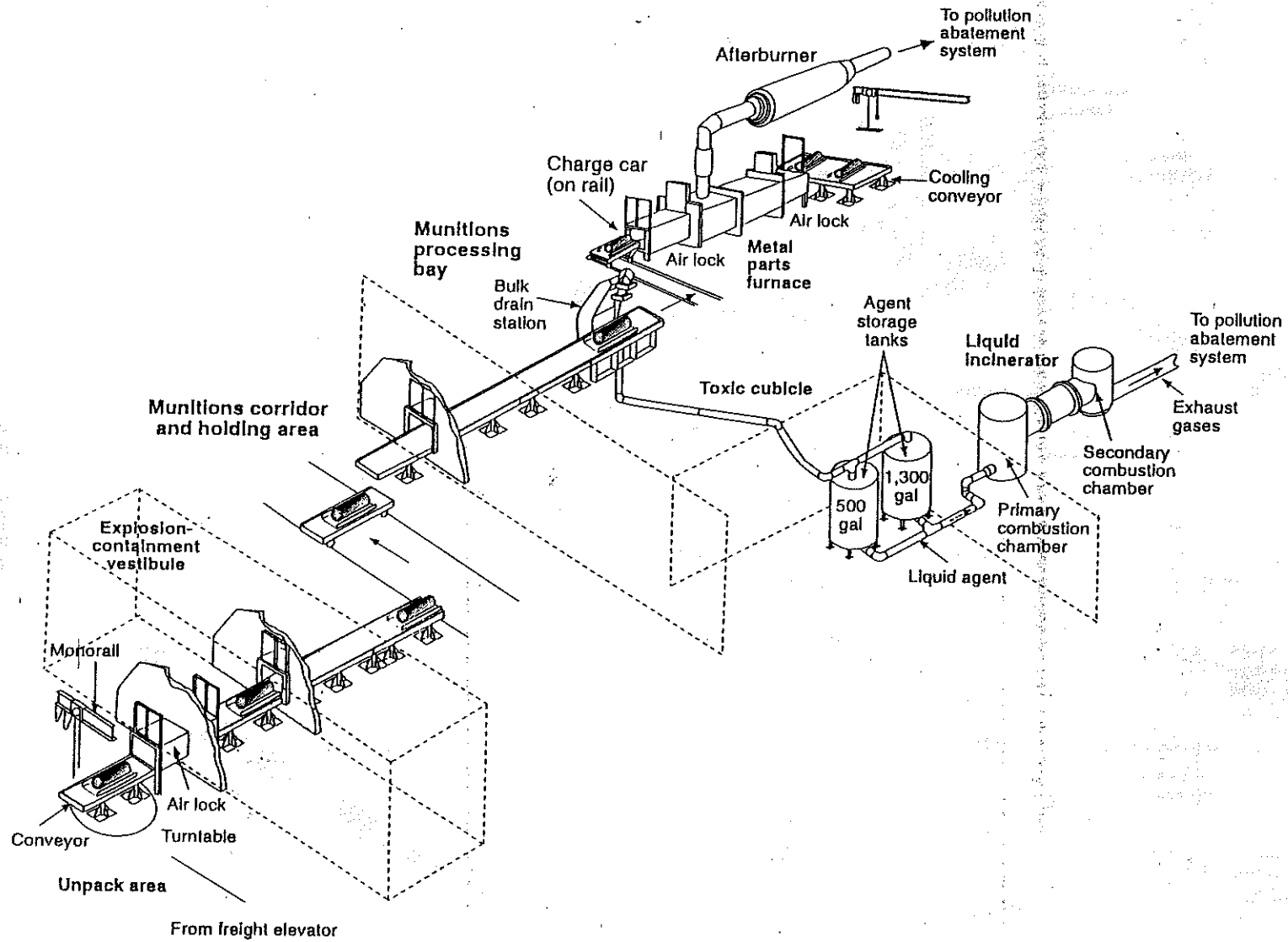
The DFS is used to destroy explosives and propellants from rockets, projectiles, and mines. Basically, the DFS is a gas-fired rotary kiln (Figure A-6). Munitions pieces are fed down a chute from the explosion-containment room into the DFS. The chute has two blast gates that open sequentially. As the kiln rotates, the pieces are moved through the kiln by a spiral baffle that pushes them along. For rocket campaigns, the kiln runs at 1,100°F. For other campaigns, it runs at 1,500°F. The pieces burn rapidly rather than detonating. As added protection against detonation, the charge end of the kiln is constructed of two-inch thick steel. The burned munitions exit onto a discharge conveyor that carries them under two electric heater banks that keep the scrap at 1,000°F for 15 minutes. This ensures that the scrap is 5X clean, (i.e., 99.9999 percent free of agent). DFS exhaust gases go through a blast-attenuation duct, a cyclone separator (to remove ash), and an afterburner before entering the pollution abatement system (PAS).

The function of the MPF is to decontaminate munitions bodies after removal of agent and explosives. The



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FIGURE A-2 Rocket-handling system. Source: Adapted from U.S. Army, 1996.



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FIGURE A-3 Bulk handling system. Source: Adapted from U.S. Army, 1996.



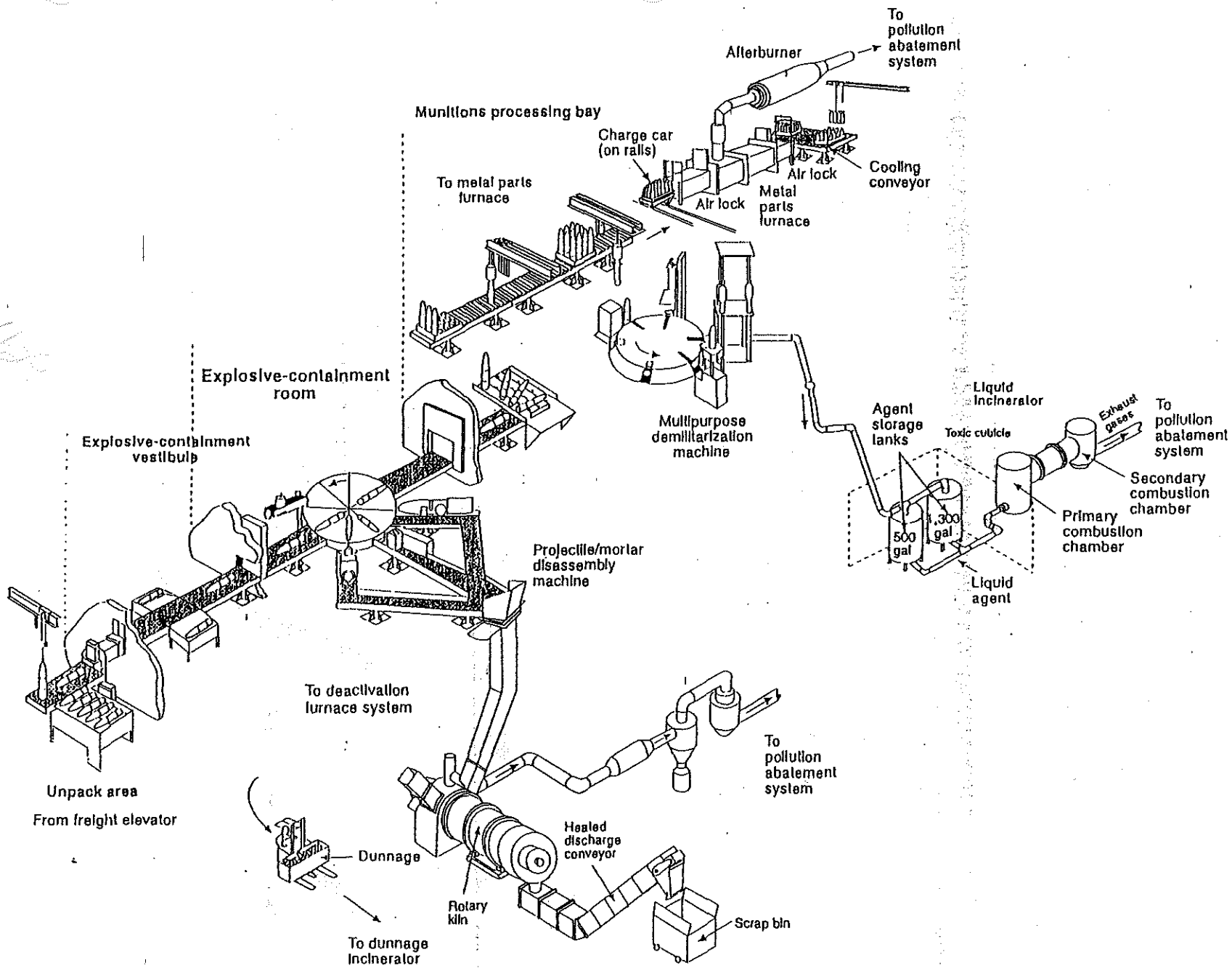
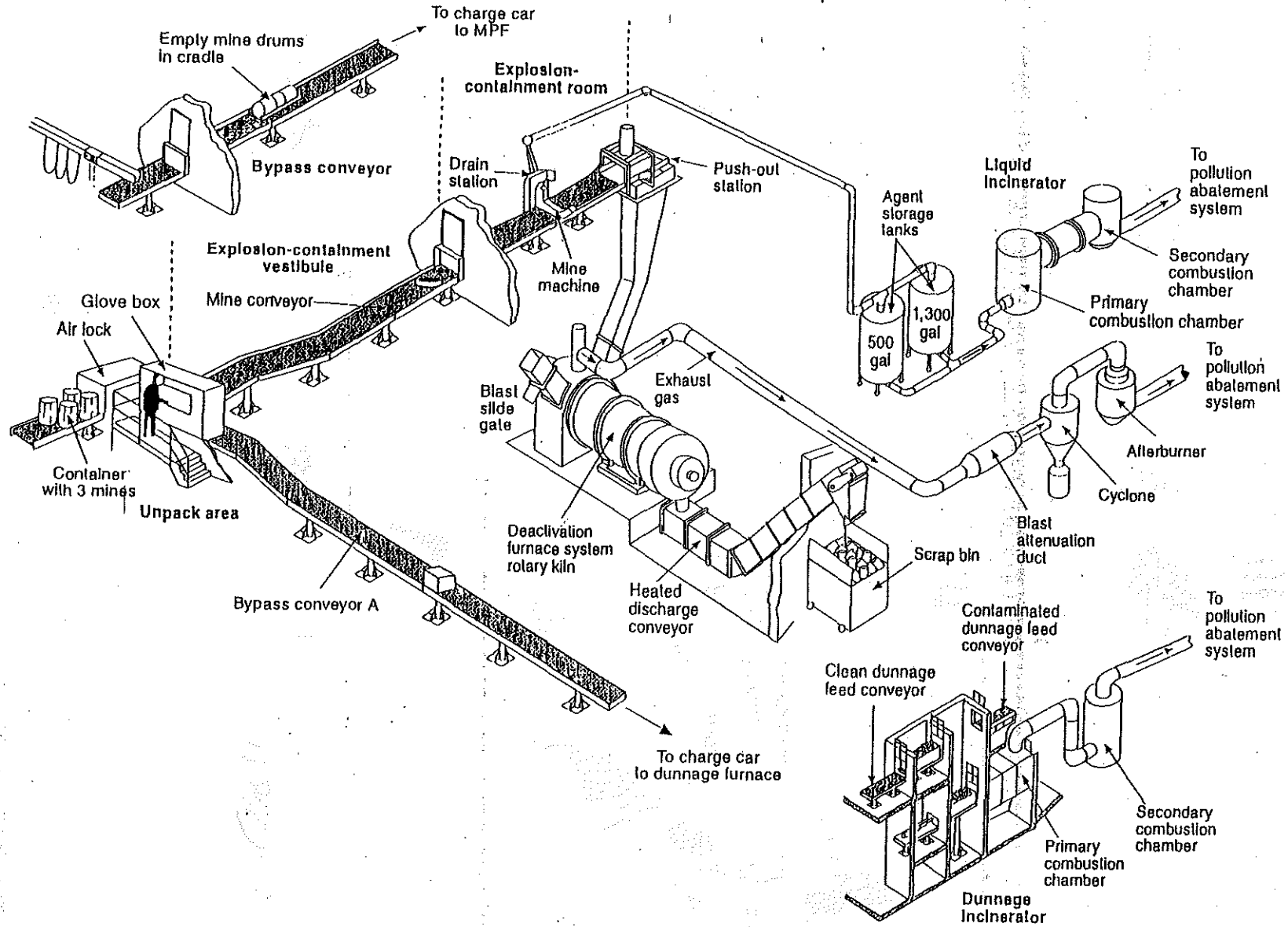


FIGURE A-4 Projectile-handling system. Source: Adapted from U.S. Army, 1996.



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FIGURE A-5 Mine-handling system. Source: Adapted from U.S. Army, 1996.

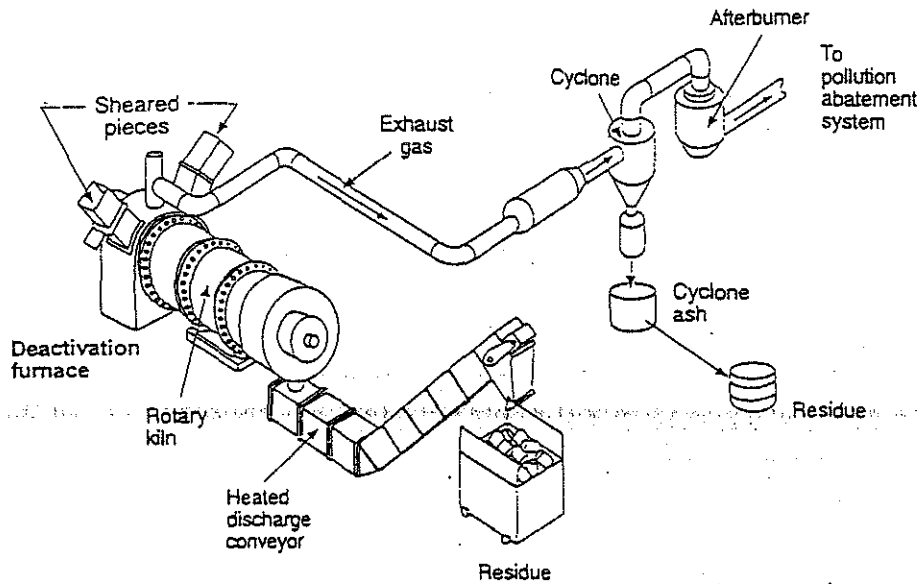


FIGURE A-6 Deactivation furnace system. Source: Adapted from U.S. Army, 1996.

MPF is diagrammed in Figure A-7. For ton containers, the MPF peaks at 1,450°F. For spray tanks, it operates at 1,525°F. For smaller items, it operates at 1,600°F. Laminated items are conveyed semicontinuously through a charge air lock into the first of three heating zones, each of which has an air-lock door. Pieces are held in the discharge air lock until they cool enough so that agent levels can be monitored. Pieces that are 5X

clean are cooled and containerized for disposal. The exhaust gas from the MPF goes through an afterburner and then to the PAS.

Two LICs destroy liquid agent. Figure A-8 shows the LIC configuration. The primary chamber, a vertical refractory-lined cylinder with a natural gas burner, operates at 2,700°F. Agent is atomized as it is injected into the air stream going into the burner. As the agent burns,

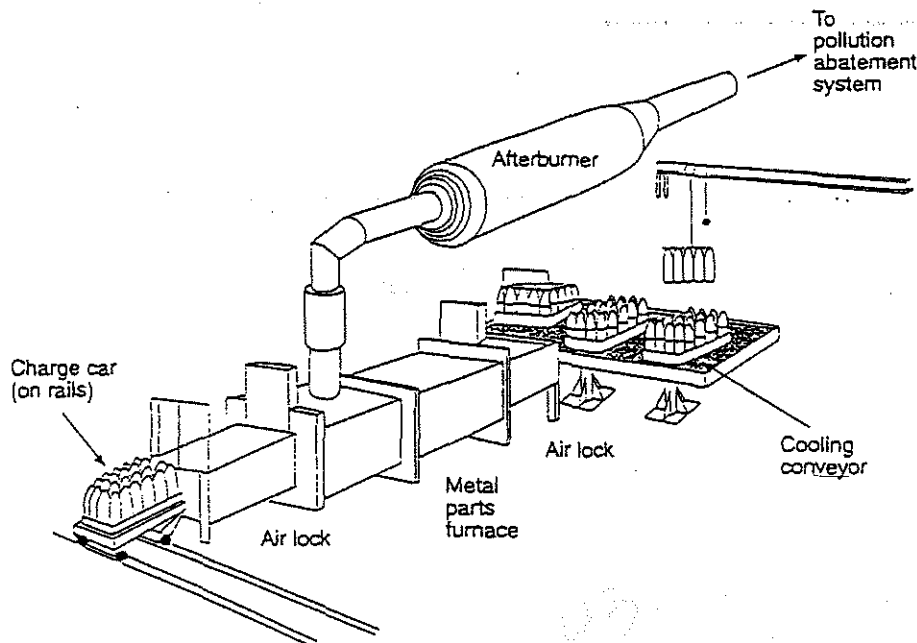


FIGURE A-7 Metal parts furnace. Source: Adapted from U.S. Army, 1996.

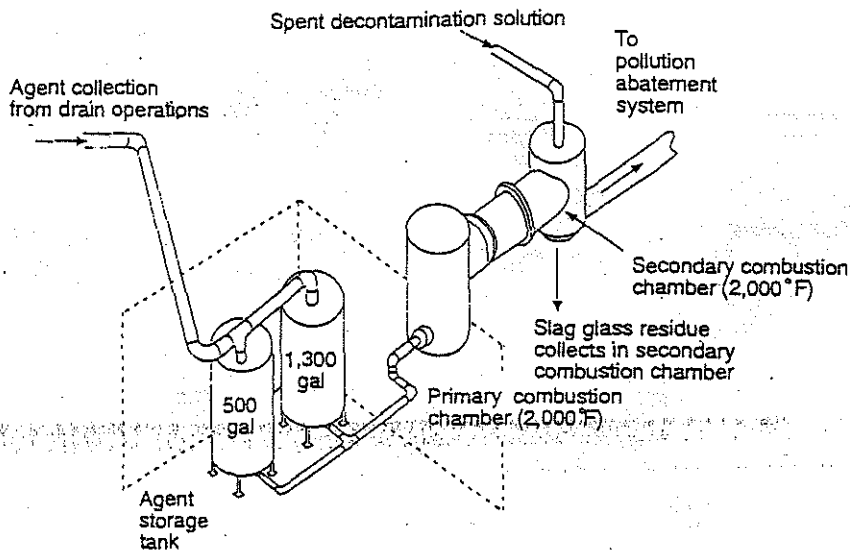


FIGURE A-8 Liquid incinerator. Source: Adapted from U.S. Army, 1996.

the natural gas supply is cut back to maintain the temperature at the desired level. The exhaust from the primary chamber goes into a similar, refractory-lined secondary chamber, in which the temperature is maintained at 2,050°F by burning natural gas. Spent decontamination solution is atomized and injected into the second combustion chamber. All of this forms a molten slag, which is drawn off through a bottom tap into barrels, where it solidifies. Once cool, these barrels are covered and stored prior to disposal.

A dunnage incinerator (DUN) is designed to destroy the plastic, wood, or paper packing cases, pallets, and other objects that may be contaminated by agent. In practice at the TOCDF, the DUN has not operated routinely because the listed materials could be safely disposed in other ways. The DUN is designed to burn natural gas and dunnage combustibles at a temperature of 1,400°F. The configuration of the DUN is shown in Figure A-9. The primary combustion chamber is refractory-lined and has four side burners. Air is supplied both through

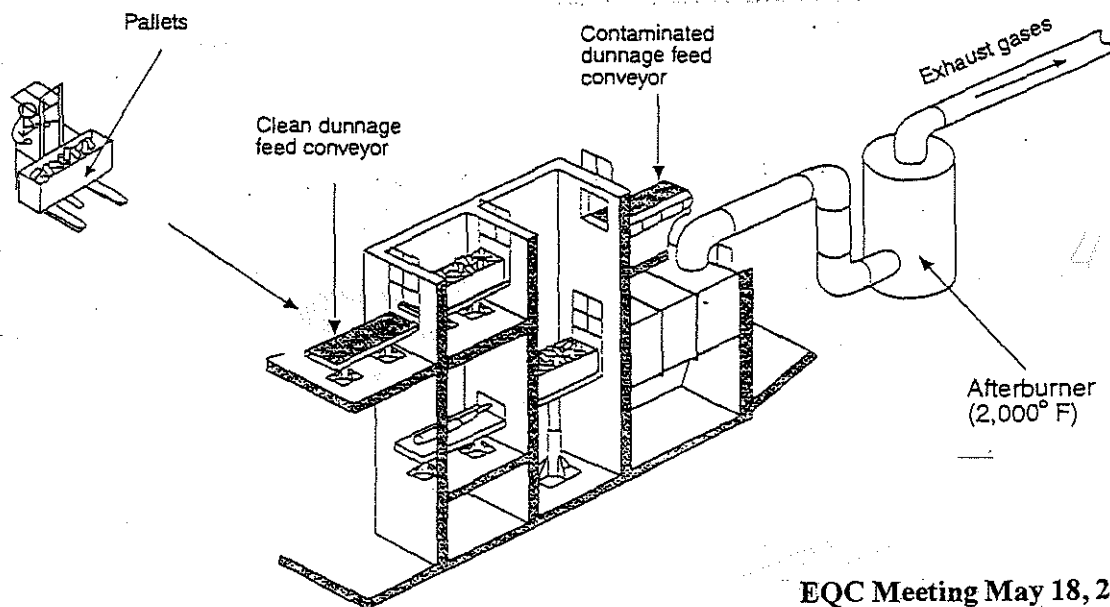


FIGURE A-9 Dunnage furnace. Source: Adapted from U.S. Army, 1996.

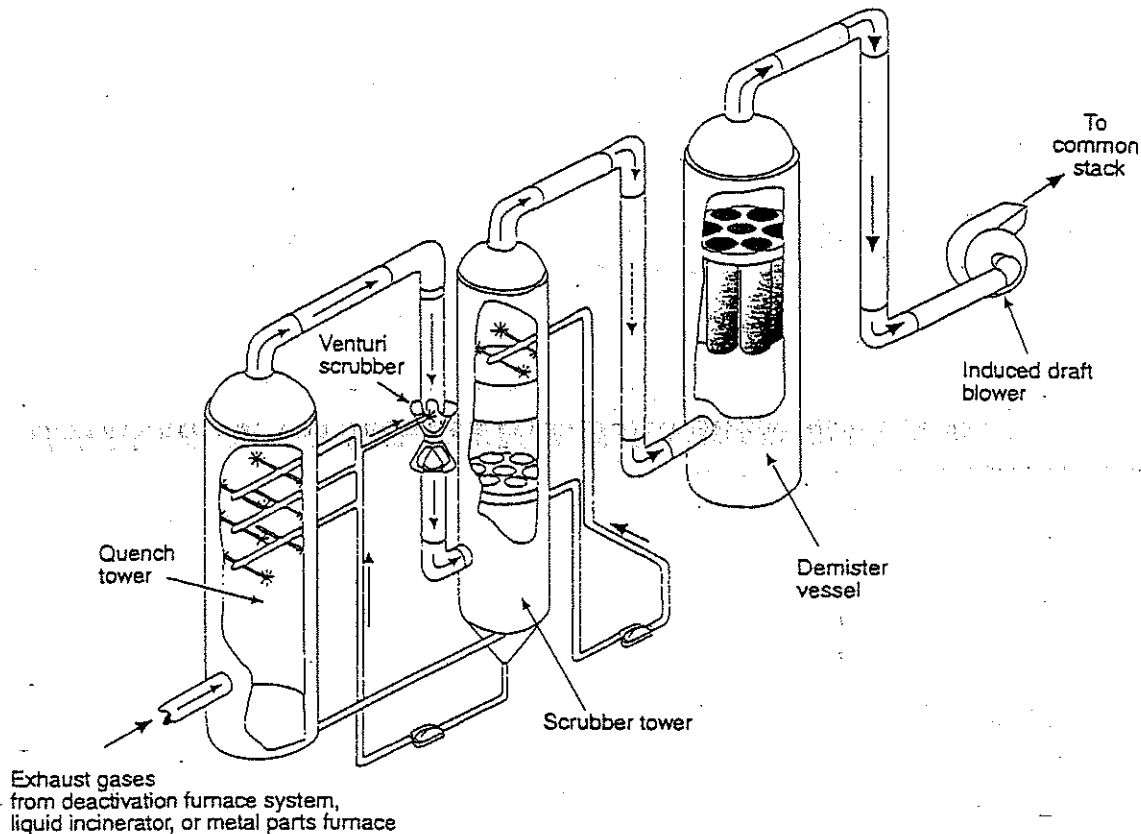


FIGURE A-10 Pollution abatement system. Source: Adapted from U.S. Army, 1996.

the burners and through side wall ports. Ashes are removed from the furnace periodically. Exhaust gases go to the afterburner, which operates at 2,000°F. Secondary exhaust passes into the PAS.

### Safety Systems

Ensuring process safety is the prime concern of the design and operation of the TOCDF. Explosion-containment requirements were mentioned in several of the preceding sections. The overall design for explosion-containment rooms requires containment of a blast from 15 pounds of TNT. The DFS room is designed to contain a blast from 28.2 pounds of TNT. Interlocked blast gates and blast doors are used to ensure containment.

Agent dispersion in the air stream is another major safety concern. Avoiding contamination is accomplished by pressure cascading the air flow throughout the plant from areas with low contamination probability through

areas with increasing contamination probability. The air from the most susceptible areas to agent contamination (the furnace rooms and the munition demilitarization building) is filtered through a series of high efficiency particulate air filters and carbon adsorption beds before being exhausted to a stack. In situ monitoring for agent occurs at many points within and around the perimeter of the plant. In addition, ambient air is continuously pumped through contaminant concentration tubes that are periodically collected and analyzed for agent by gas chromatography. There is also a system for monitoring and controlling doors so that the ventilation flowpaths are not upset even when personnel enter or leave the munition demilitarization building areas.

Fire protection is another critical safety concern. Automatic fire detectors are located throughout the plant. Sprinkler systems supplied from a large storage tank come on automatically in the event of a fire in the unloading and unpack areas. In other areas, dry chemical systems are deployed. Halon systems protect the control room and power supply room.

## Support Systems

The electric, instrumentation, compressed air, hydraulics, fuel gas, and cooling systems are fairly standard industrial systems, but they are often paralleled to ensure reliability. Each furnace system has a downstream PAS to neutralize and remove the acidic components (hydrochloric, hydrofluoric, sulfuric acids, etc.) formed during the combustion of the agent so the exit gas can be safely released to the atmosphere. Figure A-10 illustrates a typical PAS configuration. The furnace outlet gases enter a quench tower in which a caustic solution is sprayed. The cooled gases exit into a venturi scrubber where they are again in contact with caustic brine. Finally, they go through a scrubber tower where they are in contact with additional brine, through an induced draft fan, and then to a common stack. The PAS for the DUN is simple. It has only a quench tower because the exit gases are far less acidic than those from the other furnaces.

The brine reduction area (BRA) process involves evaporating brine with steam generated on site, then drying it to salt with less than 10 percent water content. The gas from the evaporator is superheated and passed through a bag filter system before being exhausted to

the atmosphere. Currently, brine from the PAS is collected, stored temporarily, and then disposed of off site as a hazardous waste. This brine disposal strategy is currently a cheaper alternative than operating the BRA.

## Operations Control Room

The central control room provides surveillance and direction for all phases of TOCDF activities. It is kept at a higher positive pressure to prevent the possibility of any agent entering it, and the air intake is doubly filtered. Several consoles line the room, each with two advisor screen monitors, two closed-circuit TV monitors, and a keyboard through which commands are entered to control plant operations. Redundant computers, software, and plant instrumentation ensure that continuous real-time control is maintained.

## Reference

U.S. Army. 1996. Tooele Chemical Agent Disposal Facility Quantitative Risk Assessment. SAIC-96/2600. Aberdeen Proving Ground, Md.: U.S. Army Program Manager for Chemical Demilitarization.

## Appendix B

# Reports of the Committee on Review and Evaluation of the Army Chemical Stockpile Disposal Program (Stockpile Committee)

- Comments on Operational Verification Test and Evaluation Master Plan for the Johnston Atoll Chemical Agent Disposal System (JACADS) (1989)*
- Demilitarization of Chemical Weapons: On-Site Handling of Munitions (1989)*
- Demilitarization of Chemical Weapons: Cryofracture (1989)*
- Workshop on the Pollution Abatement System of the Chemical Agent Demilitarization System (Letter Report, May 1991)*
- Letter report on siting of a cryofracture chemical stockpile disposal facility (August 1991)*
- Comments on Proposed Cryofracture Program Testing (Letter Report, August 1991)*
- Review of the MITRE report: Evaluation of the GB Rocket Campaign: Johnston Atoll Chemical Agent Disposal System Operational Verification Testing, dated May 1991 (Letter Report, September 1991)*
- Review of the Choice and Status of Incineration for Destruction of the Chemical Stockpile (Letter Report, June 1992)*
- Letter Report to recommend specific actions to further enhance the CSDP [Chemical Stockpile Disposal Program] risk management process (January 1993)*
- Recommendations for the Disposal of Chemical Agents and Munitions (February 1994)*
- Review of Monitoring Activities Within the Army Chemical Stockpile Disposal Program (April 1994)*
- Evaluation of the Johnston Atoll Chemical Agent Disposal System Operational Verification Testing: Part I (July 1993) and Part II (April 1994)*
- Evaluation of the Army's Draft Assessment Criteria to Aid in the Selection of Alternative Technologies for Chemical Demilitarization (December 1995)*
- Review of Systemization of the Tooele Chemical Agent Disposal Facility (March 1996)*
- Public Involvement and the Army Chemical Stockpile Disposal Program (Letter Report, October 1996)*
- Risk Assessment and Management at Deseret Chemical Depot and the Tooele Chemical Agent Disposal Facility (September 1997)*
- Using Supercritical Water Oxidation to Treat Hydrolysate from VX Neutralization (May 1998)*
- Carbon Filtration for Reducing Emissions from Chemical Agent Incineration (July 1999)*

## Appendix C

# TOCDF-Related Recommendations by the Stockpile Committee Addressed in This Report<sup>1</sup>

### SYSTEMIZATION REPORT (NRC, 1996a)

#### Duration of TOCDF Operations

Recommendation 1. Safety program development and implementation at the TOCDF must be given high priority.

Recommendation 2. Safety and environmental performance goals should be given at least equal weight with production goals in establishing award fee criteria.

Recommendation 3. Applicable portions of the accident quantitative risk assessments must be completed and all safety-related concerns resolved before the start of specific agent-destruction campaigns.

Recommendation 4. A substantial effort should be made by the Army to enhance interactive communications with the host community and the Utah State Citizens Advisory Commission on issues of mutual concern (e.g., various elements of the Chemical Stockpile Emergency Preparedness Program [CSEPP], decontamination and decommissioning, future use of the facility, and risk reduction).

#### Coordinated with the Start of Agent Operations

Recommendation 5. The Army should increase efforts to work with the Utah Division of Comprehensive Emergency Management to ensure that first-responders have been adequately trained to use the personal protective

equipment approved by the Occupational Safety and Health Administration. Tooele County must ensure their capability for responding to an emergency incident, especially because this condition relates to state requirements for the start of agent operations.

Recommendation 6. The Army, and where appropriate the Federal Emergency Management Agency (FEMA), should ensure that local and state Chemical Stockpile Emergency Preparedness Program (CSEPP) plans for responding to potential chemical events are complete and well exercised as soon as possible.

Recommendation 7. The Army/FEMA should provide the necessary resources for completing the communications system planned by the Tooele County Department of Emergency Management.

#### Prior to the Start of Agent Operations

Recommendation 8. All mandatory requirements of the Army's Pre-Operational Survey must be satisfied.

Recommendation 9. The liquid incinerator and deactivation furnace system must have demonstrated a destruction removal efficiency of 99.9999 percent (6-nines) during surrogate trial burns.

Recommendation 10. High-quality, adequately staffed safety management systems must be completely implemented (including procedures for testing

<sup>1</sup>Throughout the text of this report, references to recommendations from the 1996 NRC report, *Review of Systemization of the Tooele Chemical Agent Disposal Facility (Systemization report)*, are designated by [S-#]; recommendations from the 1996 NRC report, *Public Involvement and the Army Chemical Stockpile*

*Disposal Program (Public Involvement letter report)*, are designated by [PI-#]; and recommendations from the 1997 NRC report, *Risk Assessment and Management at Deseret Chemical Depot and the Tooele Chemical Agent Disposal Facility (Risk Assessment and Management report)*, are designated by [R-#].



cal equipment; all necessary operating, maintenance, and emergency procedures; management of change procedures; training and cross-training programs; programmatic lessons-learned activities; subject area reviews; and other safety oversight activities).

### During the First Year of Agent Operations

**Recommendation 11.** The liquid incinerator must pass all required Resource Conservation and Recovery Act (RCRA) trial burns; and the deactivation furnace system must pass required Toxic Substances Control Act trial burns.

**Recommendation 12.** Testing and certification of the brine reduction area and the dunnage incinerator should be completed at the TOCDF, or a satisfactory disposal alternative must be implemented.

**Recommendation 13.** Performance of the slag removal system for the liquid incinerators should be demonstrated when sufficient slag has accumulated.

**Recommendation 14.** The Risk Management Plan must be fully implemented.

**Recommendation 15.** A comprehensive, integrated, and clear TOCDF risk assessment study, including a full description of all significant acute and latent agent and nonagent risks associated with disposal operations, as well as with the continued maintenance of the Tooele chemical stockpile, should be completed. A full explanation of the uncertainties associated with the various estimates should be included.

**Recommendation 16.** A system for documenting and tracking unexpected upsets, errors, failures, and other sources of problems that lead to "near misses" during operation of the facility should be developed as soon as possible. A program for integrating this information into a plan for continual safety improvements at the TOCDF should be implemented.

**Recommendation 17.** An active program for continual improvement of monitoring instrumentation, including techniques for more rapid recognition of significant levels of agent release, should be pursued.

## PUBLIC INVOLVEMENT LETTER REPORT (NRC, 1996b)

**Recommendation 1.** The Army and the Chemical Stockpile Disposal Program management at all levels must make an increased commitment to public involvement throughout the entire program.

- The Program Manager for Chemical Demilitarization should establish and develop mechanisms and processes that allow direct input by affected citizens into the decision-making process for destruction of the stockpile.
- The Program Manager for Chemical Demilitarization should develop and implement a detailed public involvement plan that identifies program elements where the public and affected parties can make significant contributions to program decisions. The plan should be developed with input from the public, citizens advisory commissions, and other affected parties. The plan should define the goal of public involvement, a process for identifying opportunities for public input and review, mechanisms for interaction between the public and the parties responsible for implementing the disposal program, and individual and collective roles and accountability on the part of the Army, citizens advisory commissions, and others. Senior management of the Chemical Stockpile Disposal Program and management at each chemical stockpile site should be active and visible participants in the public involvement process.
- The Program Manager for Chemical Demilitarization should institute policies and procedures to ensure feedback to the communities detailing the Army's response to and use of input from the public and other parties in the decision-making process and program oversight.
- The Program Manager for Chemical Demilitarization is encouraged to provide independent technical assistance to the citizens advisory commissions as requested. This assistance should come from individuals or organizations that are without bias and have no conflicts of interest concerning the Chemical Stockpile Disposal Program.

**Recommendation 2.** The public affairs programs for the Chemical Stockpile Disposal Program, the Chemical Stockpile Emergency Preparedness Program, and other Army activities at stockpile locations should be

closely coordinated to avoid adversely affecting public perceptions of the Chemical Stockpile Disposal Program and delaying implementation of stockpile destruction. In addition, the public affairs program for the Chemical Stockpile Disposal Program should be coordinated with the risk management plan at each stockpile site.

## **RISK ASSESSMENT AND MANAGEMENT REPORT (NRC, 1997)**

### **Risk Assessments**

**Recommendation 1.** The Army should update both the QRA and HRA at the TOCDF whenever changes to system design or operations occur that could affect QRA or HRA calculations to ensure that estimates of risk are current and reflect changes in operating conditions and experience, assumptions, and program status (current Established Configuration). The process for updating the QRA and HRA should be included in the *Guide*.

**Recommendation 2.** The Army should continue the site-specific QRA and HRA processes at all PMCD sites. The development of assessments for sites other than the DCD will be greatly simplified because much of the methodology has already been established. The Army should continue to obtain interactive, independent expert reviews of all site-specific QRAs. The Army should heed the lessons learned from development of the TOCDF QRA and should incorporate the changes recommended by the Expert Panel.

**Recommendation 3.** The QRA methodology manual should be updated to reflect the significant improvements that have been made.

### **Risk Management**

#### *Policy*

**Recommendation 4.** The Army should expand its draft report on risk management policy, *A Guide to Risk Management Policy and Activities*, to encourage the establishment of a "safety culture" within the PMCD and its field offices and among contractors and other

government agencies. The *Guide* should elucidate the Army's policy on industrial safety, including the responsibilities of individuals and managers in the field and the definitions of acceptable performance.

**Recommendation 5.** The Army should develop a management plan (and include it in the *Guide*) that defines the integration of management roles, responsibilities, and communications across activities by risk management functions (e.g., operations, safety, environmental protection, emergency preparedness, and public outreach).

**Recommendation 6.** The Army should review and expand the current draft risk management plan to include public involvement in appropriate areas beyond the management of change process.

**Recommendation 7.** The Army should institutionalize the management of change process developed in the *Guide*. The Army should track performance of the change and document public involvement and public responses to decisions. The Army should use this experience to improve the change process.

**Recommendation 8.** The Army should expand implementation of the risk management program to ensure that workers understand the results of the risk assessments and risk management decisions. The Army should also ensure that CSEPP and other emergency preparedness officials understand the QRA and how their activities might affect risk. CSEPP activities should be tracked by the Army as part of their risk management program.

**Recommendation 9.** The Army should implement their risk management plans and update them whenever necessary to ensure that they reflect current practices and lessons learned.

### **References**

- NRC (National Research Council). 1996a. *Review of Systemization of the Tooele Chemical Agent Disposal Facility*. Committee on Review and Evaluation of the Army Chemical Stockpile Disposal Program, Board on Army Science and Technology. Washington, D.C.: National Academy Press.
- NRC. 1996b. *Public Involvement and the Army Chemical Stockpile Disposal Program*. Committee on Review and Evaluation of the

Army Chemical Stockpile Disposal Program, Board on Army Science and Technology. Washington, D.C.: National Academy Press. NRC. 1997. Risk Assessment and Management at Desert Chemical Depot and the Tooele Chemical Agent Disposal Facility.

Committee on Review and Evaluation of the Army Chemical Stockpile Disposal Program, Board on Army Science and Technology. Washington, D.C.: National Academy Press.

4/23/00

## Appendix D

### Biographical Sketches of Committee Members

David S. Kosson (*chair*) has a B.S. in chemical engineering, an M.S. in chemical and biochemical engineering, and a Ph.D. in chemical and biochemical engineering from Rutgers, The State University of New Jersey. He joined the faculty at Rutgers in 1986 and was made an associate professor with tenure in 1990 and a full professor in 1996. Dr. Kosson teaches graduate and undergraduate courses in chemical and environmental engineering and conducts research for the Department of Chemical and Biochemical Engineering on the development of microbial, chemical, and physical treatments for hazardous waste. He is responsible for project planning and coordination, from basic research through full-scale design and implementation. He has published extensively in the fields of chemical engineering, waste management and treatment, and contaminant fate and transport in soils and groundwater. Dr. Kosson has served on several Environmental Protection Agency advisory panels involved in waste research and is the director of the Physical Treatment Division of the Hazardous Substances Management Research Center in New Jersey. He is a member of the American Institute of Chemical Engineers and recently served as a member of the National Research Council Committee on Alternative Chemical Demilitarization Technologies.

Charles E. Kolb (*vice chair*) is president and chief executive officer of Aerodyne Research, Inc. Since 1971, his principal research interests at Aerodyne have included atmospheric and environmental chemistry, combustion chemistry, materials chemistry, and the chemical physics of rocket and aircraft exhaust plumes. He has served on several National Aeronautics and Space Administration panels dealing with atmospheric chemistry and global change, as well as on five National Research Council committees and boards dealing with environmental issues. From 1996 to 1999, he was atmospheric sciences editor for *Geophysical Research Letters*. In 1997, he received the Award for Creative Advances in Environmental Science and Technology from the American Chemical Society.

David H. Archer, a member of the National Academy of Engineering, has a Ph.D. in chemical engineering and mathematics from the University of Delaware. He is a retired consulting engineer with the Westinghouse Electric Company and is currently adjunct professor at Carnegie Mellon University. Dr. Archer has worked in both industry (at Westinghouse as an engineer, supervising engineer, department manager, and consulting engineer) and academia (at the University of Delaware and Carnegie Mellon University for almost 10 years). He has considerable experience in research and management related to chemical engineering, as well as experience with combustion and plant management.

Piero M. Armenante has a Ph.D. in chemical engineering from the University of Virginia and is currently professor of chemical engineering at the New Jersey Institute of Technology. Dr. Armenante's research interests include multiphase mixing in agitated systems, the biological treatment of hazardous waste, industrial sterilization processes, and biomedical engineering. He has an extensive list of peer-reviewed and other publications and has administered numerous grants, studies, and projects.

Dennis C. Bley is president of Buttonwood Consulting, Inc., and a principal of The WreathWood Group, a joint venture company that supports multidisciplinary research in human reliability. He has more than 25 years of experience in nuclear and electrical engineering, reliability and availability analysis, plant and human modeling for risk assessment, diagnostic system development, and technical management. Dr. Bley has a Ph.D. in nuclear engineering from the Massachusetts Institute of Technology and is a registered professional engineer in the state of California. He has served on a number of technical review panels for U.S. Nuclear Regulatory Commission and U.S. Department of Energy programs and is a frequent lecturer in short courses for universities, industries, and government agencies. He is active in many professional organizations and is

The Board of Directors of the International Association for Probabilistic Safety Assessment and Management. Dr. Bley has published extensively on subjects related to risk assessment. His current research interests include applying risk analysis to diverse technological systems, modeling uncertainties in risk analysis and risk management, technical risk communication, and human reliability analysis.

Jerry L.R. Chandler has a Ph.D. in biochemistry from Oklahoma State University and has done extensive post-graduate study in mathematics. He is currently a research professor at the Krasnow Institute for Advanced Study at George Mason University. During his long career, Dr. Chandler served with the U.S. Public Health Service, the National Institute for Occupational Safety and Health (NIOSH), the Food and Drug Administration, and the National Cancer Institute Epidemiology Program. More recently, he was a neuropharmacologist in the Epilepsy Branch of the National Institutes of Health. Dr. Chandler is a founding member and president of the Washington Evolutionary Systems Society and has published extensively on using mathematical category theory to understand the origins of disease. He previously served as a NIOSH observer with the National Academy of Science/National Research Council Panel on Risk Assessment.

Frank P. Crimi is a part-time consultant and retired vice president of Lockheed Martin Advanced Environmental Systems Company. He has a B.S. in mechanical engineering from Ohio University and has done graduate studies in mechanical engineering at Union College in Schenectady, New York. In addition to his appointment to the National Research Council Committee on Decontamination and Decommissioning of Uranium Enrichment Facilities, Mr. Crimi has firsthand knowledge and experience with radioactive and hazardous-waste treatment and disposal technologies.

Elisabeth M. Drake, a member of the National Academy of Engineering, is the associate director of the Massachusetts Institute of Technology Energy Laboratory. A chemical engineer with experience in risk management and technology associated with the transport, processing, storage, and disposal of hazardous materials, as well as chemical engineering process design and control systems, Dr. Drake has a special interest in the interactions between technology and the environment.

She has often been a consultant to government and industry and has been active in the American Institute of Chemical Engineers, especially the Center for Chemical Process Safety. She belongs to a number of environmental organizations, including the Audubon Society, the Sierra Club, and Greenpeace.

J. Robert Gibson is the assistant director of the Haskell Laboratory, E.I. du Pont de Nemours and Company, and an adjunct associate professor of marine studies at the University of Delaware. Since receiving his Ph.D. in physiology from Mississippi State University, Dr. Gibson has specialized in toxicology. He has been certified by the American Board of Toxicology and has written numerous publications.

Michael R. Greenberg is a professor in the Department of Urban Studies and Community Health at Rutgers, The State University of New Jersey, and is an adjunct professor of environmental and community medicine at the Robert Wood Johnson Medical School. His principal research and teaching interests include urbanization, industrialization, and environmental health policy. Dr. Greenberg holds a B.A. in mathematics and history, an M.A. in urban geography, and a Ph.D. in environmental and medical geography.

Kathryn E. Kelly received her Ph.D. in public health from Columbia University, with a concentration in environmental toxicology and the health effects of hazardous waste incineration. She also studied toxicology at the New York University Institute of Environmental Medicine. Dr. Kelly is the founder and president of three companies: Delta Toxicology, Inc., Crystal Bay, Nevada; Environmental Toxicology International, Seattle, Washington; and Alden Analytical Laboratories of Seattle, Washington. She has broad experience in toxicology, waste combustion, environmental policy, and risk communication.

Peter B. Lederman is director of the Center for Environmental Engineering and Sciences, executive director of the Office of Intellectual Property, and research professor of chemical engineering and environmental policy at the New Jersey Institute of Technology. He received his Ph.D. in chemical engineering from the University of Michigan. Dr. Lederman has 45 years of experience in all facets of environmental management, control, and policy development; hazardous substance treatment and management; process engineering; and more than 18 years of experience as an educator. He is

a registered professional engineer and a diplomate of the American Academy of Environmental Engineers. Dr. Lederman has worked on environmental policy at the federal and state levels and has served on several National Research Council committees, most recently the Committee on Decontamination and Decommissioning of Gaseous Diffusion Plants.

**Richard S. Magee** (chair from 7/94 to 7/98) is a professor in the Department of Mechanical Engineering and the Department of Chemical Engineering, Chemistry, and Environmental Science and associate provost for research and development at the New Jersey Institute of Technology (NJIT). He also directs the Environmental Protection Agency's Northeast Hazardous Substance Research Center. He is a fellow of the American Society of Mechanical Engineers (ASME) and a diplomate of the American Academy of Environmental Engineers. Dr. Magee's research expertise is in combustion, with a focus on the incineration of municipal and industrial wastes. He has served as vice chairman of the ASME Research Committee on Industrial and Municipal Wastes and as a member of the United Nations Special Commission (under Security Council Resolution 687) Advisory Panel on Destruction of Iraq's Chemical Weapons Capabilities. He was recently a member of the North Atlantic Treaty Organization (NATO) Science Committee's Priority Area Panel on disarmament technologies and is presently a member of the NATO Science Committee's Security-Related Civil Science and Technology Panel. He recently chaired the National Research Council Panel on Review and Evaluation of Alternative Chemical Disposal Technologies.

**James F. Mathis**, a member of the National Academy of Engineering, graduated from the University of Wisconsin with a Ph.D. in chemical engineering. Dr. Mathis was vice president of science and technology for Exxon Corporation, where he was responsible for worldwide research and development programs, and chair of the New Jersey Commission on Science and Technology until his retirement in 1997. Dr. Mathis' expertise is in research and development and chemical engineering.

**Walter G. May** has a B.S. in chemical engineering and an M.S. in chemistry from the University of Saskatchewan and a D.Sc. in chemical engineering from the Massachusetts Institute of Technology. He joined the faculty of the University of Saskatchewan as a professor of chemical engineering in 1943. In 1948, he began a distinguished

career with Exxon Research and Engineering Company where he was a senior science advisor from 1976 to 1983. From 1983 until his retirement in 1991, he was professor of chemical engineering at the University of Illinois, where he taught process design, thermodynamics, chemical reactor design, separation processes, and industrial chemistry and stoichiometry. Dr. May has published extensively, served on the editorial boards of *Chemical Engineering Reviews* and *Chemical Engineering Progress*, and has obtained numerous patents in his field. He is a member of the National Academy of Engineering, a fellow of the American Institute of Chemical Engineers, and has received special awards from the American Institute of Chemical Engineers and the American Society of Mechanical Engineers. He is also a registered professional engineer in the state of Illinois. Dr. May was a member of the National Research Council Committee on Alternative Chemical Demilitarization Technologies and the Committee on Decontamination and Decommissioning of Uranium Diffusion Plants.

**Charles I. McGinnis** has an M.E. from Texas A&M University. He retired from the U.S. Army as a major general and former director of civil works for the U.S. Army Corps of Engineers and recently served in senior positions at the Construction Industry Institute in Austin, Texas. He was also director of engineering and construction for the Panama Canal Company and was subsequently vice president of the company and lieutenant governor of the Canal Zone. As director of civil works for the Corps of Engineers, he was responsible for a \$3 billion per year budget for the planning, design, construction, operation, and maintenance of public works nationwide.

**Alvin H. Mushkatel**, professor in the School of Planning and Landscape Architecture, Arizona State University, is an expert in emergency management risk perceptions. His research interests include emergency management, natural and technological hazards policy, and environmental policy. He has been a member of the National Research Council Committee on Earthquake Engineering, the Committee on Decontamination and Decommissioning of Uranium Enrichment Facilities, and the Panel on Review and Evaluation of Alternative Chemical Disposal Technologies. His most recent research has been focused on intergovernmental policy conflicts involving high-level nuclear waste disposal and the role of citizens in decision-making processes. He has published extensively on issues related to siting.

I. Gregor Rigo attended Ohio University and earned his Ph.D. in mechanical and environmental engineering from the University of Illinois. He is currently president of Rigo & Rigo Associates, Inc., in Berea, Ohio. He has extensive experience in plant start-up, process and environmental engineering, and applied statistics focused on the use and control of emissions from nontraditional fuels; technical, environmental, and economic evaluations; and multipathway health risk assessments.

Kozo Saito has a Ph.D. in mechanical engineering from Seikei University in Tokyo and is currently professor of mechanical engineering in the Department of Mechanical Engineering at the University of Kentucky. Dr. Saito's expertise and experience are in experimental combustion studies, thermal sensing and control, and lean manufacturing and control. He is a member of the Combustion Institute, the American Society for Engineering Education, and the American Society of Mechanical Engineers.

W. Leigh Short earned his Ph.D. in chemical engineering from the University of Michigan. He recently retired as a principal and vice president of Woodward-Clyde, where he was responsible for management and business development associated with the company's hazardous waste services in Wayne, New Jersey. Dr. Short has expertise in air pollution, chemical process engineering, hazardous waste services, feasibility studies, site remediation, and project management. He has taught courses in control technologies, both to graduate students and as a part of the Environmental Protection Agency's (EPA's) national training programs. He has also served as chairman of the EPA's NO<sub>x</sub> Control Technology Review Panel.

Arnold F. Stancell, a member of the National Academy of Engineering, graduated from the Massachusetts Institute of Technology with an Sc.D. in chemical engineering. Dr. Stancell is currently a professor of chemical engineering at Georgia Institute of Technology and recently was visiting professor of chemical engineering at the Massachusetts Institute of Technology. For many years he worked for Mobil Oil, where he started in research and eventually became vice president of Mobil Chemical and then vice president in the crude oil and natural gas business, both domestic and international. He was responsible for a \$5 billion per year business with 5,000 employees. Dr. Stancell's expertise is in the

management of large businesses, including chemical operations.

Steven R. Tannenbaum, a member of the Institute of Medicine, has a Ph.D. in food science and technology from the Massachusetts Institute of Technology. He is currently the codirector and Underwood-Prescott Professor, Division of Bioengineering and Environmental Health, and professor of chemistry, Department of Chemistry at the Massachusetts Institute of Technology. Dr. Tannenbaum's research interests include the chemistry and pathophysiology of nitric oxide, the quantitative measurement of human exposure to carcinogens, and tissue-based microsensors for toxin detection and drug metabolism. He has been a member of the National Research Council (NRC) Board on Environmental Studies and Toxicology and several NRC committees.

Chadwick A. Tolman received his Ph.D. in physical chemistry from the University of California at Berkeley and is currently a program officer in organic and macromolecular chemistry in the Division of Chemistry at the National Science Foundation. He has extensive experience and expertise in chemistry and chemical process development. Dr. Tolman spent 31 years in Central Research at the DuPont Experimental Station. His work has spanned a broad range of subjects, including hydrocarbon oxidation, organometallic chemistry, and the destruction of toxic organic compounds in wastewater.

William Tumas graduated from Ithaca College with a B.A. in chemistry and earned his Ph.D. in organic chemistry from Stanford University, with a National Science Foundation and Hertz Foundation Fellowship. After conducting postdoctoral research in organometallic chemistry at the California Institute of Technology as a National Institutes of Health and Chaim Weizman Postdoctoral Fellow, he worked for six years at DuPont Central Research and Development. Since 1993, Dr. Tumas has been at Los Alamos National Laboratory, where he is currently group leader of the Chemical and Environmental Research and Development Group in the Chemical Sciences and Technology Division. He has previously served on two National Research Council committees, including the Panel on Review and Evaluation of Alternative Chemical Demilitarization Technologies (1995-1996). His research interests include catalysis, supercritical fluids, environmental chemistry, and waste treatment technology assessment.

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# ATTACHMENT P

## *TABLE OF COMMENTS AND EXHIBITS*

*Documents related to the  
Confederated Tribes of the Umatilla Indian Reservation (CTUIR)*

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# ATTACHMENT P

## Documents related to the Confederated Tribes of the Umatilla Indian Reservation

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
29	James R. Wilkinson's Affidavit	8/19/98	James R. Wilkinson	No Record Number Assigned	<p>Mr. James R. Wilkinson is the Program Manager for the Special Sciences and Resources Program, Department of Natural Resources, Confederated Tribes of the Umatilla Indian Reservation. This Affidavit contains two attachments (see Exhibits 29.1 and 29.2). Mr. Wilkinson states that the Affidavit is the "personal view of the author, and does not represent the views of the tribal government."</p> <p>Cited in Item No. 98-1275 (p. 40, line 0, and p. 61, line 2) to support the Petitioner's contention that the UMCDF Health Risk Assessment fails to consider "impacts of low level agent exposure; impacts on a fetus, infant, and sensitive populations; impacts that may be particular to Native Americans..."</p> <p>Item No. 98-1275 (pp. 64-65) refers to this Affidavit (pp. 5-6) to support the Petitioner's contention that the DEQ and EQC did not sufficiently consider reconfiguration when conducting analysis of alternative technologies.</p> <p>Also cited in Item No. 98-1247 (p.4); Item No. 99-0704 (p. 7); and in Item No. 99-2201 (p. 33).</p>

<sup>1</sup> The DEQ Chemical Demilitarization Program maintains a database of documents related to the Umatilla Chemical Agent Disposal Facility. Most documents are assigned a record number for tracking purposes. Individual "Exhibits" submitted during the course of G.A.S.P., et al., v. EQC, et al., (Case No. 9708-06159, Oregon Circuit Court) were not assigned record numbers at the time of submittal—only the document the Exhibit was attached to was assigned a number. Some Exhibits do have Administrative Record Numbers because the document had been previously received.

<sup>2</sup> No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (Included as Attachment A)  
 No. 98-1275: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)  
 No. 99-0704: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)  
 No. 99-2201: "Comments of G.A.S.P., et al., in Support of Their Request to Suspend and Revoke Permits for [UMCDF]," December 17, 1999 (Included in Attachment E)

## ATTACHMENT P

### Documents related to the Confederated Tribes of the Umatilla Indian Reservation

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
29.1	Resolution of the CTUIR Board of Trustees	1/17/96	Donald Sampson, Chairman	98-1391	This is Attachment "A" to Exhibit 29. This document is a Resolution of the Board of Trustees of the Confederated Tribes of the Umatilla Indian Reservation requesting there be a "one year moratorium on consideration of the Army's incinerator request, pending the completion, in cooperation with the CTUIR, of an analysis of the relative capabilities presented by alternate chemical disposition technologies and the relative risks those technologies pose to the members and residents of the CTUIR as compared to incineration and to continued storage of these weapons."
29.2	Lines Drawn in the Sand: A Review of Challenges, Opportunities, and Options for Chemical Weapons Disposal	11/14/96	Donald Sampson, Armand Minthorn, J.R. Wilkinson	98-1391	This is Attachment "B" to Exhibit 29. This is the text of the presentation given by the CTUIR to the EQC in November, 1996. Mr. Sampson outlined CTUIR concerns with UMCDF and the permitting process proposed that the chemical weapons stockpile be reconfigured to reduce risks and that a Governor's Task Force be established to review alternatives.

# ATTACHMENT Q

## ***TABLE OF COMMENTS AND EXHIBITS***

### ***Documents related to the treatment and/or off-site disposal of secondary wastes***

***and***

“Follow-up to August 18, 1999 Environmental Quality Commission Meeting,”  
Letter from the Chair of the Environmental Quality Commission to the Assistant  
Secretary of the Army and the Program Manager for Chemical Demilitarization  
September 24, 1999 (DEQ Item No. 99-1640)

Letter from the Program Manager for Chemical Demilitarization to the Chair of the  
Environmental Quality Commission (response to EQC letter of September 24, 1999)  
December 17, 1999 (DEQ Item No. 99-2272)

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## ATTACHMENT Q

### Documents related to the treatment and/or off-site disposal of secondary wastes

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
60	"Information Paper" regarding dioxin emissions from the DUN	5/21/96	LTC John Ontiveros	No record number assigned	The Information Paper discusses the causes of dioxin formation and test results from the DUN operation at JACADS that indicate the DUN will be the greatest source of dioxin emissions at the demilitarization facilities.  Cited in Item Nos. 98-1247 (p. 8); 98-1285 (p. 7); and 99-0704 (p. 13).
61	EG&G Memo - Discontinuing op. Of BRA at the Tooele Facility	7/28/98	Tom Kurkky & Debbie Sweeting	No record number assigned	Exhibit 61 is an EG&G memorandum discussing the discontinuing of BRA operations at the at the Tooele Facility and inviting affected employees to apply for other available positions at TOCDF.  Cited in Item Nos. 98-1247 (p. 8); 98-1285 (p. 7), and 99-0704 (p. 13).

<sup>1</sup> The DEQ Chemical Demilitarization Program maintains a database of documents related to the Umatilla Chemical Agent Disposal Facility. Most documents are assigned a record number for tracking purposes. Individual "Exhibits" submitted during the course of G.A.S.P., et al., v. EQC, et al., (Case No. 9708-06159, Oregon Circuit Court) were not assigned record numbers at the time of submittal—only the document the Exhibit was attached to was assigned a number. Some Exhibits do have Administrative Record Numbers because the document had been previously received.

<sup>2</sup> No. 98-1247: "Request for Contested Case Hearing and Other Relief," letter dated December 14, 1998 (Included as Attachment A)  
 No. 98-1275: "Petitioners' Memorandum Supporting Cross Motion for Summary Judgment," August 20, 1998 (Case No. 9708-06159)  
 No. 98-1285: "Petitioners' Additional Documentary Evidence," November 10, 1998 (Case No. 9708-06159)  
 No. 99-0704: "Petitioners' Opposition to Respondents' Supplemental Motion for Summary Judgment," April 12, 1999 (Case No. 9708-06159)

# ATTACHMENT Q

## Documents related to the treatment and/or off-site disposal of secondary wastes

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)	ADMIN RECORD NO. <sup>1</sup>	NOTES AND CITATIONS TO DOCUMENT <sup>2</sup>
62	Table titled "TOCDF Hazardous Waste Off-Site Disposal Activities"	(undated, but appears to have been faxed by the Utah DEQ in June, 1998.)	Utah DEQ	No record number assigned	<p>The Petitioners have described this as a Table prepared by the Utah Division of Solid and Hazardous Waste - compiling data concerning the enormous off-site waste disposal needs of the Tooele Facility - based on data from 8/96 through 3/98. This Table is referenced in Item No. 98-1275 (p. 35, line 8) as a demonstration of the consequences of not operating the BRA or the DUN and the resulting need for off-site shipment.</p> <p>Also cited in Item Nos. 98-1247 (p. 8); 98-1285 (p. 7), and Item No. 99-0704 (p. 13).</p>



92.08

99-1640

State of Oregon  
Department of Environmental Quality

**FILE**

**Oregon**

September 24, 1999

SEP 28 1999

ENVIRONMENTAL  
QUALITY  
COMMISSION

OFFICE OF THE DIRECTOR

Dr. Theodore Prociv  
Assistant Secretary of the Army  
Office of the Assistant Secretary of the Army  
Acquisition, Logistics, and Technology  
2511 Jefferson Davis Highway, Room 11300  
Arlington, VA 22202

Mr. James L. Bacon  
Program Manager for Chemical Demilitarization (PMCD)  
ATTN: SFAE-CD-Z, Building E4585  
Corner of Hoadley and Parrish Roads, Edgewood Area  
Aberdeen Proving Ground, Maryland 21010-5401

STATE OF OREGON  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
RECEIVED  
OCT 04 1999

Re: Follow-up to August 18, 1999  
Environmental Quality Commission meeting

**HERMISTON OFFICE**

Dear Dr. Prociv and Mr. Bacon:

Thank you both for your personal attendance at the meeting of the Environmental Quality Commission on August 18, 1999. The Commission has considered the information you presented about the secondary waste treatment technologies that the Army is studying for utilization at the Umatilla Chemical Agent Disposal Facility (UMCDF). The information was disconcerting, to say the least.

The UMCDF hazardous waste permit that the Commission approved in 1997 permitted five treatment units for all waste stored at the Umatilla Chemical Depot, to include the wastes generated by any activities (past, present, or future) related to the storage, treatment, or disposal of the chemical weapons stockpile. The Dunnage incinerator was the treatment unit designated for secondary wastes. The Army has now come before the Commission, almost three years later and with 60% of the facility constructed, and informed us that the Dunnage incinerator is "too expensive" and has "throughput" problems.

We want to emphasize to you that the primary mission given to the Commission by the Governor of the State of Oregon is the protection of human health and the environment. When a Permittee from a hazardous waste facility in Oregon approaches the Commission concerning major modifications to their permit, the Commission's responsibility is to insure that any modifications do not impact human health and the environment and will result in adequate protection for the citizens of Oregon. Although the Commission appreciates the need to save the taxpayer's money, the cost to the Permittee to conduct operations in a protective manner and in compliance with their Permit is rarely a key criterion when evaluating a Permittee's request.

The Commission is very concerned about the potential for "legacy wastes" remaining at the Umatilla Chemical Depot after the chemical weapons themselves have been



destroyed. The hazardous waste permit granted to the U.S. Army in 1997 was crafted to ensure the destruction of all chemical warfare materiel stored at the Depot at the time of permit issuance, and any and all byproducts from the storage activities or the demilitarization process.

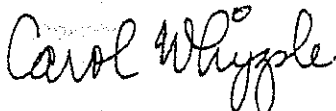
As discussed at the August 18 meeting, the Commission has requested the Department of Environmental Quality staff work with the Army to insure that any Permit Modification Request concerning a compliance schedule contains sufficient information for the Commission to evaluate its merits on the basis of providing equal or better protection to the citizens of Oregon than that originally proposed by the Army and permitted by the Commission.

Any Permit Modification Request submitted to the Department of Environmental Quality that involves the implementation of a Compliance Schedule for developing secondary waste treatment technologies should include the identification and amount of all waste streams, proposed treatment methodology (or treatments being researched), and proposed disposal methods. The Army should clearly define in the Modification Request any benefits to the citizens of Oregon in terms of protection of public health and the environment, and the risks of the various treatment options, including the risks caused by potential delays in the destruction schedule.

The Commission does not want to delay the start of hazardous waste treatment operations at the Umatilla Chemical Depot, and yet we would hesitate to approve any Permit Modification Request that allows the generation of wastes for which there is no permitted treatment technology in place to process the waste. As I indicated at the August 18, 1999 work session, I don't think it's an unreasonable request from the state to insist that the entire process be operational before it starts. The Commission has always expected that all the permitted treatment units will be operational prior to the start of the processing of hazardous wastes.

The Commission learned from the Army that the existing permitted DUN must be modified to improve processing throughput and efficacy. We believe the Army should move forward immediately with implementing improvements to the design of the Dunnage incinerator and any permit modifications should be approved by the Department prior to the start of hazardous waste operations. This approach will provide a degree of assurance for the Commission that the Army is committed to implementing a technology at Umatilla that is capable of processing the agent contaminated secondary wastes.

Sincerely,



Carol Whipple, Chair  
Environmental Quality Commission

cc: Governor John Kitzhaber  
Environmental Quality Commission members  
Langdon Marsh, Director, DEQ  
Wayne Thomas, Umatilla Program Manager, DEQ  
Raj Malhotra, Site Manager, Program Manager for Chemical Demilitarization  
LTC Woloszyn, Commander, Umatilla Chemical Depot  
Jay Bluestein, Site Project Manager, Raytheon



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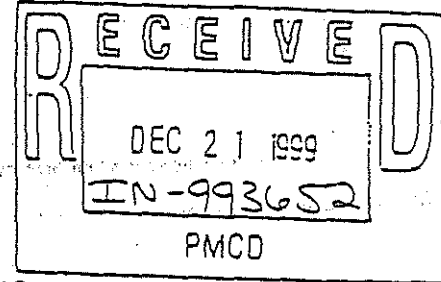
DEPARTMENT OF THE ARMY  
PROGRAM MANAGER FOR CHEMICAL DEMILITARIZATION  
ABERDEEN PROVING GROUND, MARYLAND 21010-4005

December 17, 1999

99-2272

Program Manager for  
Chemical Demilitarization

Ms. Melinda Eden  
Chair, Environmental Quality Commission  
811 SW Sixth Avenue  
Portland, Oregon 97204



Dear Ms. Eden:

Thank you for the letter of September 24, 1999, clarifying the Commission's views relative to the processing of secondary waste at the Umatilla Chemical Agent Disposal Facility (UMCDF). Only through continued effective and direct communication can we achieve our mutual goal of the safe and environmentally responsible destruction of the chemical agents and munitions stored at the Umatilla Chemical Depot.

The Chemical Stockpile Disposal Project is managed to ensure full compliance with Public Law 99-145, which requires the program to ensure maximum protection to the general public, the workers involved in the demilitarization effort, and the environment. Any changes to how we would propose to carry out destruction must meet the stringent mandate that this public law creates. We share the Commission's priority in ensuring that protection of human health and the environment remains paramount in carrying out the demilitarization effort.

We are beginning the effort to design the specific changes to the Damage Incinerator which are necessary to improve its performance. We will use the information gained by this engineering process to continue to evaluate the options for destruction of secondary wastes at the UMCDF.

I would be remiss, however, if I did not point out that it is also our responsibility to ensure that the approaches used to carry out the disposal effort are fiscally responsible and remain a sound investment by the American taxpayers. That is not to say or imply that any less costly approach can be considered; however, there may be opportunities for equally-protective, less-expensive approaches to be implemented. This is important from a financial perspective. Divorcing the financial realities of the demilitarization effort from the public safety issue is not representative of the realities facing this project. In a time of increasing competition for tax dollars, budget reductions or cuts in programs, to include the demilitarization program, are common. The best way to ensure that the

EQC Meeting May 18, 2000  
Attachment Q, Page Q-5

-2-

destruction of the Umatilla stockpile and all associated wastes is not artificially delayed is to continue to identify and implement opportunities for reducing cost while still meeting the stringent maximum protection mandate of the program. I believe that the process outlined by the Army at our August 18, 1999, meeting is wholly consistent with this approach and represents a complete commitment on the part of the Army to deal with all wastes in a responsible manner—both from a public health and environmental protection perspective as well as from a fiduciary one.


I share the Commission's concerns about any delay to the start of agent operations at the UMCDF. The greatest risk to the public remains the continued storage of the chemical stockpile; and I am committed to continuing to work with the Commission on our path forward.

As presented in our August meeting, we are evaluating and demonstrating alternate secondary waste treatment processes as part of the Johnston Atoll Chemical Agent Disposal System closure operation. In preparing our permit modification, we are working closely with the Oregon Department of Environmental Quality (DEQ) to develop a Compliance Schedule for the implementation of these processes at UMCDF.

Since our meeting, we have met with the DEQ on a weekly basis concerning secondary waste as we move forward to submit a Compliance Schedule to the Commission. In addition, we have formed a secondary waste Integrated Product Team which includes membership from the DEQ. The goal of the team is to assist the Permittees in defining the requirements necessary to demonstrate to the citizens of Oregon, the Environmental Quality Commission, and the DEQ that the Permittees have developed viable secondary waste treatment technologies for all wastes currently stored at the Umatilla Chemical Depot and any waste expected to be generated by operations at the UMCDF. This group will be used to develop the proposed Compliance Schedule.

Again, I thank you for the Commission's letter. I am committed to working with the Commission and Oregon DEQ in order to achieve our mutual goal of the safe and environmentally responsible destruction of the chemical agents and munitions stored at the Umatilla Chemical Depot. This commitment extends to secondary wastes as well, resulting in removing the legacy of chemical weapons from the State of Oregon forever.

Sincerely,

  
James L. Bacon  
Program Manager for  
Chemical Demilitarization

ATTACHMENT R

***TABLE OF COMMENTS AND EXHIBITS***  
***Affidavits of Legal Standing from Petitioners***

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# ATTACHMENT R

## Affidavits of Legal Standing from Petitioners

The following list of Exhibits (1-22) are "Standing Affidavits" filed with the "*Petitioner's Memorandum Supporting Cross Motion for Summary Judgment and Opposing Respondents Motion for Summary Judgment*," August 20, 1998, G.A.S.P., et al. v. Environmental Quality Commission, et al., State of Oregon Circuit Court, Multnomah County, Case No. 9708-06159 (DEQ Item No. 98-1275).

The Department does not challenge Petitioners claim to standing.

EXHIBIT NO.	TITLE	DATE OF DOCUMENT	AUTHOR (IF APPLICABLE)
1	Standing Affidavit	8/17/98	Karyn Jones (and G.A.S.P.)
2	Standing Affidavit	8/7/98	Dr. Robert J. Palzer (and the Sierra Club)
3	Standing Affidavit	8/17/98	Cindy Beatty
4	Standing Affidavit	8/18/98	Christine Clark
5	Standing Affidavit	8/12/98	David Burns
6	Standing Affidavit	8/11/98	Debra Burns
7	Standing Affidavit	8/17/98	Gail L. Horning
8	Standing Affidavit	8/13/98	Heather Billy
9	Standing Affidavit	8/17/98	Janet S. Nagy
10	Standing Affidavit	8/13/98	Karla Stuck
11	Standing Affidavit	8/17/98	LaDonna King
12	Standing Affidavit	8/17/98	Pius Horning
13	Standing Affidavit	8/14/98	Stuart Dick
14	Standing Affidavit	8/10/98	Andrea E. Stine
15	Standing Affidavit	8/17/98	Merle Jones
16	Standing Affidavit	8/15/98	Janice Lohman
17	Standing Affidavit	8/17/98	John Spomer
18	Standing Affidavit	8/17/98	Susan L. Jones
19	Standing Affidavit	8/15/98	Leandra Phillips
20	Standing Affidavit	8/18/98	Melanie Beltane
21	Standing Affidavit	8/13/98	Dorothy Irish
22	Standing Affidavit	8/20/98	Paul Loney, Oregon Wildlife Federation

# ATTACHMENT R

## Affidavits of Legal Standing from Petitioners

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# ATTACHMENT S

## *LEGAL RULINGS RELATED TO THE TOOELE CHEMICAL AGENT DISPOSAL FACILITY (TOOELE, UTAH)*

Date Decided	Ruling Body	Disposition	Page
8/13/96	U.S. District Court for the District of Utah (Central Division) (Civil No. 2:96-CV-425C)	Plaintiffs' motion for a preliminary injunction is denied	S-1
12/6/96	U.S. Court of Appeals for the Tenth Circuit (No. 96-4166)	Appellants' motion for stay pending appeal is denied. Motion to expedite appeal is granted.	S-13
3/24/97	U.S. District Court for the District of Utah (Central Division) (Civil No. 2:96-CV-425C)	Plaintiffs' second motion for a preliminary injunction denied.	S-17
4/22/97	U.S. Court of Appeals for the Tenth Circuit (No. 96-4166)	Judgment of Utah District Court's ruling on August 13, 1996 is affirmed.	S-31
7/22/97	Utah Solid and Hazardous Waste Control Board Order	First and Second Requests for Agency Action by the Petitioners is denied.	S-39
10/14/97	U.S. District Court for the District of Utah (Central Division) (Civil No. 2:96-CV-425C)	Defendant's motion for summary judgment on Count 10 is granted.	S-53
8/20/98	Court of Appeals of Utah (Case No. 971313-CA)	Declined to disturb the Order of the USHW Board of July 22, 1997	S-57
1/19/99	U.S. District Court for the District of Columbia [Misc. Action No. 98-156 (AER)]	Plaintiff's motion to compel production of documents is denied	S-67
4/14/00	U.S. District Court for the District of Utah (Central Division) (Civil No. 2:96-CV-425C)	"Findings of Fact and Conclusions of Law," granting judgment for the defendants on all claims against them brought by the plaintiffs.	S-71

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CHEMICAL WEAPONS WORKING GROUP INC., et al., Plaintiffs, vs.  
UNITED STATES DEPARTMENT OF THE ARMY, et al., Defendants.

Civil No. 2:96-CV-425C

UNITED STATES DISTRICT COURT FOR THE DISTRICT OF UTAH,  
CENTRAL DIVISION

935 F. Supp. 1206; 1996 U.S. Dist. LEXIS 12033; 44 ERC (BNA) 1352; 27

ELR 20022

August 13, 1996, Decided

**DISPOSITION:**

[\*\*1] Plaintiffs' motion for a preliminary injunction is DENIED.

**COUNSEL:**

For CHEMICAL WEAPONS WORKING GROUP, SIERRA CLUB, VIETNAM VETERANS OF AMERICA FOUNDATION, plaintiffs: Paul Van Dam, Mr., JONES WALDO HOLBROOK & MCDONOUGH, SALT LAKE CITY, UT. Randall M. Weiner, LAND AND WATER FUND OF THE ROCKIES, BOULDER, CO. Mick G. Harrison, Robert Ukeiley, Ashley Schannauer, GREENLAW INC, BLOOMINGTON, IN. Robert Guild, COLUMBIA, SC. Richard Condit, WASHINGTON, DC.

For DEPARTMENT OF THE ARMY, UNITED STATES DEPARTMENT OF DEFENSE, defendants: Stephen L. Roth, Mr., US ATTORNEYS OFFICE - UTAH. Lisa Ann Holden, US DEPARTMENT OF JUSTICE, ENVIRONMENTAL & NATURAL RESOURCES DIV, WASHINGTON, DC. Alan David Greenberg, Robert H. Foster, US DEPARTMENT OF JUSTICE, ENVIRONMENTAL DEFENSE, DENVER, CO. For EG&G DEFENSE MATERIAL, defendant: David Tundermann, Mr., Michael A. Zody, Craig D. Galli, PARSONS BEHLE & LATIMER, SALT LAKE CITY, UT. Lisa Ann Holden, US DEPARTMENT OF JUSTICE, ENVIRONMENTAL & NATURAL RESOURCES DIV, WASHINGTON, DC. Robert H. Foster, US DEPARTMENT OF JUSTICE, ENVIRONMENTAL DEFENSE, DENVER, CO.

**JUDGES:**

TENA CAMPBELL, United States District Judge.  
Judge Ronald N. Boyce

**OPINIONBY:**

TENA CAMPBELL

**OPINION:**

[\*1208] MEMORANDUM [\*\*2] DECISION AND ORDER

On May 10, 1996, plaintiffs filed this suit challenging defendants' proposed operation of the Tooele Chemical Agent Disposal Facility (TOCDF). The amended complaint alleges that defendants have violated the National Environmental Policy Act (NEPA), the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the Defense Authorization Act, and the Clean Water Act, and that defendants' operation of TOCDF will constitute a nuisance under Utah law. The court has granted defendants' motions to dismiss certain of the counts. Remaining for disposition in this case are plaintiffs' claims (1) that defendants are in violation of NEPA for failing to supplement the necessary environmental impact statements in light of substantial new information regarding the project and due to substantial changes having been made to the project, (2) that the operation of TOCDF will violate TSCA due to defendants' failure to show that the TOCDF incinerator will destroy the chemical warfare agent at the required level of efficiency, and (3) that the operation of TOCDF will constitute a nuisance. n1

n1 This claim was subject to a motion to dismiss by all defendants, and the court dismissed the claim as against the federal defendants on immunity grounds. The court took defendant EG&G Defense Material, Inc.'s

motion to dismiss this count under advisement.

[\*\*3]

On June 12, 1996, plaintiffs filed a motion for preliminary injunctive relief seeking to enjoin defendants from beginning preliminary incineration tests of chemical warfare [\*1209] agent. n2 A hearing on plaintiffs' motion for a preliminary injunction was held over several days from July 22, 1996, through August 2, 1996. Having considered the evidence presented at that hearing, the memoranda filed by the parties, and the relevant law, the court denies plaintiffs' motion and enters the following findings of fact and conclusions of law:

n2 When defendants later obtained final permits to begin testing the TOCDF incinerator, plaintiffs filed a motion for a temporary restraining order. Defendants agreed to refrain from beginning test burns of chemical warfare agent pending this court's resolution of the motion for preliminary injunction.

## FINDINGS OF FACT

### Background

1. The United States has a stockpile of 30,000 tons of chemical warfare agent manufactured during and after World War II, which is stored [\*\*4] at eight sites in the United States, including the Tooele Army Depot at Tooele, Utah. Fourty-four percent of this stockpile is stored at Tooele. There are three types of chemical agent stored at Tooele: a blistering agent known as mustard and two nerve agents known as "GB" and "VX." This agent is stored in over 1.1 million separate containers in three basic configurations: (1) projectiles, cartridges, mines, and rockets containing propellant and/or explosives (referred to generally as "energetics"), (2) other projectiles that do not contain energetics; and (3) spray tanks and large steel bulk storage containers known as "ton containers."

2. Continued storage of these dangerous weapons poses significant problems. The stockpile is vulnerable to catastrophic events such as earthquakes or airplane crashes, which could result in a fatal release of agent. As the stockpile of chemical munitions ages, it presents increasing dangers due to leakage of the containers and destabilization of rocket propellants. The M55 rockets which form a pan of the munitions stored are of particular concern, as the stabilizer in the rocket

propellant degrades slowly over time, creating an increased risk of shock [\*\*5] sensitivity. In addition, there is some indication that leaking chemical agent may cause corrosion which could lead to accidental arming of a rocket's fuse. Of the approximately 30,000 rockets stored at Tooele Army Depot, approximately 1,000 have been identified as "leakers." In addition, leakage of GB nerve agent from ton containers has been cited as a significant risk.

3. In the Department of Defense Authorization Act of 1986, Pub. L. No. 99-145, Title XIV, Part B, Sec. 1412, 99 Stat. 583 (1985) (codified as amended at 50 U.S.C. § 1521), Congress mandated that the stockpile of chemical warfare agent be destroyed by September 30, 1994. See 50 U.S.C. § 1521(a) This deadline has since been extended to December 31, 2004. 50 U.S.C. § 1521(b)(5) (Supp. 1996). Congress directed the Army to accomplish the destruction of this agent in such a manner as to provide (1) maximum protection of the environment, the general public, and the personnel who will be involved in the destruction process; (2) adequate and safe facilities designed solely for the destruction of the chemical agent; and (3) cleanup, dismantling, and disposal of the facilities when the disposal program is complete. 50 [\*\*6] U.S.C. § 1521(c)(1).

4. The Army determined that the "baseline" technology for destruction of these weapons is on-site incineration at each of the storage facilities. The Army has considerable experience with large-scale incineration of agent materials. In 1979, the Army began operation of the Chemical Agent Munitions Disposal System pilot facility (CAMDS), located at the Tooele Army Depot. CAMDS was built to evaluate incineration and neutralization disposal methods. By 1988, CAMDS had incinerated 75,000 pounds of GB, 8,000 pounds of VX, and 38,000 items of munitions. CAMDS continues to be used for testing. The Army has also been operating an incineration facility at Johnston Atoll (JACADS) for six years and during that time has destroyed over two million pounds of agent and over nine million pounds of drained containers and dunnage. The operation of JACADS has been successful and generally free of significant incidents or risk.

### [\*1210] NEPA Compliance Process

5. In order to evaluate the environmental effects of the proposed destruction of chemical munitions and agent, the Army completed and circulated a Draft Programmatic Environmental Impact Statement in 1986 (DEIS). This document [\*\*7] evaluated the impacts of disposal of the stockpile as against

continued storage. In 1988, the Army issued the Final Programmatic Environmental Impact Statement (FPEIS) and the Record of Decision (ROD). Incineration was selected for the disposal program. Other destruction technologies were rejected as either unreasonable or immature and unproven.

6. The DEIS and FPEIS were national in scope and did not focus on a particular site. In the ROD, the Army committed to conducting site-specific NEPA reviews for each of the eight stockpile locations. Consequently, in 1988, the Army prepared a Phase I Report at Tooele which concluded that the FPEIS on-site destruction alternative remained valid for Tooele. In 1989, the Army prepared a draft environmental impact statement to address the environmental impacts resulting from the construction and operation of TOCDEF. After public comment and review, the Army issued a Final Environmental Impact Statement for Tooele (FEIS) and a ROD in 1989. On-site incineration was selected as the preferred alternative.

7. On July 13, 1996, the Army, through Major General Robert D. Orton, Program Manager for Chemical Demilitarization, adopted a Record of Environmental [\*\*8] Consideration (REC) which found that "no new and significant information has appeared since the signing of the Chemical Demilitarization Programmatic EIS and Tooele Site-Specific EIS and associated RODs that requires completion of a supplement (sic) environmental impact statement." This document was based on an attached 84 page report which evaluated new information on dioxin emissions, alternative technologies, and baseline incineration. "Evaluation of Information on Dioxin Emissions, Alternative Technologies and Baseline Incineration" (hereinafter, "REC Report").

#### The Prototype Facility: JACADS

8. As part of the further development of its incineration plan, the Army constructed JACADS as a full-scale operational incineration plant, intended to serve as a prototype for the eight planned incinerator facilities located in the continental United States, including TOCDEF. The February 28, 1988 ROD, which memorialized the Army's decision to adopt incineration as the baseline technology for agent destruction discusses the role of JACADS in the development of the incinerator technology, and states that the Congressional mandate of agent destruction by 1994 would of necessity be [\*\*9] postponed in order to evaluate the incineration process as conducted at a full-scale operation such as JACADS and implement changes to later incinerator plans in light of that experience. The National Defense Authorization Act of

1989, Pub. L. No. 100-456 (1988), required the Army to complete Operational Verification Testing (OVT) of JACADS before proceeding to destroy the stockpiles of chemical agent and munitions in the continental United States. Before it could proceed with its destruction program, the Army was required to certify to the Secretary of Defense and subsequently to Congress that the JACADS operation had been successful. The Secretary of Defense certified to Congress that OVT at JACADS had been completed in August, 1993.

9. The MITRE Corporation was retained by the Army to monitor, evaluate, and report the results of all phases of OVT. In 1987, the National Research Council's standing Committee on Review and Evaluation of the Army Chemical Stockpile Disposal Program (Stockpile Committee) was formed to provide the Army with technical advice on the disposal program. The Stockpile Committee was chartered to monitor OVT at JACADS and to review the results of OVT as reported [\*\*10] by the MITRE Corporation.

10. The MITRE OVT reports found that, although there were events that occurred at JACADS that increased the probability of agent exposure or injury to workers, JACADS met the OVT safety performance goals. Similarly, although the Stockpile Committee found problems with the JACADS [\*1211] operations, none were "show stoppers."

11. The operation and problems arising out of the operation of JACADS were discussed in the REC Report. The report concluded that, although the operation was not flawless, the program had effectively and safely disposed of chemical agent and munitions and that the JACADS operation had not revealed any new or significant information to indicate that operation of TOCDEF would create significant environmental impacts not contemplated in the site-specific Tooele FEIS.

12. Over 2 million pounds of agent have been processed at JACADS, including 1.8 million pounds of GB, 141,000 pounds of VX, and 250,000 pounds of mustard. JACADS has also processed 1.7 million pounds of energetics, and over 9 million pounds of drained containers and dunnage. Problems which have occurred at JACADS during its operation have been investigated, analyzed, and used in a [\*\*11] "lessons learned" program. Through the lessons learned program, modifications and changes have been incorporated in the design of the facility and the operation procedures of TOCDEF.

#### TOCDEF

13. TOCDEF has five separate incinerators. Two

liquid incinerators (LIC) will be used to incinerate liquid agent that is drained from munitions and bulk containers. The LIC destroys agent by burning it as a fuel after it is mixed with natural gas and air. A Deactivation Furnace System (DFS) will be used to incinerate munitions containing energetics, such as rockets and land mines, which have been drained of agent but are still contaminated. A Metal Parts Furnace will be used to thermally decontaminate non-energetic metal parts that have been drained of agent, such as ton containers. A Dunnage Incinerator (DUN) was planned for burning non-agent-contaminated and agent-contaminated dunnage, such as pallets and used carbon filters. The DUN is presently not operational and the dunnage will be stored on the Tooele facility until the DUN begins operations. A Brine Reduction Area was designed to treat slag from the wet pollution abatement system. Problems have been encountered with this system [\*\*12] and current plans are to begin operations at TOCDEF without it.

#### Regulatory Compliance

14. The Army has been in the process since 1986 of obtaining the numerous necessary permits to operate TOCDEF. It began the process by submitting to the Executive Secretary of the Solid and Hazardous Waste Control Board within the State of Utah's Department of Environmental Quality its application for a hazardous waste operation plan for TOCDEF. The Executive Secretary published a draft plan for TOCDEF in April 1989. The Executive Secretary then conducted public hearings on the proposed plan and approved the proposed plan in June 1989. Since the initial approval, the Executive Secretary has approved numerous modifications to reflect changes in the design and operation of the incinerators, often to reflect the lessons learned from JACADS.

15. TOCDEF has obtained a RCRA permit to operate from the State of Utah under Utah's delegated program. TOCDEF has obtained a Clean Air Act permit, also from the State of Utah. The United States Environmental Protection Agency (EPA) regulates the disposal of polychlorinated biphenyls (PCBs) found in the shipping and firing tubes. TOCDEF is also subject [\*\*13] to health and safety regulations such as OSHA.

#### Trial Burns

16. The Army completed construction of TOCDEF in July 1993. Before becoming fully operational, TOCDEF is required by RCRA and TSCA to undergo a series of trial burns to determine whether the facility can destroy agent and other materials without releasing a significant amount of toxics into the environment.

TOCDEF has completed two trial burns for the LIC and the DFS: a "shakedown burn" with no agent and an "R&D Burn" with no agent. The two trial burns remaining are to be conducted with agent. The destruction removal efficiency (DRE) for each of the two completed tests was in excess of the 99.9999% required under RCRA, and the State of Utah approved the results of both tests.

17. The shipping and firing tubes of the M55 rockets are the only source of PCBs to [\*1212] be incinerated at TOCDEF. This will be done in the DFS. Pursuant to its TSCA permit, issued by the EPA, TOCDEF conducted a trial burn of M55 rockets, without agent, in the DFS and achieved a DRE of at least 99.9999%. EPA has approved the test results and has now authorized TOCDEF to proceed with trial burns of agent-containing rockets.

#### Accidents and [\*\*14] Equipment Failures

18. The Army's experience in operating JACADS and the implications of that experience for the proposed operation of TOCDEF form the basis for part of plaintiffs' claim that there is significant new information regarding the environmental effects of TOCDEF that have not been evaluated in a supplemental EIS. Accordingly, the specifics of various alleged incidents at JACADS and the defendants' implementation of corrective measures at TOCDEF to address such problems has been the subject of dispute between the parties in this case.

19. In support of their allegation that significant problems have arisen in the operation of JACADS that have not been addressed or corrected at TOCDEF, plaintiffs have submitted evidence in the form of records and reports dealing with JACADS operations and the testimony of Mr. Steve Jones, who was employed by the Army Inspector General's Office as a Safety and Occupational Health Manager. Plaintiffs question the effectiveness of the lessons learned program, and cite several examples of JACADS problems which are alleged to have been left uncorrected at TOCDEF. However, the court finds that many of these allegations are largely based on hearsay [\*\*15] evidence provided by Steve Jones, or that the cited problems were, in fact, addressed by defendants in the process of construction and systemization of TOCDEF. For each of the allegations made regarding equipment and procedural failures at JACADS and TOCDEF, no matter how thinly supported by evidence by plaintiffs, defendants have presented affirmative evidence that indicates that the problems either do not exist or that corrective actions have been taken in constructing and testing the systems at TOCDEF For

example, Mr. Jones states in his declaration that deterioration of firebricks caused an explosion at JACADS and offers a theory about how this could occur. But no source for this information is cited, and plaintiffs do not present any evidence as to whether any alleged problem with firebricks continues at TOCDF. Robert Perry, Chief of Risk Management, Quality Assurance Office within the Office of the Program Manager for Chemical Demilitarization, testified that no such explosion had occurred. Mr. Perry testified that the only problem with the firebricks was erosion of the brick over time. Mr. Jones states in his declaration that he "observed" problems with blast gates at both JACADS [\*\*16] and TOCDF, but cites only incidents alleged to have occurred at JACADS, and Mr. Jones acknowledged that he has no personal knowledge of such incidents. Mr. Jones testified concerning a number of design and operation deficiencies in equipment at TOCDF, but has no qualifications regarding equipment design, and has no knowledge as to the current status of the equipment to be used at TOCDF. Ultimately, the court finds that the importance and/or credibility of Mr. Jones' allegations are questionable in light of his lack of personal knowledge regarding many of them, and his failure to report many of these occurrences at the time he allegedly learned of them.

20. Defendants acknowledge that there have been three confirmed atmospheric releases of live agent, but these releases were minimal and posed no risk of harm to JACADS employees or to the environment. Each of these releases were investigated and changes were made in equipment, design, and operations in order to address the problems. These changes were also implemented at TOCDF as part of the lessons learned program. See e.g., REC Report, p. 3-5 (Modifications and changes to the LIC agent line/nozzle purge system design, purging [\*\*17] sequence and LIC agent nozzle removal procedure implemented in response to agent release on December 8, 1990). Defendants also confirmed that one employee was slightly injured by a nerve agent spill within the facility, but the testimony of Robert Perry indicated that this accident was caused by a failure to follow standard procedures.

#### [\*1213] Dioxin hazards

21. It is not disputed that the incinerators at TOCDF will create and release dioxins to the environment. Plaintiffs assert that there is new information regarding the overall effects of dioxin exposure and the exposure levels at which dioxin becomes harmful, and that the dioxin risks associated with the operation of TOCDF to particular individuals (especially infants) living in the vicinity of the plant have not been adequately evaluated.

22. The evidence indicates that the existence and amount of the health risks associated with exposure to background levels of dioxin, and the likely significance and effects of the incremental increases in the dioxin levels due to the operation of TOCDF, are largely uncertain. The conflicting opinions offered by the experts who presented testimony in this case emphasize the fact that the [\*\*18] effects of dioxin at various levels of exposure are far from settled issues within the scientific community. Plaintiffs rely to a great extent on the draft document "Health Assessment Document for 2,3,7,8 Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds" (Dioxin Reassessment) issued by EPA in 1994, which by its terms is not to be cited or quoted. Certain of the findings in the Dioxin Reassessment were questioned in significant areas by EPA's Science Advisory Board in 1995. The document is still under review and does not currently represent a final position of the EPA.

23. Plaintiffs also rely on a "reference dose" of 1 picogram/kg/day level noted by the Agency for Toxic Substances and Disease Control (ATSD) in 1989 to establish harm to humans. However, this reference dose is derived by dividing the lowest level at which adverse effects are shown in animals by 1,000 in order to conservatively account for unknown factors. Accordingly, although this "reference dose" may indicate a safe level for exposure, it does not follow that exceeding this level is likely to result in harm. The EPA Dioxin Reassessment itself states that the use of such a reference dose would be "inappropriate" [\*\*19] and of "doubtful significance." Dioxin Reassessment, p. 9-84. The evidence presented indicates that this level of exposure is already exceeded in most industrialized areas of the world. Although plaintiffs argue that any increase in the levels of dioxin exposure is unacceptable, the danger associated with relatively small increases is far from certain, and the evidence presented by plaintiffs is insufficient to support a finding that such danger is likely to be significant.

24. Prior to approving trial burns of chemical agent at TOCDF, the State of Utah Department of Environmental Quality (DEQ) performed a screening health risk assessment which analyzed the impacts on human health and the environment resulting from the expected emissions from TOCDF. The assessment followed EPA guidance in adopting conservative assumptions. The assessment modeled TOCDF emissions by using maximum JACADS levels and increasing them to account for the greater capacity at TOCDF. The assessment also assumed that emissions at TOCDF would be twice the JACADS detection limits for the many compounds which were not detected. Concerning dioxin, the assessment also made

the conservative assumption that all dioxin [\*\*20] emissions consist of only the 17 types of dioxins (out of 210 possible) that have been determined to be toxic.

25. The Utah DEQ used these assumptions to calculate the potential exposures to hypothetical individuals residing within six miles north (usually downwind) of TOCDF. Assuming simultaneous operation of all five furnaces at TOCDF, the overall cancer and non-cancer risks were at or below EPA screening risk levels. As far as the cancer effects of dioxin, the risk assessment found that EPA guidance levels were not exceeded for 10, 15, and 30 year operating periods. The risk assessment did not calculate non-cancer effects of the dioxin exposure because there is currently no applicable reference dose for dioxin, as indicated above. Defendant's expert, Dr. Finley, calculated average daily intakes of dioxin for the scenarios used in the Utah DEQ assessment and concluded that the exposures should be below the level of concern for non-cancer effects.

26. The Utah DEQ assessment had originally included in a draft form scenarios regarding a subsistence farmer and a breast-feeding [\*1214] infant. This report was not released to the public. Instead of the subsistence farmer scenario, the final [\*\*21] form of the DEQ assessment considered three farmer scenarios based on a survey of actual farming practices in the area, n3 and simply deleted the breast-feeding infant scenario. Plaintiffs presented evidence that risks of dioxin exposure are particularly high for a breast-feeding infant and question the deletion of this scenario from the Utah DEQ assessment. However, defendants' experts calculated the exposure risks for a breast-feeding infant and found that such exposures would result in only nominal increases of dose and risk, and would be at or below levels deemed acceptable under current EPA guidelines. Ultimately, the court finds that the Utah DEQ assessment is intended to show an area of safety, not predict an actual level of risk. Although plaintiffs have shown that the assumptions applied in the State's health risk assessment may indicate a higher level of risk for some hypothetical persons, this does not constitute a showing that there is an actual risk to some person or persons posed by the emissions levels predicted for the facility.

n3 This is apparently a standard practice in creating risk assessments; if a "worst case" hypothetical person appears to have an unacceptable risk, the assumptions are made more realistic (less conservative) by conducting a survey of the actual area being assessed.

[\*\*22]

#### Alternative Technologies

27. Plaintiffs have submitted evidence regarding several alternative processes or technologies which could be used to destroy the chemical weapons, and which plaintiffs assert offer significant safety and efficiency advantages over incineration. Indeed, it appears that many of these technologies have been developed in response to Army requests for alternatives to the incineration technology adopted at TOCDF.

28. In 1992 and 1993, the National Research Council undertook a major study to re-evaluate the Chemical Disposal Program and the progress of alternative technologies. As part of this process, the NRC held a public forum to address the criteria for evaluating these alternatives. The NRC's 1994 Report endorsed the Army's choice of incineration, finding that there is no currently feasible alternative for disposal of energetics, but recommending that the Army continue to evaluate these technologies for sites other than the Tooele stockpile. There has been no change in the NRC recommendation of incineration as the preferred technology at Tooele. On June 4, 1996, Dr. Magee, Chairman of the Stockpile Committee, stated in his testimony before Congress: [\*\*23] "To sum up, the Stockpile Committee has endorsed the baseline incineration system as the technology to accomplish the overall chemical stockpile disposal program effectively and expeditiously. However, the committee by its recommendations regarding alternative technologies left open the door for the possible employment of a technology other than incineration at selected sites, depending on comparative factors of safety, performance and implementation schedule." Quoted in REC Report, p. 43.

29. In August 1995, the Army requested submissions by commercial vendors for technologies to use at the sites that store only ton containers of chemical agent. Three promising technologies were chosen and are currently being studied by the Army and the NRC: High Temperature Gas Phase Reduction (Eco-Logic), Molten Metal Catalytic Extraction Process (M4) and Electrochemical Oxidation (AEA). The companies' own conceptual designs indicate that it would take a minimum of three years to implement any of these technologies for disposal of ton containers at the Aberdeen and Newport sites, and Defendant's expert, Dr. Francis W. Holm, estimated that implementation of these methods could take longer. Each [\*\*24] of these technologies has tested only a small amount of live nerve agent on a laboratory scale.



These technologies have not been tested using any munitions such as are present at the Tooele stockpile. Dr. Holm testified that a conservative estimate of the time required for implementation of these technologies at Tooele would be 6.5 years.

30. Plaintiffs have presented a great deal of evidence regarding the advantages, both in terms of cost and safety, of these alternative technologies. Plaintiffs disagree with defendants' [\*1215] estimates regarding the readiness of these alternatives to begin processing chemical agent, questioning many of the assumptions which underlie Dr. Holm's 6.5 year estimate. Plaintiffs argue that the existing facility could be adapted to an alternative technology and that permit modifications could be obtained instead of starting the RCRA permit process from scratch. Plaintiffs also cite to the time estimates provided by the private companies promoting these technologies as evidence that, for example, M4 and Eco-Logic could be operational within about 4 years. Plaintiffs also submit evidence of recent developments which questions the Army's assumptions regarding the [\*\*25] lack of readiness of these technologies and argue that although the alternative technologies' ability to process energetics is relatively untested, dual use of both incineration and an alternative could be implemented.

#### CONCLUSIONS OF LAW

1. Plaintiffs bear the burden in this case of establishing the need for injunctive relief. In making its determination regarding the necessity of the injunction, the court must consider four factors: (a) whether plaintiffs have shown a substantial probability of success on the merits; (b) whether plaintiffs are threatened with irreparable injury in the absence of an injunction; (c) whether plaintiffs' potential injury outweighs any damage to defendants; and (d) whether the injunction would be adverse to the public interest. *Potawatomi Indian Tribe v. Enterprise Management Consultants, Inc.*, 883 F.2d 886, 888-89 (10th Cir. 1989); *Lundgrin v. Claytor*, 619 F.2d 61, 63 (10th Cir. 1980). If plaintiffs are able to show that they will suffer irreparable injury and that "the balance of hardships tips decidedly in [their] favor," the requirement of showing a substantial probability of success on the merits is satisfied by raising "questions [\*\*26] going to the merits so serious, substantial, difficult and doubtful as to make them a fair ground for litigation and thus for more deliberate inquiry." *Lundgrin*, 619 F.2d at 63 (quoting *Continental Oil Co. v. Frontier Refining Co.*, 338 F.2d 780, 781-82 (10th Cir. 1964)).

#### Irreparable Injury

2. Mere threatened, speculative harm, without

more, does not amount to irreparable injury for purposes of justifying preliminary injunctive relief such as that sought by plaintiffs. E.g., *Mullis v. United States Bankruptcy Court*, 828 F.2d 1385 (9th Cir. 1987), appeal dismissed, cert. denied, 486 U.S. 1040, 100 L. Ed. 2d 616, 108 S. Ct. 2031 (1988); *Wisconsin Gas Co. v. FERC*, 244 U.S. App. D.C. 349, 758 F.2d 669, 674 (D.C. Cir. 1985) (movant must show that irreparable injury is "both certain and great; it must be actual and not theoretical"). Unlike most cases alleging violations of NEPA, plaintiffs in this case do not assert the sort of environmental harm due to construction which is usually seen as irreparable. TOCDEF is already fully constructed, so all of Plaintiffs' asserted irreparable harm in this case is related to the alleged health risks of incineration, due [\*\*27] to either emissions from normal operations, or agent releases due to accidents.

#### Dioxin exposure risks.

3. The harm cited by plaintiffs resulting from increased dioxin exposure is based on extrapolations from conservative hypothetical scenarios used by the Utah DEQ in compiling their health risk assessment. As noted above, the methodology used for determining the nature of the risks by Utah DEQ is able to calculate safe levels of exposure, but does not determine levels at which harm is likely to occur. Although plaintiffs are able to put forward a scenario in which a breast-feeding infant would be exposed at levels significantly higher than levels determined by Utah DEQ to be safe, they have not submitted evidence that any plaintiff, or any person at all, would in fact be placed at risk by the projected dioxin emissions from TOCDF. The court finds that the asserted risks of harm due to dioxin exposure are too speculative to qualify as irreparable harm to plaintiffs.

#### Operational Risks.

4. Defendants assert that the operation of TOCDF will result in immediate risks to workers and the public from accidental releases of agent. Plaintiffs have a difficult [\*1216] case to make [\*\*28] on this issue in light of the safety record at JACADS and the independent evaluations of JACADS, as noted above, which found no significant risks associated with JACADS. Plaintiffs' experts testified that the risks associated with the agent processing at JACADS and TOCDF have been underestimated or improperly evaluated for various reasons, including a lack of adequate monitoring equipment and failure to evaluate true worst-case scenarios. However, the fact remains that during its entire operation, only one minor worker

injury due to agent processing was reported. Although three releases of live agent were reported, these did not result in any injury. Plaintiffs may be correct that the risks associated with operating TOCDF have been underestimated to some unspecified degree. However, there is no evidence that human injury is inevitable or even likely pending the court's final resolution of this case. Accordingly, the court finds that operational risks cited are too speculative to support a finding of irreparable injury to plaintiffs.

#### NEPA Harm.

5. The purpose of NEPA is to ensure that the agency and the public are aware of the environmental consequences of a project before [\*\*29] beginning the project. *Sierra Club v. Hodel*, 848 F.2d 1068, 1097 (10th Cir. 1988). Courts have noted that the harm from proceeding with a project without completing the necessary NEPA evaluation is irreparable in that once a decision has been made and implemented, NEPA's purpose of making certain that decision makers have all relevant information prior to making final decisions would be thwarted. *Id.*; *Sierra Club v. Marsh*, 872 F.2d 497, 503-04 (1st Cir. 1989). This is not an injury arising out of the substance of the decision that has been made or its effects; it is a procedural interest in protecting the processes established by NEPA and providing the decision maker with all the relevant information. In this case, the alleged NEPA harm does not arise out of the decision to construct TOCDF, a decision that was made and implemented long ago. Rather, the decision which plaintiffs seek to enjoin is the Army's decision to operate the incinerator during the approximately one year before a final trial on the merits. During this period, the Army will be conducting the remaining trial burns, carried out with live agent. The court finds that, pending final resolution of this case, [\*\*30] such injury will occur during only a small portion of the expected operating lifetime of TOCDF, and is therefore relatively minimal.

#### Balancing of Harms

6. Even if the court assumes that the risks cited by plaintiffs are sufficiently likely so as to qualify as irreparable harm, the court must balance those risks against the risks and harms asserted by defendants. *Weinberger v. Romero-Barcelo*, 456 U.S. 305, 312, 72 L. Ed. 2d 91, 102 S. Ct. 1798 (1982). In 1987, the Army completed a comprehensive quantitative risk analysis that evaluated the risks of accidents and catastrophic events as they relate to the proposed alternatives. The report concluded that the risk of continued storage was greater than the risk of

processing. In 1995, the quantitative risk assessment was updated to address information specific to TOCDF. The updated analysis confirmed the Army's earlier conclusion that the risks of fatalities associated with one estimate of the entire period of TOCDF operations (6.2 years) were equaled by the same risks associated with only eleven days of storage. For individuals living closest to TOCDF, the risks resulting from continued storage are one-hundred times greater [\*\*31] than the risks resulting from disposal operations. It is true that this quantitative risk assessment does not include calculations for non-catastrophic long-term exposures to pollutants, but it is also true that the significance of those risks (whatever they might be) must only be considered in the context of the time required for a final decision in this case.

7. This is not a case in which the harm to the environment and the public posed by a proposed government action is definite; the Army is not seeking to divert a river or level a forest. Rather, the harm plaintiffs seek to prevent pending final disposition of this case is speculative and subject to conflicting expert testimony. The Army and other independent consultants have evaluated the relative risks and have concluded that the risks [\*\*1217] of storage outweigh the risks associated with operation of TOCDF. The court is left, then, with the issue of whether harm to the NEPA process itself is a sufficient allegation of harm to support the injunction. As noted above, the action plaintiffs are seeking to enjoin is the daily operation of TOCDF for approximately one year pending a final decision in this case, a period of time during which [\*\*32] the test burns with live agent will be carried out. If, after trial, it is determined that supplementation of the EIS is necessary, this supplementation can still take place and be just as effective as it would be now, since the NEPA harm would be minimal. In fact, it appears that the test burns will themselves provide information useful to the evaluation of the environmental impact resulting from the operation of TOCDF. Plaintiffs are challenging the operation of this facility, which is, in effect, a daily decision to burn chemical agent which can always be stopped and reevaluated in light of information presented in a supplemental EIS if the court finds that such is required after a trial on the merits. The court finds that the balancing of harms favors denial of the preliminary injunction.

#### Likelihood of Success on the Merits

##### NEPA Claims

8. NEPA requires that an EIS be prepared for "major Federal actions significantly affecting the

quality of the human environment." 42 U.S.C. § 4332(2)(C). The duty to make certain that decision makers are presented with all relevant information is an ongoing one which does not end when an initial EIS is prepared. Regulations [\*\*33] promulgated by the Council on Environmental Quality require that an EIS be supplemented when an agency makes substantial changes to the project or when there are significant new circumstances or information relevant to the project and its impacts. 40 C.F.R. § § 1502.9(c)(1)(i) and (ii). In this case, although the facility which was the subject of the original EIS has already been constructed, the daily operation of TOCDF will itself constitute a "major federal action" that would require a supplemental EIS if "new information is sufficient to show that the remaining action will 'affect the quality of the human environment' in a significant manner or to a significant extent not already considered." *Marsh*, 490 U.S. 360 at 374, 104 L. Ed. 2d 377, 109 S. Ct. 1851. In order to provide a means for documenting the agency's evaluation of the significance of new information or changes made to a project in situations where such information or changes have been "adequately assessed in existing documents and determined not to be environmentally significant," the Army has promulgated regulations which provide for the preparation of a REC. 32 C.F.R. § 651.14(a).

9. Plaintiffs challenge the weight to be given to the Army's July 13, [\*\*34] 1996 REC, questioning both the adequacy and the sincerity of the review found in the REC. According to plaintiffs, the timing of the REC makes it suspect. The REC is based on an attached report which was apparently completed one day before its adoption in the REC and was first made public as an exhibit to defendants' memorandum in opposition to this motion for a preliminary injunction. The REC is obviously directed to making findings regarding the precise claims raised by plaintiffs in this case, and plaintiffs argue that the court should not give the usual deference to the factual findings in the REC because it was prepared in the course of litigation. However, although the court is not blind to the adversarial context in which this document was prepared, the REC represents the considered position of the public official charged with making the decisions regarding TOCDF operations and determining the significance of any new information brought forward. The REC is based on a lengthy report which evaluates the facts plaintiffs claim should affect the decision. There is no evidence that the experts whose opinions underlie the REC were merely advocates preparing litigation documents. The [\*\*35] court also notes that in *Marsh*, the Supreme Court, without discussion of the timing, gave deference to a Supplemental Information Report (a document similar

to a REC) which had been prepared by the Army Corps of Engineers in January 1986, several months after the plaintiffs had filed suit. See 490 U.S. at 379-80. The [\*1218] Army's decision, as stated in the REC, that a supplemental EIS is not required before operations begin at TOCDF, is subject to a only a limited review by this court. The Marsh Court held that under the provisions of the Administrative Procedures Act, 5 U.S.C. § 706, a challenge to an agency decision regarding the significance of alleged changes is "a classic example of a factual dispute the resolution of which implicates substantial agency expertise." *Id.* at 376. "Accordingly, as long as the [agency] decision not to supplement the [EIS] was not 'arbitrary or capricious,' it should not be set aside." *Id.* at 377. The court's responsibility in this case is to review the record and satisfy itself that "the agency has made a reasoned decision based on its evaluation of the significance--or lack of significance--of the new information [or circumstances]." [\*\*36] *Id.* at 378. It is clear that "an agency need not supplement an EIS every time new information comes to light after the EIS is finalized. To require otherwise would render agency decision making intractable, always awaiting updated information only to find the new information outdated by the time a decision is made." *Id.* at 373.

New information regarding safety of TOCDF based on JACADS experience.

10. Plaintiffs argue that the documentation of the performance of the incineration facility at JACADS and the testimony of Steve Jones constitutes new information which should be evaluated in a supplemental EIS. However, the court finds that these allegations do not constitute new information not already considered. It is true that perfection was not achieved at JACADS and that various problems were encountered there with both equipment and personnel. However, such problems were anticipated and planned for; JACADS was meant to expose such problems in order to implement solutions at TOCDF. To the extent that JACADS operations revealed problems with the baseline incineration technology, measures were taken to correct the problems. The ROD for the FPEIS contemplated that problems [\*\*37] would occur at JACADS which could then be remedied at the stockpile incineration sites in the Continental United States, including TOCDF. In addition, most of the allegations raised by Mr. Jones (if assumed to be true) appear to be relatively minor issues that, in the context of overall operations at TOCDF, would not constitute significant new information, even in the aggregate. In any event, the REC indicates that the Army has investigated the more serious operational allegations

raised in this case and found that they were not significant, or that the problems cited have been adequately mitigated. The Army's analysis of these problems appears to be thorough and reasonable.

11. In addition, plaintiffs allege that defendants have failed to evaluate the significance of changes made to the plans for operation of TOCDF; specifically, that defendants have not analyzed the dangers associated with "co-processing" both explosive munitions and ton containers at the same time. However, defendants presented evidence that co-processing risks have in fact been considered and that the quantitative risk analysis (currently in draft form) has indicated that any increase in risks associated with [\*\*38] co-processing is negligible. The Army's experts have concluded that the TOCDF quantitative risk analysis shows that "the storage risk is significantly larger than that posed by the disposal process (greater than 10 fold)." REC Report at 12.

#### New information regarding dioxin harms.

-12. Plaintiffs point to recent information regarding the effects of dioxin and the 1994 EPA draft dioxin reassessment as constituting new information which must be considered through in a supplemental EIS. However, the EPA 1994 dioxin reassessment's analysis is at best an indication that the debates regarding the effects of dioxin are still ongoing. The wide range of expert testimony presented to the court during the hearing on plaintiff's motion makes clear that the seriousness of the dioxin threat is far from settled. In considering the likelihood of plaintiff's success on the merits of this claim, this court is guided by the Supreme Court's observation in *Marsh* that a determination of whether new information is significant is an [\*1219] issue that the agency is to resolve. As in *Marsh*, "because analysis of the relevant documents 'requires a high level of technical expertise,' we must defer to [\*\*39] 'the informed discretion of the responsible federal agencies.'" 490 U.S. at 377 (quoting *Kleppe v. Sierra Club*, 427 U.S. 390, 412, 49 L. Ed. 2d 576, 96 S. Ct. 2718 (1976)). Defendants presented expert testimony characterizing the dioxin risks as minimal, and although plaintiff's experts, who sounded a strong warning regarding dioxin risks at even low doses, were also highly qualified, "when specialists express conflicting views, an agency must have discretion to rely on the reasonable opinions of its own qualified experts even if as an original matter, a court might find contrary views more persuasive." 490 U.S. at 378; *Holy Cross Wilderness Fund v. Madigan*, 960 F.2d 1515, 1527 (10th Cir. 1992). Although plaintiffs challenge the certainty with which the defendants' experts were able to support their opinions regarding

the low level of the dioxin risks, the court finds that the effect of the arguments raised is simply to emphasize the lack of definitive information available. See REC Report at 66-64 ("Large uncertainties exist in estimates of exposure, dose, background, and hazard or risk. ... The general knowledge of hazardous waste incinerators as a source of dioxins [\*\*40] has changed little since the early 1980s."). The court finds that the Army has carefully reviewed the dioxin issue and its current uncertainties, and that the Army's evaluation of the significance of the asserted new information is not arbitrary or capricious.

#### Existence of alternative technologies.

13. Plaintiff's argument that the Army must prepare a supplemental EIS to consider recent developments in alternative technologies would also require the court to accept a controversial factual position. The court would have to accept plaintiff's factual argument that these technologies present a reasonable alternative that can be implemented immediately, even though the Army's experts have explicitly found otherwise. As with the dioxin issue, the readiness of these technologies is an issue that is not definitively resolved, and the expert testimony is contradictory. Because of the inherent time pressures in disposing of the chemical weapons stockpile, these technologies would have to be an immediate option in order to be significant. At the very least, even assuming the most optimistic schedules, implementation of the most promising of these alternatives will take several years, [\*\*41] and the court cannot say that the Army is wrong in deciding that the risks of additional storage time outweigh the possible advantages that alternative technologies offer. In light of the deference to be given to the agency's evaluation of the issue, both through the testimony of its experts at the hearing and in the REC, the court holds that the Army's decision that these alternative technologies have not progressed sufficiently to require a supplemental EIS is not arbitrary and capricious.

#### Compliance with TSCA.

14. Under EPA regulations promulgated under TSCA, all incinerators are required to destroy PCBs and PCB-containing materials so that no more than one part in a million leaves the incinerator stack. 40 C.F.R. § 761.70(b)(1). This is the equivalent of the RCRA requirement of a 99.9999% DRE. Plaintiffs claim that defendants have failed to show that they are able to meet this standard for the DFS incinerator at TOCDF which will destroy the rocket tubes which contain PCBs.

15. As noted above, TOCDF has completed a test burn of PCB-containing rocket tubes and met the regulatory standard. Because the PCB characteristics of the agent-containing rockets to be processed [\*\*42] will be similar to those previously incinerated, defendants claim that the proposed operation of TOCDF will meet the 99.9999% DRE required under TSCA.

16. While acknowledging that TOCDF is able to meet the required DRE for PCBs in concentrations of over 1,000 parts per million (ppm), plaintiffs argue that many of the PCBs to be incinerated are in lower concentrations, and that defendants have not shown that the 99.9999% DRE can be achieved for such. Plaintiffs have pointed to studies which indicate that it is impossible for any incinerator to achieve a 99.9999% DRE for [\*1220] concentrations below 100 ppm. However, Mr. Rick Holmes, the associate project manager for TOCDF, testified that he had calculated that the TOCDF furnace could meet the required DRE even if feed concentrations were as low as 300 ppm. Accordingly, the court finds that plaintiffs have not shown a likelihood of success on the merits of their claim that there is an existing or threatened future violation of TSCA.

#### Nuisance.

17. The court has previously granted the Federal defendants' motion to dismiss this claim on the basis of immunity. Defendant EG&G has also moved to dismiss this count. The court finds that [\*\*43] plaintiffs' allegations with regard to their nuisance claim are inadequate. "Under Utah law, [plaintiffs] must suffer some substantial injury or damage not inflicted on the community at large in order to recover on a public nuisance theory." *Hardy Salt Co. v. Southern Pacific Transportation Co.*, 501 F.2d 1156, 1164 (10th Cir. 1974). n4 The complaint fails to specify the nature of the particularized injury that individual plaintiffs will suffer as a result of the proposed operation of TOCDF by EG&G. Indeed, based on the general environment-related complaints which form the basis of plaintiffs' suit, it does not appear likely that plaintiffs will be able to allege injury which would be different in nature from that would be

suffered by the public in general. To the extent that plaintiffs' assertion of likely injury is based upon alleged increases in pollutant levels, the court finds that such injury, if it exists, would not be different from that which is suffered by the general public. Accordingly the court will grant defendant EG&G's motion to dismiss the nuisance claim, although the court will allow plaintiffs to amend their complaint to reassert this claim should particular [\*\*44] plaintiffs be able to allege individualized injury due to the operation of TOCDF.

n4 To the extent that plaintiffs are asserting a private nuisance theory, they have failed to specify how the operations of TOCDF would affect individual plaintiffs' interest in land. See *Turnbaugh v. Anderson*, 793 P.2d 939, 942-43 (Utah Ct. App. 1990).

#### Conclusion

In light of the above analysis, the court finds that plaintiffs have failed to show that they will be irreparably harmed during the pendency of this action and that the relatively minor interest in preserving an opportunity for NEPA documents to be prepared pending a final ruling in this case is insufficient to justify injunctive relief. The court also finds that plaintiffs have failed to show a sufficient likelihood of success on the merits to support a preliminary injunction. Plaintiffs' motion for a preliminary injunction is therefore DENIED. In addition, the court finds that defendant EG&G's motion to dismiss plaintiffs' nuisance claim is granted without [\*\*45] prejudice.

IT IS SO ORDERED.

DATED this 13 day of August, 1996.

BY THE COURT:

TENA CAMPBELL

United States District Judge

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CHEMICAL WEAPONS WORKING GROUP (CWWG); SIERRA CLUB and  
VIETNAM VETERANS OF AMERICA FOUNDATION, Plaintiffs-Appellants,  
v. DEPARTMENT OF THE ARMY, UNITED STATES DEPARTMENT OF  
DEFENSE and EG&G DEFENSE MATERIAL, Defendants-Appellees.

No. 96-4166

UNITED STATES COURT OF APPEALS FOR THE TENTH CIRCUIT

101 F.3d 1360; 1996 U.S. App. LEXIS 31336; 36 Fed. R. Serv. 3d (Callaghan)  
35; 27 ELR 20569

December 6, 1996, Filed

**PRIOR HISTORY:**

[\*\*1] D.C. Judge Campell.

**DISPOSITION:**

Appellants' motion for stay pending appeal DENIED.  
Motion to expedite appeal GRANTED.

**JUDGES:**

Before BALDOCK, LUCERO, and MURPHY, Circuit  
Judges. Lucero, J., Dissenting.

**OPINIONBY:**

MICHAEL R. MURPHY

**OPINION:**

[\*1361] ORDER

Appellants have filed a motion for stay pending appeal requesting that this court enjoin all incineration activities at the Tooele Chemical Agent Disposal Facility (TOCDF) during the pendency of their appeal. They also have requested that their appeal be expedited. Appellees do not object to the request to expedite. Upon consideration, we deny the motion for stay pending appeal and grant the request to expedite.

Requests for stay pending appeal are governed by Fed. R. App. P. 8(a), which provides that an application for stay "must ordinarily be made in the first instance in the district court." A motion for relief may be made to this court, but the movant must show "that application to the district court for the relief sought is not practicable, or that the district court has denied an application, or has failed to afford the relief which the applicant requested." *Id.* Appellants concede that they have failed to seek a stay in the district court.

Citing [\*\*2] *Populist Party v. Herschler*, 746 F.2d 656, 657 n.1 (10th Cir. 1984), however, they contend that temporal urgency made it impracticable to first seek a stay in the district court.

The chronology of events in this case belies appellants' claim that resolution of the stay issue by this court is a matter of extreme urgency needing immediate resolution. The district court denied appellants' motion for preliminary injunction on August 13, 1996. Incineration began at the TOCDF on August 22, 1996. Appellants waited until October 11, 1996, to appeal from the district court's order and until October 18, 1996, to seek a stay pending appeal even though the events upon which they primarily premise the need for Rule 8 relief occurred on August 16 and 24, 1996, and appellants were aware of these events at least by August 30, 1996.

[\*1362] Appellants also contend that it was impracticable to present an application for stay to the district court because, in denying their motion for preliminary injunction, it had prejudged the issues. When the district court's order demonstrates commitment to a particular resolution, application for a stay from that same district court may be futile and hence impracticable. [\*\*3] *See McClendon v. City of Albuquerque*, 79 F.3d 1014, 1020 (10th Cir. 1996); *see also, e.g., Walker v. Lockhart*, 678 F.2d 68, 70 (8th Cir. 1982) (district court's finding, in inmate civil rights action, that prisoner would be "safe" in Arkansas prison system obviated need for requesting stay of transfer order from same district court).

The futility theory, however, is inapplicable in this case. A careful review of appellants' motion for stay reveals that relief is sought predominantly on the basis of new evidence concerning events which occurred

after the district court denied the motion for a preliminary injunction. This evidence has not yet been considered by the district court. It does not necessarily follow from the refusal to grant a preliminary injunction that the district court would also refuse injunctive relief pending appeal. See *Bayless v. Martine*, 430 F.2d 873, 879 n.4 (5th Cir. 1970). This is particularly so when the relief sought pending appeal is premised primarily on new evidence which the district court has not yet had a chance to consider. We will not assume that the district court would not properly consider the new evidence if a motion for stay or other [\*\*4] appropriate motion were presented to it in the first instance.

Beyond the inapplicability of the futility theory, the fundamentally different roles of appellate and trial courts mandate consideration of the new evidence by the district court under Fed. R. Civ. P. 62(c) before Rule 8 proceedings in this court. The district court is the proper forum for presentation, testing and confrontation of the new evidence. Only upon completion of the district court's factfinding role, should this court consider any relief pending appeal. See *In re Montes*, 677 F.2d 415, 416 (5th Cir. 1982); *Ruiz v. Estelle*, 650 F.2d 555, 567 (5th Cir. 1981).

The dissent primarily takes issue with the majority's failure to refer appellants' motion for an injunction pending appeal to the district court. While this difference appears insignificant, its appearance is deceiving; the difference is fundamental. The dissent would mandate consideration of an injunction pending appeal by the district court and would dictate the specific issues for that court to address. This court's Order, on the other hand, allows the appellants to choose whether or not to seek an injunction in the district court. Equally important, [\*\*5] the Order would allow the parties, the district court and the traditional processes of litigation to control any further proceedings in the district court pending appeal.

Accordingly, after careful and thorough consideration, appellants' motion for stay pending appeal is DENIED. Their motion to expedite the appeal is GRANTED.

ENTERED FOR THE COURT

Michael R. Murphy

Circuit Judge

DISSENTBY:  
LUCERO

DISSENT:

Lucero, J., Dissenting

I agree with my colleagues that this motion for stay pending appeal is based primarily upon events which occurred after the district court denied appellants' request for a preliminary injunction. Thus, at this point, this new evidence has not been analyzed by any court in order to determine whether continued incineration at the Tooele Chemical Agent Disposal Facility ("TOCDF") presents an imminent threat of irreparable harm to the public and to the environment, as appellants tell us it does.

Appellants' claims appear facially substantial. They assert that since August 13, 1996, the date of the district court's denial of the preliminary injunction, nerve agent has leaked into non-agent areas at Johnson Atoll Chemical Agent Destruction System (a prototype [\*\*6] facility upon which TOCDF is modeled), and has been discovered in non-airtight filter vestibules at TOCDF; decontamination fluid has leaked through cracks in a concrete floor above an electrical wiring and equipment room at TOCDF; and the slag removal system in the liquid nerve agent incinerator malfunctioned at TOCDF, leading to operation shutdown. This list is non-exhaustive.

Given the district court's previous examination of the factual and legal questions presented [\*1363] by this action, I agree that this new evidence would best be considered by that court. My disagreement with the majority is that they do not refer appellants' request for a stay to the district court; instead, without evaluating this new evidence at all, they simply deny the request, without requiring the district court to consider the evidence. The majority opinion implies that the district court would consider the new evidence. Were the majority to hold that the district court has no discretion but to hear that new evidence, there would be no disagreement between us. However, given the posture in which the majority leaves this case, it is unclear whether the district court must consider the recent developments, [\*\*7] and thus whether the new evidence could escape judicial consideration. In my mind, the issues presented for our consideration and their potential effect upon the public and the environment are far too important to dispose of them by summary denial. Pursuant to our broad authority under 28 U.S.C. § 1651(a) and Fed. R. Civ. P. 62(g), I would refer appellants' request for a stay to the district court for its consideration. n1

n1 28 U.S.C. § 1651(a), the All Writs Act, provides that "the Supreme Court and all courts established by Act of Congress may issue all writs necessary or appropriate in aid of their



respective jurisdictions and agreeable to the usages and principles of law." The Supreme Court has explained that the Act serves as a "legislatively approved source of procedural instruments designed to achieve rational ends of law." *Harris v. Nelson*, 394 U.S. 286, 299, 22 L. Ed. 2d 281, 89 S. Ct. 1082 (1969) (quotations and citations omitted). Fed. R. Civ. P. 62(g) states that "the provisions in this rule do not limit any power of an appellate court ... to stay proceedings during the pendency of an appeal ... or to make any order appropriate to preserve the status quo ...." This rule is not a grant of power, but is "a declaration that whatever power the appellate courts have, by virtue of the All Writs Act ... or other applicable provision of law is not restricted by Rule 62." 11 Charles Alan Wright et al., *Federal Practice and Procedure* § 2908 (2d ed. 1995).

[\*\*8]

- In so doing, I would direct the district court to consider whether the events that have occurred since its denial of appellants' motion for preliminary injunction

warrant granting of the stay. I would specifically instruct the district court to address two issues: (1) whether these recent developments, considered in the context of the totality of the evidence, necessitate conducting a Supplemental Environmental Impact Statement in accordance with the legal standards set forth by the district court in its order; and (2) where the public interest lies in light of the new evidence. As to the latter issue, I would require that the public interest be expressly considered on the record under the standard set forth in *Northern Cheyenne Tribe v. Hodel*, 851 F.2d 1152, 1157 (9th Cir. 1988). Implicit consideration of the public interest, though allowed in copyright infringement cases, see *Autoskill, Inc. v. National Educ. Support Sys. Inc.*, 994 F.2d 1476 (10th Cir. 1993), is inadequate for cases involving potentially grave public and environmental consequences. I would ask the district court to compare the risks associated with test-burning a relatively small amount of agent with the [\*\*9] risks associated with storing that same small quantity. It is unclear whether the district court followed the above approach or instead compared the risk of large-scale incineration with the risk of large-scale storage.

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CHEMICAL WEAPONS WORKING GROUP INC., et al., Plaintiffs, vs.  
UNITED STATES DEPARTMENT OF THE ARMY, et al., Defendants.

Civil No. 2:96-CV-425C

UNITED STATES DISTRICT COURT FOR THE DISTRICT OF UTAH,  
CENTRAL DIVISION

963 F. Supp. 1083; 1997 U.S. Dist. LEXIS 4709; 44 ERC (BNA) 1628

March 24, 1997, Decided

March 24, 1997, filed

**DISPOSITION:**

[\*\*1] Plaintiffs' second motion for a preliminary injunction DENIED.

**COUNSEL:**

For all three plaintiffs: Paul Van Dam, JONES, WALDO, HOLBROOK & MCDONOUGH, Salt Lake City, Utah. Randall M. Weiner, Boulder, Colorado. Mick G. Harrison, GREENLAW, INC., Berea, Kentucky. Robert Guild, Columbia, SC. Richard Condit, Washington, D.C.

For Department of the Army and United States Department of Defense: Stephen L. Roth, Assistant U.S. Attorney, U.S. Attorney's Office, District of Utah, Salt Lake City, Utah. Lisa Ann Holden, U.S. Department of Justice, Environmental & Natural Resources Division, Washington, D.C. Alan David Greenberg, Robert H. Foster, U.S. Department of Justice, Environmental Defense, Denver, CO. David Tundermann, Michael A. Zody, Craig D. Galli, PARSONS, BEHLE, & LATIMER, Salt Lake City, Utah. Laura J. Lockhart, Utah Attorney General's Office, Salt Lake City, Utah.

**JUDGES:**

TENA CAMPBELL, United States District Judge

**OPINION BY:**

TENA CAMPBELL

**OPINION:**

[\*1085] MEMORANDUM DECISION AND ORDER

This matter is before the court on plaintiffs' second

motion for preliminary injunctive relief to enjoin defendants from incinerating chemical warfare agent at the Tooele Chemical Agent Disposal Facility (TOCDF). Plaintiffs [\*\*2] claim that "new" evidence, that is, evidence discovered after the conclusion of hearings on plaintiffs' first motion for preliminary injunctive relief, demonstrates that continued incineration of agent at TOCDF poses a threat of irreparable harm. Plaintiffs also contend that the new evidence requires that defendants prepare a supplemental environmental impact statement (SEIS). The new evidence presented by plaintiffs falls into two general categories: (1) operation of TOCDF, and (2) stack emissions.

**Procedural Background**

Plaintiffs initiated this suit on May 10, 1996. The amended complaint alleges that defendants have violated the National Environmental Policy Act (NEPA), the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the Defense Authorization Act, and the Clean Water Act (CWA) and that defendants' operation of TOCDF constitutes a nuisance under Utah law. The court granted defendants' motions to dismiss the RCRA, CWA, and nuisance counts. Subsequently, plaintiffs initiated several proceedings before the Utah Solid and Hazardous Waste Control Board ("Utah Board") to challenge various issues and decisions regarding TOCDF's hazardous [\*\*3] waste permits. These parallel proceedings are, to date, ongoing.

Plaintiffs' first motion for preliminary injunctive relief ("first motion"), filed on June 12, 1996, sought to enjoin defendants from commencing trial burns of chemical warfare agent at TOCDF. After a nine-day

evidentiary hearing, this motion was denied on August 13, 1996. See *Chemical Weapons Working Group, Inc. v. Department of the Army*, 935 F. Supp. 1206 (D. Utah 1996) ("CWWG I").

On October 11, 1996, plaintiffs filed a notice of appeal of the court's denial of their first motion and dismissal of various claims alleged in the first amended complaint. Seven days later, on October 18, 1996, plaintiffs moved the United States Court of Appeals for the Tenth Circuit to stay TOCDF operations pending resolution of their appeal. Because plaintiffs had failed to first seek a stay in the district court, the Tenth Circuit denied plaintiffs' motion on December 6, 1996. *Chemical Weapons Working Group (CWWG) v. Department of the Army*, 101 F.3d 1360 (10th Cir. 1996). The Tenth Circuit did not address the merits of plaintiffs' appeal.

On January 11, 1997, plaintiffs filed a consolidated motion for stay and second motion [\*\*4] for preliminary injunction. A hearing on plaintiffs' consolidated motion was held over six days from March 3, 1997 through March 10, 1996. Having considered the evidence presented at that hearing, the memoranda filed by the parties, and the arguments presented by counsel, the court denies plaintiffs' second motion for a preliminary injunction n1 and enters the following findings of fact and conclusions of law:

n1 The court entered judgment on plaintiffs' motion for a stay pending appeal by a separate Order.

## FINDINGS OF FACT

### Background

1. In its previous Memorandum Decision and Order, the court made detailed factual findings concerning the physical facility at TOCDF, the nature of the chemical warfare agent stockpile stored at Deseret Chemical [\*1086] Depot n2 ("Depot"), the Army's nearly twenty-years of experience with large-scale incineration of agent materials, and the compliance process dictated by NEPA. *CWWG I*, 935 F. Supp. at 1209-14. The court will not repeat its prior findings here except as [\*\*5] necessary to explain the pending consolidated motion.

n2 Formerly known as the Tooele Army Depot.

### TOCDF Operations

2. On August 22, 1996, TOCDF began destroying chemical agent pursuant to Trial Burn Plans approved by the Utah Division of Solid and Hazardous Waste. n3 Two of TOCDF's five furnaces became operational -- the Deactivation Furnace System (DFS) and the first of two Liquid Incinerators (LIC-1). The DFS is used to incinerate munitions which, after being drained of agent, remain contaminated. Agent drained from munitions and ton containers is destroyed in the LIC. As of February 4, 1997, the DFS had functioned for more than 569 hours and the LIC for over 736 hours, resulting in the destruction of 11,472 rockets and 122,750 pounds of the nerve agent GB. This amount represents thirty-eight percent of the stockpile of GB-filled rockets stored at the Depot.

n3 TOCDF's RCRA Part "B" permit specifies distinct sets of conditions for the "long term" and "short term" operation of the facility. The short term period is comprised of three phases -- "shakedown," "trial burn," and "post-trial burn." The trial burn plans cover the shakedown and trial burn phases only.

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3. On January 17, 1997, TOCDF began processing ton containers n4 stored at the Depot in the Metal Parts Furnace (MPF) and GB nerve agent drained from those containers in the second LIC (LIC-2). As of February 4, 1997, fifty-one such ton containers and 76,500 pounds of GB had been destroyed.

n4 Ton containers are large steel bulk storage containers. There were approximately 5,709 GB-filled ton containers in the original stockpile.

4. All present activities at TOCDF are governed by the Trial Burn Plans. TOCDF is currently operating in the "shakedown" phase, a period designed to identify possible mechanical difficulties, ensure that the facility has reached operational readiness, and achieve steady-state operating conditions prior to conducting the trial burns.

5. A munitions processing schedule governs the order in which the various munitions stored at the Depot are to be destroyed at TOCDF. Each portion of the schedule, termed a "campaign," is devoted to the

disposal of a specific item in the stockpile inventory. [\*\*7] Defendants submitted evidence in the form of declaration testimony by Gary J. Boyd, author of the quantitative risk assessment for TOCDF, that since the court's decision in CWWG I, the munitions processing campaigns have been reordered to provide for the destruction of higher risk munitions earlier in the processing schedule. Mr. Boyd testified that accidents involving nerve agent GB represent the majority of the risk from potential stockpile accidents; accordingly, the first campaign in the reordered munitions processing schedule provides for the disposal of GB-filled rockets and ton containers. The reorganization of the munitions processing campaigns will reduce the stockpile risks much more rapidly than would have occurred under the original processing schedule.

6. During the shakedown period, three events have occurred which have caused defendants to halt operation of TOCDF: (1) detection of low levels of agent in two filter containment vestibules; (2) leakage of a small quantity of decontamination fluid through hairline cracks in a second level cement floor to a first floor electrical room; and (3) migration of agent into an observation corridor. In addition, TOCDF has experienced [\*\*8] other operational and personnel difficulties. Citing these events and difficulties, plaintiffs maintain that TOCDF's present-day operation is substantially different from that contemplated during the NEPA compliance process and presents a risk of irreparable harm. Specifically, plaintiffs contend that while the "lessons learned" program and the operation of prototype facilities at the Depot (CAMDAS) and at Johnson Atoll (JACADS) were designed to identify, analyze, and correct problems of this type prior to the commencement of agent operations at [\*1087] TOCDF, the facility is being operated in a reactive, trial-and-error manner.

#### Agent Migration Into Filter Vestibules

7. The primary means of preventing an airborne agent release to the environment or the spread of agent vapor within TOCDF is the Heating, Ventilation, and Air Conditioning (HVAC) system. The HVAC maintains negative pressure throughout the facility so that air from areas least likely to be contaminated with agent flows to areas where contamination is more likely. Air from areas in which contamination is most likely is steadily removed and directed through a bank of filters designed to extract agent. Of the nine filter [\*\*9] units in the system, seven are typically in use at any given time with the remaining two units serving as reserves. Air passing through the filters is funneled into a common exhaust stack and monitored for the presence of agent. Additional agent monitors are

located between the charcoal banks that comprise the filter units.

8. The HVAC filters are enclosed within a metal structure containing sealed access doors. In March 1995, it was discovered that the gaskets surrounding similar access doors at JACADS allowed small amounts of agent to escape to the environment. It was subsequently determined that different door gaskets and clamping mechanisms would prevent future agent releases. It was also determined that secondary containment structures, not part of the original design plans for either JACADS or TOCDF, should be constructed over the access doors at both facilities. These structures, called "vestibules," were constructed at both facilities in 1996.

9. The filter vestibules are pre-fabricated wooden structures. The interiors of the vestibules are modified so that each is lined with 22-gauge stainless steel sheeting and caulked with silicon; however, the structures are not designed [\*\*10] to be airtight. In August 1996, the vestibules were monitored for the presence of agent through the use of Depot Area Air Monitoring System (DAAMS) units. DAAMS units collect air contents onto an absorbent material inside a testing tube over an extended period of time, typically eight hours. The absorbent material is then analyzed for the presence of agent. The other monitoring system used at TOCDF, Automatic Continuous Air Monitoring System (ACAMS), is a self-contained chromatograph used to determine agent concentrations on a near real-time basis.

10. On August 23, 1996, GB nerve agent migrated into the filter vestibules attached to filter units 107 and 108. The release was detected and confirmed the next day during laboratory analysis of absorption tubes removed from DAAMS units in both vestibules. The testing revealed that between 8:00 a.m. and 4:00 p.m. on August 23, 1996, agent was present in vestibule 108 at a level of 3.62 Time Weighted Average (TWA) n5 and in vestibule 107 at a level of .25 TWA. During this eight hour period, filter unit 107 was in operation for approximately nine minutes; filter unit 108 was off-line for the entire day. On the afternoon of August 23, 1996, [\*\*11] three TOCDF employees were present in the vestibule 107 for approximately twenty minutes. Filter 107 was off-line at the time. Medical tests of the personnel indicated that they suffered no agent exposure.

n5 TWA is an agent concentration exposure measurement established by the Office of the Surgeon General. An average individual can be exposed to one TWA for

eight hours per day, forty hours per week, for his or her lifetime without suffering adverse health effects.

11. The plant shift manger was notified of the confirmed agent levels in the filter containment vestibules at approximately 2:32 p.m. on August 24, 1996. Processing of M55 rockets was immediately suspended. An announcement made over the public address system declared the area in and around the filter units off-limits to all but essential personnel, a 200-foot clear zone was established and cordoned off with barricade tape, and ACAMS agent detection systems were placed outside the filter vestibules and at the plant boundaries. None of these ACAMS units [\*\*12] registered the presence of chemical agent. In addition, any personnel entering the clear zone were required to wear protective masks. Richard Holmes, Associate Project Manager for TOCDF, testified that he could not recall whether a masking alarm sounded to warn TOCDF personnel in the area to don their [\*1088] masks; however, the evidence suggests that the alarm was not sounded. Finally, the ambient air present in the filter vestibules was drained back into TOCDF.

12. An investigation of the incident revealed that the most probable cause of the agent migration into the filter containment vestibules was the procedure used to place the filter units off-line, a phenomenon not encountered at JACADS. After consultation with the Executive Secretary of the Utah Board, defendants altered the procedure to ensure that negative pressure was maintained within the filter units at all times. Defendants also installed additional filtered valves in all of the filter vestibules. Finally, defendants permanently installed ACAMS agent detection systems in the vestibules. All of these actions were taken before agent operations resumed on August 30, 1996.

#### Cracks in the Concrete

13. On September 18, 1996, [\*\*13] TOCDF experienced a leak of approximately eight ounces of decontamination liquid through the ceiling of an electrical room located on the first floor of the Munitions Demilitarization Building from a decontamination area located above. Upon learning of the leak, the plant manager halted agent processing activities. Tests detected no chemical agent present in the liquid, and no electrical equipment was affected. An inspection of the decontamination room, used by TOCDF personnel to decontaminate their protective equipment after exiting Explosive Containment Rooms (ECRs), revealed several hairline cracks in the concrete

floor which allowed fluid to leak into the electrical room. Mr. Holmes testified that the cracks were sealed by an injection of a low viscous grout.

14. Cracks in concrete have occurred in other areas at TOCDF. Donald Smith, EG&G's Senior Quality Assurance Specialist at TOCDF, testified that he noticed cracks as early as 1990 during construction of the facility. However, Timothy Thomas, the Army's TOCDF Project Manager, testified that cracks in the concrete identified during construction of the facility were repaired. John Russell Hall, an Engineering Technician for EG&G [\*\*14] at TOCDF from February 6, 1994 to January 4, 1996, testified that he noticed cracks in the concrete floors of the Toxic Maintenance Area (TMA) and the Residue Handling Area (RHA) in 1995. Mr. Hall testified that he completed a work order for the cracks in the TMA on November 22, 1995, but he was unable to recall whether these cracks or those located in the RHA were repaired by the time he left EG&G's employ. In fact, Mr. Hall testified in his deposition that he had no knowledge of any corrective action taken by defendants to address cracks in the concrete at TOCDF since his employment was terminated. Further, the court notes that Mr. Hall's tenure at TOCDF was during systemization, a phase of operations designed to identify and correct problems in TOCDF's physical plant and equipment.

15. Defendants have established corrective measures to identify, map, evaluate, and repair cracks in the concrete at TOCDF. Cracks are identified through routine and scheduled inspections of TOCDF's structural integrity by EG&G personnel. When a crack is identified, a work order is prepared and the crack is evaluated to determine its nature and the appropriate method of repair. Minor and hairline cracks [\*\*15] in the concrete or the floor coating are repaired by applying a filling compound resistant to decontamination fluid and re-coating the area with chemical-resistant epoxy paint. Major cracks are repaired in a similar manner after being injected with a bonding compound. When cracks are identified in a toxic area, agent operations in that area are suspended until the crack is fixed. Thomas A. Kurkky, EG&G's Risk Management Division Director, testified that hundreds of minor cracks and three major cracks -- cracks having a discernible void -- have been identified in the concrete floor and floor coating at TOCDF and have been repaired.

#### Agent Migration Into Observation Corridors

16. On January 26, 1997, GB nerve agent vapors migrated into an unoccupied observation corridor

adjacent to the first floor buffer storage area. An ACAMS alarm in the corridor sounded, and TOCDF personnel donned their protective masks and evacuated the building. In addition, TOCDF operations were halted pending an investigation [\*1089] into the alarm. The ACAMS monitoring system indicated that agent had been present in the observation corridor at a level of 1.04 TWA. Agent was not released to the environment and [\*\*16] no TOCDF employees were exposed to agent. The Army notified the appropriate regulatory authorities of the event, and agent operations resumed only after state approval was received.

17. An investigation revealed that the event was triggered when, at approximately 10:30 p.m. on January 25, 1997, an interior door between an air lock and the DFS room was opened during maintenance operations. The opening of the door caused the air pressure in nearby Toxic Cubicle n6 to rise slightly, which, in turn, activated an alarm in TOCDF's control room. A control room operator responded by opening a toxic cubicle bypass damper to lower the air pressure in the Cubicle, an action that violated TOCDF's standard operating procedures. Opening the damper had a secondary effect of causing a pressure imbalance between the observation corridor and the buffer storage area. As a result, when a drained GB ton container was moved through the storage area en route to the MPF, GB vapor was permitted to migrate into the corridor.

n6 The Toxic Cubicle houses the liquid agent storage tank.

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18. Defendants have taken corrective measures to prevent such an event from recurring: operator procedures and system changes have been implemented, control room operators have received additional training on the secondary effects of opening bypass dampers, TOCDF's standard operating procedures have been modified to emphasize the appropriate use of the toxic cubicle bypass damper, and additional air pressure alarms have been installed in TOCDF's control room.

#### Other Operational Events at TOCDF

19. TOCDF has experienced additional operational events during the shakedown period. These include: the failure of heating elements in the slag removal system in LIC-1; incidents during rocket processing initialization, loss of electrical power, temporary HVAC imbalance during a test of the fire suppression

system, malfunction of the agent quantification system, and use of a "hot cut-out" procedure to remove TOCDF personnel from their protective clothing.

#### Slag Removal System Operation

20. The incineration of liquid agent produces acidic by-products which condense on the walls of the secondary combustion chamber of the LICs to form a molten slag. This slag slowly flows down [\*\*18] the walls and collects in a pool at the bottom of the chamber. The slag removal system employs sixteen heating elements to maintain the slag in a molten state so that it may be drained from the LICs. During agent operations in LIC-1, several of the elements failed, requiring defendants to halt processing in LIC-1 temporarily so that the faulty elements could be replaced. Defendants intend to modify the slag removal system by fitting protective sleeves around the heating elements to increase their useful life expectancy.

#### Incidents During Rocket Processing Initialization

21. On October 14, 1996, an end cap from the rear of an M55 rocket shipping and firing tube was inadvertently removed by a feed gate designed to allow rockets to pass into an ECR for disassembly. Operation of the affected rocket processing line was halted temporarily to allow TOCDF personnel to examine the tube and the rocket. Once it was determined that the rocket was intact and stable, the employees secured the end cap to the tube and processing resumed. Rocket processing procedures have since been modified to minimize the likelihood that such an event will occur in the future.

22. On two occasions -- once [\*\*19] in November 1996 and once in December 1996 -- rocket parts have jammed in the chute feeding into the DFS. After both incidents, operations at TOCDF were halted to allow the jams to be cleared and an evaluation to be conducted. An investigation revealed that a build-up of heated materials on the feed chute prevented sheared rockets from being fed properly into the DFS. Feed chute jams experienced at JACADS had a different root cause, one not observed at TOCDF. To reduce the likelihood of future jams at TOCDF, defendants [\*1090] have heightened inspection of the chute area and have modified the chute to allow for ready access, should a jam occur.

#### Loss of Electrical Power

23. In mid-September 1996, TOCDF experienced a loss of commercial electrical power for 38 minutes. TOCDF's emergency power supply activated and

provided power to essential equipment in the plant, including the HVAC system. During the restart of the HVAC system, only one of the two normally operating air supply handlers came on line, causing an imbalance in the HVAC system air pressure. The masking alarm sounded and notification was given to the Deseret Chemical Depot Emergency Operations Center. Within minutes of the [\*\*20] power loss, the second air supply handler was started manually and the masking signal was withdrawn. No chemical agent migrated from the facility and no TOCDF personnel were exposed to agent.

24. Power failures are not uncommon at TOCDF. However, there has never been an occasion when the backup power system failed to properly activate upon loss of power. Because ACAMS systems operate on an independent and uninterrupted power supply, their operation is not affected by a loss of commercial power.

#### Temporary HVAC Imbalance During Fire Suppression System Test

25. On September 2, 1996, a temporary imbalance in the HVAC system occurred in the Unpack Area (UPA) during a test of the fire suppression system. In conducting the test, maintenance personnel shut off the water supply to the sprinkler system. This action triggered an abnormal water pressure alarm and caused the internal fire dampers in the UPA ventilation system to close automatically. This closure caused a temporary pressure imbalance in the UPA HVAC system. Negative pressure was maintained throughout TOCDF during the event and the UPA HVAC system was stabilized quickly. No agent migrated from primary containment areas [\*\*21] and employee safety was maintained. TOCDF maintenance personnel have since received corrective training to ensure that such an incident does not recur.

#### Agent Quantification System Operation

26. The Agent Quantification System (AQS) is designed to measure the amount of agent drained from munitions. The measurement is made not for security purposes but to determine the amount of residual agent being fed into the DFS. This calculation is required by TOCDF's RCRA permits. During initial agent operations it was discovered that the AQS was improperly indicating the presence of agent in rockets that had been completely drained. An investigation revealed that the AQS allowed a small quantity of agent to flow into the agent holding tank before being measured. Proper operation of the AQS was restored by the installation of a metal plate vertically from the

top of the AQS downward into the tank, and similar problems have not recurred.

#### Hot Cut-Outs

27. TOCDF personnel working in contaminated areas are required to wear demilitarization protective ensemble (DPE) suits. These plastic suits are completely sealed from the outside environment and must be physically cut to be removed [\*\*22] from employees. When the cut-out procedure is performed in an area where agent concentration exceeds 1 TWA, the exit is termed a "hot" cut-out. Plaintiffs argue that the hot cut-out procedure exposes TOCDF employees to chemical agent. In support of their claim, plaintiffs presented documentary evidence that the number of hot cut-outs performed at TOCDF increased steadily from ten in September 1996 to a high of fifty in November 1996. The increased frequency of hot cut-outs was due to two factors. First, practices in place at the time attempted to minimize the amount of decontamination liquid utilized outside the ECRs. Second, the nature of the work performed during those months required more frequent handling of equipment bearing liquid agent. While the hot cut-out procedure requires employees to exit the DPE suit in the presence of agent, GB nerve agent is primarily an inhalation hazard and every worker is equipped with an independent breathing apparatus. Because TOCDF will process only GB nerve agent for at least one year, the court finds that the hot cut-out [\*1091] procedure does not present a threat to employee safety prior to trial.

28. None of the events cited by plaintiffs or other [\*\*23] operational difficulties experienced at TOCDF has resulted in loss of life, injury to TOCDF personnel, or harm to the environment. James J. Cudahy, an expert in the evaluation, design, operation, and permitting of hazardous waste incineration facilities, testified that the number of safety related incidents at TOCDF is not unusually high when compared to typical start-ups of modern complex systems for hazardous waste incineration.

#### TOCDF Management

29. Plaintiffs argue that defendants' management of TOCDF does not ensure protection of public health and the environment. In support of their assertions, plaintiffs presented documentary evidence and testimony from former TOCDF employees Gary Millar, John Hall, and James DeHaven, and current employee Donald Smith.

30. Plaintiffs rely heavily on a November 9, 1996 letter from Gary Millar, former General Manager at



TOCDF, to Fred Parks, President of EG&G, written shortly after Mr. Millar's employment with EG&G was terminated. In the letter, Mr. Millar raised several issues about TOCDF operations and management. Mr. Millar indicated that on the date agent operations began at TOCDF, August 22, 1996, the facility was at a marginally [\*\*24] acceptable state of safety readiness. The letter also speaks of numerous safety, quality, environmental, and operational deficiencies which, in Mr. Millar's opinion, are excessive in a "high risk business like TOCDF." In addition, Mr. Millar was highly critical of management actions at TOCDF which he analogized to the those preceding the nuclear accident at Three Mile Island and the Challenger Disaster and of a corporate "mindset" which, according to Mr. Millar, presents a high risk to TOCDF employees, the public, and the environment.

31. Mr. Millar's testimony under oath belies many of the concerns raised in the November 9, 1996 letter. On December 12, 1996, Mr. Millar testified to the Utah Board that TOCDF was being operated safely and that state regulatory agencies charged with overseeing the facility were doing a "good job" keeping TOCDF operations and the public safe. Mr. Millar further testified that he never intended his letter to become public and that he considered the issues raised therein to concern EG&G's internal management, not plant safety. Mr. Millar's deposition testimony echos his testimony before the Utah Board. Mr. Millar acknowledged that when he wrote the letter, [\*\*25] he was upset about his recent firing and that he did not intend the letter to be disseminated to the Army, the State of Utah, or the public. Further, Mr. Millar testified that he believed TOCDF to be "inherently safe" and that he did not consider the risks described in the November 9, 1996 letter to be so serious that he was required to disclose them to state regulatory authorities. The court finds Mr. Millar's testimony more credible and more probative than the contents of his November 9, 1996 letter.

32. Plaintiffs also presented evidence in the form of deposition and live testimony from John Hall. Mr. Hall testified that he had noticed and reported various problems at the facility, including cracks in concrete flooring and leaks of sulfuric acid from batteries powering the emergency power system. However, Mr. Hall also testified that his employment with EG&G ended on January 4, 1996 and that he has no knowledge of conditions or operations at TOCDF since that date. Accordingly, insofar as Mr. Hall's testimony relates to events occurring since he left EG&G's employ or the potential for future problems at the facility, the court finds his testimony to be of little probative value. [\*\*26]

33. Plaintiffs also presented evidence in the form of testimony by James DeHaven, an emergency medical technician employed at the Tooele Health Clinic from October 1, 1996 to February 14, 1997. Mr. DeHaven testified that electrocardiograms (EKGs) he administered to several Depot personnel revealed a higher than normal incidence of bradycardia (slow heart rate) and "blocks" (interruptions of the electrical pathways to the heart), both symptoms of nerve agent exposure. Mr. DeHaven further testified that his medical supervisors, Army personnel, [\*1092] and representatives from the Utah Department of Health ignored his concerns. On cross-examination, Mr. DeHaven acknowledged that he did not know the prior medical histories of those employees exhibiting bradycardia or blocking, how long they had exhibited either condition, possible other causes of the symptoms, how long the workers had been employed at the Depot, or whether they worked at TOCDF or some other area of the Depot. n7 Mr. DeHaven also testified that all EKGs administered at the Tooele Health Clinic were transmitted to an Army hospital in Texas to be read by a cardiac specialist. Mr. DeHaven was not aware of any instance in which an [\*\*27] EKG administered at the Depot had been deemed abnormal by a cardiac specialist. Accordingly, the court finds that Mr. DeHaven's testimony did not constitute evidence that TOCDF personnel had suffered nerve agent exposure.

n7 Later testimony established that the medical clinic at TOCDF is separate from the Tooele Health Clinic.

34. Plaintiffs also relied on the testimony of Donald Smith and on entries contained in private journals in which Mr. Smith recorded concerns and frustrations he experienced as EG&G's Senior Quality Assurance Program Development Coordinator at TOCDF. Throughout his testimony, Mr. Smith made clear that his journals did not represent his professional work product, were intended to be private, and were often used to "[vent] emotional feelings at the time." Hearing Tr. at 76 (March 6, 1997). Mr. Smith also testified that the latter portions of his journal were written while he was being treated with heavy medication. Finally, Mr. Smith testified that many, if not most, of his journal entries [\*\*28] relating to TOCDF were based not on his personal knowledge, but on hearsay evidence. Accordingly, the court finds Mr. Smith's testimony to be of little probative value.

35. Finally, plaintiffs attempted to establish that Mr. Millar and Mr. Hall were terminated from their

employment with EG&G in retaliation for raising concerns regarding safety at TOCDF. Defendants presented evidence in the form of Timothy Thomas' supplemental declaration that Mr. Millar's firing was predicated on his inability to effectively communicate his management priorities and instructions and on his management approach, which caused stress in other EG&G personnel. In his deposition testimony, Mr. Millar admitted being told that he was causing morale problems among the workforce at TOCDF and that several EG&G managers had filed written complaints about him. Defendants also presented Mr. Hall's deposition testimony in which he conceded that he had no direct evidence that his firing was retaliatory in nature. The court finds that plaintiffs have produced insufficient evidence to establish that either Mr. Millar or Mr. Hall were terminated from their employment with EG&G for raising concerns regarding safety at [\*\*29] TOCDF.

#### Quantitative Risk Assessment

36. The Army's Program Manager for Chemical Demilitarization, Major General Robert D. Orton, has directed that a quantitative risk assessment (QRA) and risk management program be developed for each of the eight planned chemical demilitarization facilities in the continental United States, including TOCDF. The TOCDF QRA estimates the probabilities and public health consequences of potential accidental releases of chemical agent during chemical storage and disposal activities. Releases resulting from internal initiating events (those originating inside the facility or directly from the activity being performed) and from external events (e.g. earthquakes, aircraft accidents, and tornadoes) were included. In addition, the TOCDF QRA assesses the public risk associated with storage of the chemical munitions at the Depot absent demilitarization operations. The TOCDF QRA is based on the "as-built TOCDF design" and incorporates data derived from JACADS.

37. At the time of the court's decision in CWWG I, the QRA for TOCDF was in draft form. Since that time, the final QRA for TOCDF has been issued. The final QRA reflects several changes [\*\*30] from the draft version. First, as discussed above, the munitions [\*1093] processing campaigns have been reordered so that higher risk munitions are destroyed earlier in the processing schedule. Second, the expected duration of processing operations at TOCDF has increased from 6.2 to 7.1 years. This change reflects the final QRA's reliance on the now de-classified actual processing schedule for TOCDF rather than on an estimated schedule, as had the draft QRA. Third, the final QRA incorporates a more realistic model for measuring risks

associated with agent spills in storage area igloos. The draft QRA assumed that all igloo spills would completely exit the igloos and be subject to outside evaporation rates. The final QRA assumes that smaller spills not having sufficient volume to reach the doorway will be confined to the interior of the igloo. Fourth, the final QRA more realistically predicts the number of M55 rocket igloos that would explode during an earthquake. The draft QRA assumed that the explosion of one igloo would trigger all of the remaining igloos to explode. The current model predicts the number of igloos that would explode in earthquakes of varying sizes.

38. The final QRA concludes [\*\*31] that, on average, 34 days of continued storage of the stockpile incurs a public risk equal to that associated with the entire 7.1 years of TOCDF agent operations. If rare events such as earthquakes and aircraft accidents are removed from the assessment, the finding is stronger -- the risk to the public from the entirety of TOCDF's operations is equaled by the risk of only 2.3 days of continued storage. n8 The final QRA also concludes that a one year delay in processing will approximately double the risk to the population surrounding the stockpile.

n8 This is so because earthquakes dominate the risks from disposal more than those associated with storage.

#### Stack Emissions

39. Plaintiffs allege that "the health risk from the on-going daily stack emissions of toxic chemicals [at TOCDF] including both dioxin and nerve agent is both more real and quantitatively greater than previously disclosed." Plaintiffs' Consolidated Memorandum in Support of Plaintiffs' Motion for an Injunction Pending Appeal and Plaintiffs' [\*\*32] Second Motion for Preliminary Injunction, at 3. Plaintiffs base this claim on "new" evidence that: (1) nerve agent GB is being emitted from the stacks at TOCDF; and (2) the Utah Department of Environmental Quality (DEQ) improperly manipulated the screening health risk assessment (SRA) performed for TOCDF by reducing estimates of mustard gas emissions, deleting risk calculations associated with open burning and open detonation, and omitting risk scenarios based on dioxin exposure to breast-fed infants and subsistence farmers.

#### GB Emissions

40. Stack effluent gasses at TOCDF are regularly monitored for a number of analytes, including GB, by

ACAMS and DAAMS monitoring systems installed in the stacks. Stack samples are analyzed, and the results are forwarded to state regulatory authorities.

41. Plaintiffs argue that analyses of stack particulate emissions at TOCDF indicate the presence of nerve agent GB in the stack effluent. Plaintiffs also allege that defendants' testing and analysis methodologies underestimate the amount of nerve agent actually escaping the stack and overestimate the agent destruction and removal efficiencies calculated for the DFS. In support of their claims, [\*\*33] plaintiffs presented evidence in the form of declaration and live testimony by Pat Costner and a document prepared by EG&G's subcontractor, Battelle, which reports non-zero readings for nerve agent GB in stack emissions at TOCDF. The court finds that the evidence presented by plaintiffs is insufficient to demonstrate conclusively that nerve agent GB is being emitted from the stacks at TOCDF. All of the positive results cited in the Battelle document were below the level of quantification (LOQ), that is, the sensitivity or calibration range, of the monitoring equipment, a level approximately equivalent to a GB stack concentration over 5,500 times less than the maximum allowable regulatory-based GB stack concentration. Values below the LOQ have a lower confidence that the quantity of GB detected is [\*\*1094] accurate and could reflect machine "noise," an interferant, or a false positive. The court finds that Ms. Costner's testimony is only marginally probative in that much of the scientific data underlying her opinions was not directly applicable to the TOCDF facility.

42. Plaintiffs attempt to analogize the potential health effects of alleged GB emissions with illnesses suffered by veterans [\*\*34] of the Persian Gulf War. In lieu of written or live testimony, the parties introduced documentary evidence, mainly in the form of articles from periodicals. The court finds that because the etiology of Gulf War illness is not known with any degree of reasonable certainty, the evidence submitted on this subject is not probative of the issues raised by plaintiffs' consolidated motion.

#### Screening Health Risk Assessment

43. Prior to approving trial burns of chemical agent at TOCDF, DEQ performed an SRA which analyzed the impacts of expected TOCDF emissions on human health and the environment. The SRA followed Environmental Protection Agency (EPA) guidance in adopting conservative assumptions.

44. In CWWG I, the court discussed in detail the risk assessment performed for TOCDF. 935 F. Supp. at 1213-14. After carefully considering the health risks

associated with dioxin exposure and DEQ's decision to eliminate from its February 1996 SRA risk scenarios regarding a subsistence farmer and a breast-feeding infant, the court found that:

although plaintiffs have shown that the assumptions applied in the State's health risk assessment may indicate a higher level of risk for [\*\*35] some hypothetical persons, this does not constitute a showing that there is an actual risk to some person or persons posed by the emissions levels predicted for the facility.

*Id.* 935 F. Supp. 1206 at 1214. None of the new evidence presented by plaintiffs undermines the court's prior finding.

45. As they did with their first motion, plaintiffs rely heavily on a draft chapter of the EPA's "Health Assessment Document for 2, 3, 7, 8, Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds" (Dioxin Reassessment). However, this document, which by its terms is not to be cited or quoted, remains subject to review by EPA's Science Advisory Board and possible public comment and does not represent the EPA's final position. The court finds that scientific knowledge regarding health risks associated with dioxin exposure and the methods to assess the health impacts of dioxin emissions at TOCDF remains unchanged since the previous hearing.

46. In CWWG I, the court addressed the omission of the subsistence farmer and breast-feeding infant scenarios from the SRA. 935 F. Supp. at 1213-14. The court noted that the final version of the SRA "considered three farmer scenarios based on a survey of actual [\*\*36] farming practices in the area, and simply deleted the breast-feeding infant scenario." *Id.* at 1214. Plaintiffs argue that the final SRA erroneously omitted consumption of local dairy products from the risk calculus. In support of this contention, plaintiffs presented evidence in the form of a written summary of farming activity surrounding TOCDF drafted by Rachel Shilton, an engineer in DEQ's Division of Solid and Hazardous Waste, and an unofficial table prepared former EG&G Permitting Manager Gary Harris which, according to plaintiffs, demonstrate that such dairy consumption is, in fact, occurring. The court finds this evidence to be unreliable. While the table appears to identify a family of local dairy consumers, no names or other identifying information is provided. The summary indicates, at most, that local dairy production may have occurred in the past. The court finds more probative Ms. Shilton's testimony that she was unable to locate any persons in the area of TOCDF who presently consume locally produced dairy products.

47. Plaintiffs allege that risk calculations for open burning and open detonation (OB/OD) of chemical weapons at the Depot were improperly omitted from [\*\*37] the SRA. However, plaintiffs presented no evidence that OB/OD operations were occurring or would occur within the next year. Ms. Shilton testified in her declaration that DEQ will allow open burning to occur at the Depot [\*1095] only if agent operations at TOCDF have ceased or if emissions from OB/OD could be modeled with the other emissions considered in the RSA to produce a cancer risk no higher than 10 per million. Plaintiffs presented no evidence that either condition has occurred.

48. The SRA models stack emissions for four stacks: the combined stack for the LICs, DFS, and MPF incinerators, the HVACS (ventilation) stack, the Dunnage Incinerator stack, and the CAMDAS stack. Early screening calculations for risks associated with mustard agent (HD) stack emissions assumed that all four stacks would emit both HD and GB continuously at the minimum concentration that would trigger a waste-feed cutoff under TOCDF's operating permits. When these early calculations showed a high risk level for HD, the model was revised to assume that HD emissions from the HVACS stack would be at the detection level, 20% of the waste-feed cutoff level. The court finds that this change reflects a more realistic [\*\*38] approximation of expected HVACS stack emissions. The court also finds that there is no evidence that HD will be processed at TOCDF within the next year. Indeed, according to the revised munitions processing schedule, TOCDF will process only GB-filled M55 rockets and ton containers for at least one year.

### CONCLUSIONS OF LAW

1. Plaintiffs bear the burden of establishing that they are entitled to injunctive relief. To meet their burden, plaintiffs must establish: (1) that they will be irreparably injured unless an injunction issues; (2) that the threatened injury outweighs any damage defendants might suffer; (3) that the injunction, if issued, is not adverse to public interest; and (4) that they have shown a substantial probability of success on the merits. *Walmer v. U.S. Department of Defense*, 52 F.3d 851, 854 (10th Cir.), cert. denied, U.S. , 133 L. Ed. 2d 403, 116 S. Ct. 474 (1995). If plaintiffs establish the first three requirements for a preliminary injunction to issue, they may establish likelihood of success by showing "questions going to the merits so serious, substantial, difficult and doubtful, as to make the issues ripe for litigation and [\*\*39] deserving of more deliberate investigation." *Id.* (citing *City of Chamute v. Kansas Gas & Elec. Co.*, 754 F.2d 310, 314 (10th Cir. 1985)).

### Irreparable Harm

2. To constitute irreparable harm, an injury must be certain, great, and actual. *Wisconsin Gas Co. v. FERC*, 244 U.S. App. D.C. 349, 758 F.2d 669, 674 (D.C. Cir. 1985). Irreparable harm cannot be speculative; "the injury complained of [must be] of such imminence that there is a 'clear and present' need for equitable relief to prevent irreparable harm." *Id.* (emphasis in original)(citations and internal quotations omitted); see also *Regan v. Vinick & Young*, 862 F.2d 896, 902 (1st Cir. 1988) ("speculation or unsubstantiated fears about what may happen in the future cannot provide the basis for a preliminary injunction"). Plaintiffs' claims of irreparable injury relate to: (1) the alleged public health consequences of the operation of, and emissions from, TOCDF; and (2) defendants' failure to prepare a supplemental environmental impact statement (SEIS), which, according to plaintiffs, constitutes a violation of NEPA.

### Operational Risks

3. Plaintiffs assert that the occurrence of several incidents [\*\*40] at TOCDF since agent operations began demonstrates that continued operation of the facility poses immediate risks to TOCDF employees, the public, and the environment. The overall record of operations at TOCDF does not support plaintiffs' claim. Although there have been problems at the facility, some of which required the suspension of operations, none of the events caused harm to TOCDF personnel, the public, or the environment. There is no evidence that human injury or environmental harm is inevitable or likely. In fact, the record suggests that TOCDF's safety equipment and procedures are effective in preventing such harms.

4. The evidence presented through John Hall, Donald Smith, and James DeHaven does not undermine this conclusion as it lacks sufficient probative value to be of merit. Likewise, in light of Gary Millar's testimony [\*1096] in his deposition and before the Utah Board that TOCDF was being operated in a safe manner, his November 9, 1996 letter cannot serve as a basis for finding that TOCDF operations pose a risk of irreparable harm.

5. The problems experienced at TOCDF do not demonstrate that the "lessons learned" program is a failure. To the contrary, the evidence indicates [\*\*41] that events experienced at JACADS have not recurred at TOCDF and the root causes of incidents at TOCDF were not observed at JACADS.

6. The fact remains that all of the events at

TOCDF occurred during the shakedown period, a phase designed to identify and correct operational difficulties prior to full-scale operations. As testified to by defendants' expert, James Cudahy, such events are to be expected during shakedown operations for any large-scale hazardous waste incinerator. The court finds that the occurrences cited by plaintiffs are too speculative to support a finding of irreparable harm.

#### Risks from Stack Emissions

7. Plaintiffs argue that the presence of nerve agent GB in TOCDF's stack effluent constitutes a direct and present threat to public safety and the environment. However, there has never been a confirmed detection of agent in the stack emissions from TOCDF since agent operations began. Non-zero values for GB reported in the stack particulate analysis relied upon by plaintiffs were well-below the level of quantification of the monitoring equipment, a level that is itself more than five thousand times less than the maximum GB stack concentration permitted by the [\*\*42] regulatory scheme. No significant degree of scientific confidence can be placed in the results of the particulate analysis; indeed, the evidence indicates that the positive readings for GB could have benign origins such as machine noise or false positives. The court finds that the asserted risks from emissions of GB from the stacks at TOCDF is too speculative to qualify as irreparable harm to plaintiffs.

8. Plaintiffs' allegations regarding mustard agent emissions cannot support a finding of irreparable harm. The evidence reflects that mustard agent will not be processed at TOCDF before trial on the merits. Thus, plaintiffs will suffer no injury justifying preliminary injunctive relief. Further, while final SRA prepared by DEQ utilized a less conservative model for mustard agent stack emissions than did earlier assessments, the court finds that the revision more accurately reflects the actual operating conditions at TOCDF.

9. Plaintiffs' allegation that the SRA underestimates the risks associated with dioxin exposure is not tantamount to irreparable harm. The elimination of the breast-feeding infant and subsistence farmer scenarios is consistent with EPA guidance for facilities like [\*\*43] TOCDF. Further, there is simply no reliable evidence that either scenario applies to the areas surrounding the facility. At most, plaintiffs have shown that the assumptions applied in the SRA may indicate a higher level of risk for some hypothetical persons, not that there exists an actual risk to actual persons from projected emissions levels.

10. The SRA's omission of risk calculations for open burning/open detonation at TOCDF does not

support a finding of irreparable harm. Neither activity currently occurs at TOCDF, and plaintiffs produced no evidence that OB/OD operations would commence before trial. The court finds that the asserted risks of harm due to dioxin exposure are too speculative to constitute irreparable harm to plaintiffs.

11. Having carefully considered all of these factors, the court concludes that neither the plaintiffs nor the public will suffer irreparable harm from TOCDF emissions.

#### NEPA Harm

12. The purpose of NEPA is to focus "government and public attention on the environmental effects of proposed agency action." *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 371, 104 L. Ed. 2d 377, 109 S. Ct. 1851 (1989). To this end, NEPA requires [\*\*44] federal agencies to consider all information prior to taking an action which might have significant environmental effects. *Id.* Plaintiffs contend that defendants' failure to supplement the 1989 environmental impact statement (EIS) violates NEPA and constitutes irreparable harm. As [\*1097] discussed more fully in the court's examination of plaintiffs' likelihood of success on the merits, plaintiffs' "new" information did not require the preparation of a supplemental environmental impact statement. However, even if defendants' decision not to generate a SEIS did violate NEPA, "pending final resolution of this case, such injury will occur during only a small portion of the expected operating lifetime of TOCDF, and is therefore relatively minimal." *CWWG I*, 935 F. Supp. at 1216.

#### Balancing of Harms -- Public Interest

13. In this case, the interests of both plaintiffs and defendants coincide with different elements of public interest. Plaintiffs assert that the public interest requires a suspension of operations at TOCDF pending trial; defendants assert the public interest lies in disposing of the stockpile of lethal chemical agent and munitions stored at the Depot. It is true [\*\*45] that halting agent operations at TOCDF could have negative consequences for defendants, including a loss of proficiency in operations and a risk to employees during decontamination of "hot" portions of the facility. However, these harms are best considered in the analysis of where the public interest lies. Indeed, the public has an interest in the safe and efficient operation of TOCDF, and TOCDF personnel are, of course, members of the public.

14. In *CWWG I*, the court found that the risks of

continued storage outweigh the risks of operation of TOCDF during the period before trial. 935 F. Supp. at 1216-17. This conclusion has been strengthened by changes made by defendants in the munitions processing schedule. During the approximately one-year period before trial, the Army will continue to process the volatile GB nerve agent, the source of the majority of the risk from potential stockpile accidents. Reorganizing the munitions processing campaigns to destroy higher risk munitions earlier in the schedule, starting with GB, will reduce the overall stockpile risks faster than would have occurred under the previous schedule. Further, the risks from potential accidental releases of chemical [\*\*46] agent are minimized by allowing agent disposal activities at TOCDF to continue. Gary Boyd, author of the QRA for TOCDF, concluded that as of February 1997, when the bulk of GB in the stockpile remained unprocessed, a one-year delay in agent operations would approximately double the risk to the population surrounding TOCDF.

15. There is no general presumption that a NEPA violation will in all cases outweigh other public interests. See *Fund for Animals, Inc. v. Lujan*, 962 F.2d 1391, 1400 (9th Cir. 1992); *Concerned Citizens v. Secretary of Transportation*, 641 F.2d 1, 7-8 (1st Cir. 1981); *Southern Utah Wilderness Alliance v. Thompson*, 811 F. Supp. 635, 641 (D. Utah 1993). Here, even if defendants' failure to prepare an SEIS violated NEPA, this harm is outweighed by the harm to the public by allowing an injunction to issue.

16. Congress has mandated that the nation's stockpile of lethal chemical weapons be destroyed and has designated the U.S. Department of the Army to carry out this directive. Pub. L. 99-145 (codified as amended at 50 U.S.C. § 1521 (1996)). The deadline for destruction of the stockpile, originally set for 1994, has been extended to December 31, 2004, less [\*\*47] than eight years from now. Pub. L. 102-484 (1993). This Congressional mandate is further evidence of the public's interest in the prompt disposal of the stockpile.

17. Having carefully considered all of these factors, the court concludes that the harms balance in favor of defendants and that the public interest is best served by the continued destruction of chemical agent at TOCDF.

#### Likelihood of Success on the Merits

18. A federal agency's duties under NEPA do not end when an initial decision is made or when an EIS is prepared. *Marsh*, 490 U.S. at 371-72. Rather, there are circumstances which require an agency to supplement and EIS. According to regulations promulgated by the Council on Environmental Quality, an EIS must be

supplemented if an "agency makes substantial changes in a [project] that are relevant to environmental concerns; or ... [if] there are significant new circumstances or information relevant to environmental concerns. [\*1098] and bearing on the [project] or its impacts." 40 C.F.R. § 1502.9(c)(1)(i) & (ii) (1996); see also *Marsh*, 490 U.S. at 374 ("if there remains major Federal action to occur, and if the new information is sufficient to show that [\*\*48] the remaining action will affect the quality of the human environment in a significant manner or to a significant extent not already considered, a supplemental EIS must be prepared" (citations and internal quotations omitted)). Not all new information requires a SEIS; information must be "significant" to trigger the need for supplementation. See *Wisconsin v. Weinberger*, 745 F.2d 412, 420 (7th Cir. 1984) (duty to supplement EIS not triggered simply because information is "worthy of further inquiry or may be considered important research").

19. The court's review of the Army's decision not to prepare a SEIS is narrow. *Marsh*, 490 U.S. at 378. "So long as the [Army's] decision not to supplement the [EIS] was not 'arbitrary and capricious,' it should not be set aside." *Id.* at 377. Because the question is a factual one that implicates the agency's technical expertise, the court must defer to the agency's informed discretion. *Id.* Such deference is not automatic. In this, as in every case involving an agency's decision to not prepare a SEIS, the court must review the record and satisfy itself "that the agency has made a reasoned decision based on its evaluation of the [\*\*49] significance -- or lack of significance -- of the new information." *Id.* at 378.

20. The new evidence which plaintiffs claim mandates a SEIS is not significant information. The operational problems encountered at TOCDF caused no injury to workers or the environment, were quickly remedied, and were the type of events common to the startup of a complex industrial facility. The evidence from the EG&G employees, when closely examined, has little probative value. The evidence regarding the dangers from emissions from the stacks is either not "new," having been previously considered by the court, or is speculative and of little merit. In short, the evidence presented by plaintiffs does not present "a seriously different picture of the likely environmental consequences of TOCDF." *Weinberger*, 745 F.2d 412 at 420. Accordingly, the court finds that the Army's decision not to prepare a SEIS was not arbitrary and capricious.

#### Conclusion

21. In light of the above analysis, the court finds that plaintiffs have failed to show that they or the public will be irreparably harmed during the pendency of this action. The court also finds that the public interest favors continued operation [\*\*50] of TOCDF and that plaintiffs have failed to show a sufficient likelihood of success on the merits to support a preliminary injunction. Plaintiffs' second motion for a

preliminary injunction is therefore DENIED.

DATED this 24 day of March, 1997.

BY THE COURT:

TENA CAMPBELL

United States District Judge

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**CHEMICAL WEAPONS WORKING GROUP, INC. (CWWG); SIERRA CLUB; and VIETNAM VETERANS OF AMERICA FOUNDATION, Plaintiffs - Appellants, v. UNITED STATES DEPARTMENT OF THE ARMY; UNITED STATES DEPARTMENT OF DEFENSE; and EG&G DEFENSE MATERIAL, INC., Defendants - Appellees.**

No. 96-4166

**UNITED STATES COURT OF APPEALS FOR THE TENTH CIRCUIT**

*111 F.3d 1485; 1997 U.S. App. LEXIS 7926; 44 ERC (BNA) 1683; 27 ELR 21130*

April 22, 1997, Filed

**PRIOR HISTORY:**

[\*\*1] APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF UTAH. (D.C. No. 96-CV-425). D.C. Judge Campbell.

**DISPOSITION:**

AFFIRMED.

**COUNSEL:**

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**JUDGES:**

Before PORFILIO, EBEL and HENRY, Circuit Judges.

**OPINION BY:**

PORFILIO

**OPINION:**

[\*1487] PORFILIO, Circuit Judge.

In this [\*\*2] appeal, Appellants Chemical Weapons Working Group, Inc., Sierra Club, and Vietnam Veterans of America Foundation (Plaintiffs) argue that the district court erred in denying their request for a preliminary injunction and in dismissing their claims under the Clean Water Act, Resource Conservation and Recovery Act, 1986 Department of Defense Authorization Act, and Administrative Procedures Act. Finding none of their arguments persuasive, we affirm.

**I.**

In 1985, Congress directed the Department of Defense to destroy the nation's stockpile of lethal chemical weapons, which is currently located at Johnston Island in the Pacific Ocean and at eight different sites in the continental United States. One of these sites, Tooele Chemical Agent Disposal Facility near Tooele, Utah, stores just over 40% of the nation's 30,000 tons of chemical warfare agent. Tooele's stockpile consists of both nerve and blister agents contained in a variety of bulk containers and munitions, some of which contain "energetics" (explosives and propellants) that also require disposal. This appeal results from a dispute over how to best implement the 1985 mandate: by incinerating the chemical weapons immediately [\*\*3] or by storing them pending the

development of feasible incineration alternatives.

In 1986, the Army completed and circulated a Draft Environmental Impact Statement, which considered the environmental consequences of continued storage of the nation's chemical weapons stockpile compared to different logistical arrangements for its immediate disposal. The following year, the Army completed a quantitative risk assessment, concluding that the accident risk associated with continued stockpile storage significantly outweighed that associated with disposal operations. The Army used this assessment to support its 1988 Final Programmatic Environmental Impact Statement and Record of Decision, which selected on-site incineration as the means by which chemical weapons would be destroyed nationwide. At that time, the Army rejected alternatives to incineration as either unreasonable or premature. In 1989, the Army issued a site-specific Final Environmental Impact Statement and Record of Decision for Tooele, adopting the 1988 Final Programmatic Environmental Impact Statement conclusions and choosing on-site incineration as the method of destroying the chemical weapons stored there.

Before allowing [\*\*4] the Army to proceed with its incineration plan, Congress required it to conduct Operational Verification Testing of the Johnston Atoll Chemical Agent Disposal System, a full-scale, operational chemical weapons incineration plant on Johnston Island [\*1488] that was designed to serve as the prototype for incinerators at other stockpile sites such as Tooele. In 1993, the Secretary of Defense certified to Congress that testing at Johnston Atoll was complete, verifying that the operation there had been a success. The MITRE Corporation, a private contractor, was engaged by the Army to monitor, evaluate and report its operational testing results. The National Research Council's Committee on Review and Evaluation of the Army Chemical Stockpile Disposal Program (Stockpile Committee) was also chartered to monitor the Army's testing at Johnston Atoll and to review the test results reported by the MITRE Corporation. In its 1993 report, the MITRE Corporation concluded that although improvements could be made in the incineration technology used, Johnston Atoll had "no apparent fundamental safety, environmental, or process-related problems." Similarly, the Stockpile Committee concluded in 1994 that although [\*\*5] Johnston Atoll had some operational problems, none were "show stoppers" for other chemical incineration plants.

In 1994, the Stockpile Committee also issued a report endorsing the Army's choice of incineration as the means by which to destroy the nation's chemical

weapons stockpile. In that report, the Committee found there was no feasible alternative to incineration for the destruction of energetics, although it recommended that the Army update its 1987 quantitative risk assessment and continue to evaluate alternative technologies for sites other than Tooele. The Stockpile Committee report also considered the chronic health risks associated with routine incineration operations, concluding that alternative technologies would affect only a fraction of the releases caused by incineration and that "any reduction in disposal risk afforded by an alternative technology will be more than offset by the larger cumulative risk from extended storage." The Committee therefore recommended that disposal operations proceed without delay. In response to the Stockpile Committee's report, the Army performed a site-specific quantitative risk assessment for Tooele in 1995, again concluding that the accident-associated [\*\*6] risk of continued stockpile storage significantly outweighed that of incineration operations. n1

n1 Specifically, the 1995 assessment found that the accident risk associated with 11 days of continued stockpile storage approximated that associated with 6.2 years of incineration operations. For individuals living closest to Tooele, the fatality risk from accidents was found to be 100 times greater for continued stockpile storage versus incineration operations.

In May 1996, Plaintiffs brought this action, alleging violations of various environmental protection acts. In one of those allegations, Plaintiffs claimed that the Army violated the National Environmental Policy Act by failing to prepare a Supplemental Environmental Impact Statement on the basis of significant new information relevant to environmental concerns. The Army responded in part by preparing a Record of Environmental Consideration in July 1996, which concluded that no new, significant information had developed since its 1988 Final Programmatic Environmental [\*\*7] Impact Statement and 1989 site-specific Final Environmental Impact Statement were issued that would require the preparation of a supplemental environmental statement. Attached to the Record of Environmental Consideration was an 84-page report evaluating new information on dioxin emissions and alternative technologies. This report also discussed the problems experienced at Johnston Atoll, concluding that although the operation there had not been perfect, it had safely and effectively disposed of chemical agent and had not resulted in significant environmental impacts not already contemplated.

Presently, the Army has all permits necessary to operate Tooele. The Utah Department of Environmental Quality has issued both Clean Air Act and Resource Conservation and Recovery Act permits under its delegated authority from the Environmental Protection Agency. The Army has thus far conducted two trial burns at Tooele without chemical agent to determine whether the facility can destroy agent and other materials without releasing a significant amount of toxins into the environment. The Utah Department of Environmental Quality has approved the results of both tests. Presumably, the Army is now [\*\*8] in the process of conducting trial burns with live agent, the results of [\*1489] which must also be approved by Utah before Tooele can become fully operational.

## II.

After extensive hearings, the district court denied Plaintiffs' request for a preliminary injunction of the Army's scheduled incineration operations at Tooele because none of the requirements for injunctive relief had been met. First, the court found Plaintiffs had failed to establish irreparable harm because the health risks associated with the Army's incineration operations were too speculative, while Plaintiffs' allegation of a National Environmental Policy Act violation was, without more, insufficient to meet the irreparable harm requirement. Next, the court found Plaintiffs had failed to meet the balance of harms requirement for injunctive relief, relying principally on the Army's 1987 and 1995 quantitative risk assessment results. Finally, the district court held Plaintiffs were unlikely to prevail on the merits of their claim under the National Environmental Policy Act because the Army's 1996 Record of Environmental Consideration was entitled to deference and because the Army was entitled to rely on its own experts [\*\*9] in determining whether a Supplemental Environmental Impact Statement was warranted.

We review a district court's denial of a preliminary injunction for abuse of discretion. *Lundgrin v. Claytor*, 619 F.2d 61, 63 (10th Cir. 1980). "An abuse of discretion occurs only when the trial court bases its decision on an erroneous conclusion of law or where there is no rational basis in the evidence for the ruling." *In re Coordinated Pretrial Proceedings in Petro. Prod. Antitrust Litig.*, 669 F.2d 620, 623 (10th Cir. 1982). Because a preliminary injunction is an extraordinary remedy, "the right to relief must be clear and unequivocal." *SCFC ILC, Inc. v. Visa USA, Inc.*, 936 F.2d 1096, 1098 (10th Cir. 1991).

To obtain injunctive relief, a party must establish that: (1) it will suffer irreparable injury unless an

injunction is issued; (2) its threatened injury outweighs any harm the proposed injunction may cause to the opposing party; (3) it will likely prevail on the merits of the litigation; and (4) an injunction, if issued, would not be adverse to the public interest. *Lundgrin*, 619 F.2d at 63. Because the district court's balance of harms analysis is dispositive [\*\*10] on this point of appeal, we consider it first.

On appeal, Plaintiffs argue that the district court's balance of harms finding is clearly erroneous because it overestimates the accident-related risk of continued storage, while underestimating the chronic health-related risks of routine incineration operations. We disagree. Although Plaintiffs' evidence on the health-related risks of short-term dioxin exposure is significant, we cannot conclude that the district court's finding on this issue is without any rational basis. To the contrary, the court's conclusion is amply supported by the results of the Army's 1987 and 1995 quantitative risk assessments as well as the Stockpile Committee's 1994 report, which specifically considered the health-related risks associated with routine incineration operations. We therefore affirm the district court's denial of Plaintiffs' request for a preliminary injunction on the basis of its balance of harms finding, obviating the need to address Plaintiffs' other arguments justifying a preliminary injunction in this instance. Because we conclude the district court properly denied injunctive relief, we also do not address Plaintiffs' claim that a remand [\*\*11] is necessary to consider the effect a preliminary injunction would have on the public interest. n2

n2 We note, however, that any duty the district court had to consider the public interest was discharged implicitly in its balance of harms analysis. *See Autoskill, Inc. v. National Educ. Support Sys., Inc.*, 994 F.2d 1476, 1499 (10th Cir. 1993) (district court implicitly addressed public interest requirement for injunctive relief).

## III.

Plaintiffs next argue the district court erred in holding § 301(f) of the Clean Water Act does not apply to Tooele's stack emissions, dismissing their count under that section for failure to state a claim upon which relief can be granted. Plaintiffs reason that § 301(f)'s ban on the discharge of chemical [\*1490] warfare agent into navigable waters must apply to Tooele's stacks because the text of that provision places no limitation on the form of chemical agent discharged or on the manner in which it enters navigable waters.

Absent such limitations, Plaintiffs urge [\*\*12] us to read § 301(f) broadly to include discharge by way of atmospheric deposition to effectuate congressional intent to keep the nation's navigable waters clean.

We review de novo a district court's dismissal of a cause of action for failure to state a claim upon which relief can be granted. *Edwards v. International Union, United Plant & Guard Workers of Am.*, 46 F.3d 1047, 1050 (10th Cir. 1995). As is true when we construe any statute, the plain language of the provision controls absent an irrational result. *Edwards v. Valdez*, 789 F.2d 1477, 1481 (10th Cir. 1986). We must also construe apparently conflicting statutes harmoniously where possible. *United States v. State of Colo.*, 990 F.2d 1565, 1575 (10th Cir. 1993). Because Plaintiffs' interpretation of § 301(f) of the Clean Water Act is inconsistent with congressional intent, leads to irrational results, and creates a conflict between the Clean Water Act and Clean Air Act, we decline to construe that provision in the broad manner proposed by Plaintiffs.

Section 301(f) of the Clean Water Act provides that "it shall be unlawful to discharge any radiological, chemical, or biological warfare agent, any high-level [\*\*13] radioactive waste, or any medical waste into the navigable waters." 33 U.S.C. § 1311(f). Because both parties agree that § 301(f)'s ban is absolute, application of this provision to Tooele's stack emissions would effectively shut down its incineration operations indefinitely. This result, however, is completely at odds with congressional knowledge, approval, and funding of incineration as the baseline technology for destroying chemical weapons since 1986, when the Army first submitted its disposal program to Congress. We therefore reject Plaintiffs' proposed construction of § 301(f) because it is clearly inconsistent with congressional intent to implement Tooele's incineration plan.

We also reject Plaintiffs' construction of § 301(f) of the Clean Water Act because it would lead to irrational results. Because Clean Water Act § 301(a) regulates the discharge of any pollutant into navigable waters, *see* § § 1311(a), 1362(12), Plaintiffs' broad construction of the phrase "discharge ... into the navigable waters" under § 301(f) would necessarily result in regulation under § 301(a) of any air emission that might possibly result in atmospheric deposition into navigable waters. [\*\*14] While Plaintiffs argue that the Environmental Protection Agency could issue a nationwide permit "for sources of water pollution such as cars and chimneys" to the extent § 301(a) would apply, the very thought of regulating car emissions under the Clean Water Act exposes the absurdity of their position. Tellingly, Plaintiffs also fail to cite a

single instance in which stack emissions are regulated under the Clean Water Act. We therefore conclude that under the facts of this case, they are not. Although Plaintiffs may be correct in arguing that an object may fly through the air and still be "discharged ... into the navigable waters" under the Clean Water Act, common sense dictates that Tooele's stack emissions constitute discharges into the air--not water--and are therefore beyond § 301(f)'s reach. n3

n3 Likewise, we reject Plaintiffs' claim that Tooele's stack emissions constitute discharge into navigable waters because in other instances, this court has recognized jurisdiction under the Clean Water Act where pollutants were discharged into ground or surface water that in turn flowed into navigable water. *See, e.g., Quivira Mining Co. v. United States Envtl. Prot. Agency*, 765 F.2d 126 (10th Cir. 1985). Without determining the precise jurisdictional limits of the Clean Water Act, we hold only that Tooele's stack emissions, unlike other indirect discharges, lack the requisite nexus to navigable waters to render them subject to regulation under that statute.

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Finally, we reject Plaintiffs' proposed construction of § 301(f) because in this instance, it would create a regulatory conflict between the Clean Water Act and Clean Air Act. Plaintiffs do not deny that under delegated authority by the Environmental Protection Agency, Utah has issued the Army a Clean Air Act permit for Tooele to discharge limited amounts of chemical warfare agent particles into the atmosphere. Because Tooele's Clean Air Act permit specifically allows the discharges that Plaintiffs claim are barred [\*\*1491] under Clean Water Act § 301(f), applying that provision to Tooele's stack emissions would create an irreconcilable conflict between the two regulatory regimes. n4 We decline Plaintiffs' invitation to create such a conflict, especially since the pollution effects of atmospheric deposition are expressly considered and regulated under the Clean Air Act. *See, e.g., 42 U.S.C. § 7403(e)(4)* (requiring Environmental Protection Agency to evaluate "the effects of air pollution on water quality"); § § 7651(a)-(o) (regulating pollution sources of acid rain). We therefore hold that § 301(f) of the Clean Water Act does not apply to Tooele's stack emissions because they do [\*\*16] not constitute discharge into navigable waters, despite the broad language and policy goals of that provision. *See also Train v. Colorado Pub. Interest Research Group*,

*Inc.*, 426 U.S. 1, 48 L. Ed. 2d 434, 96 S. Ct. 1938 (1976) (radioactive materials regulated under Federal Water Pollution Control Act do not include substances already subject to regulation under the Atomic Energy Act, despite the absence of limiting language in statute). As a result, we do not address the Army's alternative arguments that § 301(f) is inapplicable because Tooele does not discharge chemical warfare agent and because any discharge into navigable waters does not come from a discernable point source.

n4 We defenestrate plaintiffs' suggestion that the Army's Clean Air Act permit is somehow inferior to the result required under the Clean Water Act because it was issued by the Utah Department of Environmental Quality, rather than the Environmental Protection Agency. Under the Clean Air Act, this distinction is without a difference because Utah had federally-delegated authority and employed permit standards no less stringent than those promulgated by the Environmental Protection Agency. § 7412(I)(1).

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#### IV.

Plaintiffs next argue the district court erred in dismissing their imminent hazard claim under the Resource Conservation and Recovery Act for lack of subject matter jurisdiction. The district court reasoned that Plaintiffs' claim was essentially a collateral attack on the Army's permit under the Act because it challenged Utah's finding in issuing the permit that Tooele's incineration operations would not constitute an imminent hazard to human health or the environment. As a result, the court held that Plaintiffs' claim was barred under 42 U.S.C. § 6972(b)(2)(D), which expressly forbids citizen suits to restrain or enjoin the issuance of Resource Conservation and Recovery Act permits.

Plaintiffs argue the district court's ruling should be reversed because they are attempting to enjoin permitted activities that create an imminent hazard, not the issuance of a Resource Conservation and Recovery Act permit. According to Plaintiffs, that Act's citizen suit provision for imminent hazards must allow claims against permitted activity because another citizen suit provision already allows for claims against facilities operating in violation of permit conditions or without [\*\*18] any permit at all. Plaintiffs additionally maintain that Tooele's permit specifically states that

compliance with permit conditions does not constitute a defense to an imminent hazard claim under the citizen suit provision. Finally, Plaintiffs argue that reversing the district court in this instance would vindicate the dual-purpose of the imminent hazard citizen suit provision: to grant citizens enforcement powers equal to those enjoyed by the Environmental Protection Agency and to prevent all imminent hazards to human health and the environment.

We review a district court's dismissal of a claim for lack of subject matter jurisdiction de novo. *Olguin v. Lucero*, 87 F.3d 401, 403 (10th Cir. 1996). Where a statute is susceptible to two meanings, we will choose the one that gives full effect to all of its provisions. *Negonsott v. Samuels*, 933 F.2d 818, 819 (10th Cir. 1991), *aff'd* 507 U.S. 99, 122 L. Ed. 2d 457, 113 S. Ct. 1119 (1993). Because allowing Plaintiffs' imminent hazard claim to proceed in this instance would ignore the Resource Conservation and Recovery Act's ban on suits to enjoin the issuance of permits while undermining its limited provisions for judicial review of permit decisions, [\*\*19] we affirm.

Under § 6972(a)(1)(B) of the Resource Conservation and Recovery Act, any person [\*\*1492] may bring an action against anyone else "who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment." 42 U.S.C. § 6972(a)(1)(B). This provision is limited only by § 6972(b)'s bar on suits "to restrain or enjoin the issuance of a permit." § 6972(b)(2)(D). For individuals desiring to judicially challenge the issuance of a Resource Conservation and Recovery Act permit, § 6976(b) provides for direct appeal of Environmental Protection Agency permit decisions to the circuit court of appeals in which the individual resides within 90 days of the permit decision at issue, unless the application for review is based on information that arose after the 90-day period has expired. § 6976(b). All challenged permit decisions are considered under the "arbitrary and capricious" standard of review. *See id.*; 5 U.S.C. § 706. Thus, by its own terms, the Resource Conservation and Recovery Act does not allow collateral [\*\*20] attacks on Environmental Protection Agency permit decisions or those of state agencies with federally-delegated authority. *See* § 6976(b) (state-issued permits under the Resource Conservation and Recovery Act have same force and effect as those issued by Environmental Protection Agency).

Because Plaintiffs' imminent hazard claim essentially attacks Utah's decision to issue the Army a Resource Conservation and Recovery Act permit, we

conclude that the district court properly refused to recognize jurisdiction under § 6972(b). The Resource Conservation and Recovery Act's implementing regulations provide that the Environmental Protection Agency may not issue a permit for trial burns without first having determined that they "will not present an imminent hazard to human health or the environment." 40 C.F.R. § 270.62(b)(5)(ii). Under Utah's parallel regulatory provisions, the Executive Secretary of the Utah Solid and Hazardous Waste Control Board, a division of the Utah Department of Environmental Quality, was required to make the exact same finding before issuing Tooele's Resource Conservation and Recovery Act permit under its federally-delegated authority. Because Plaintiffs' [\*\*21], imminent hazard claim directly challenges this finding, we are unable to construe it as anything other than a collateral attack on the Executive Secretary's permit decision itself. Indeed, recognizing jurisdiction in this case would severely undermine the limited judicial review of agency permit decisions provided under the Resource Conservation and Recovery Act, allowing disgruntled individuals to circumvent the Act's 90-day window for directly challenging such decisions and deferential standard of review. *See also Greenpeace, Inc. v. Waste Tech. Indus.*, 9 F.3d 1174 (6th Cir. 1993) (imminent hazard citizen suit against facility operating within confines of Resource Conservation and Recovery Act permit constitutes impermissible collateral attack on Environmental Protection Agency permit decision); *Palumbo v. Waste Tech. Indus.*, 989 F.2d 156 (4th Cir. 1993) (same).

Plaintiffs' arguments to the contrary are unpersuasive. While insisting that the focus of their imminent hazard claim is not on the permit process itself, Plaintiffs concede that in this instance, the only consequence of their suit would be to enjoin the Army's operations at Tooele entirely. That being [\*\*22] the case, Plaintiffs' claim is indistinguishable from other attempts to enjoin the issuance of the Army's Resource Conservation and Recovery Act permit, although in this case the attempt is made retroactively. Plaintiffs' statutory construction argument based on the text of the Resource Conservation and Recovery Act and Tooele's permit under that Act is equally unpersuasive. Because the Army agrees that an imminent hazard citizen suit may be brought for permitted activity so long as it is based on information not already considered in the permit process Plaintiffs' claim that they must be able to sue for permitted activity is, without more, inapposite. n5 While we [\*1493] agree with Plaintiffs that any limitation on the citizen suit provision creates a disparity between the enforcement powers enjoyed by the Environmental Protection Agency and concerned individuals, we conclude that this disparity was created

by Congress because only the citizen suit provision is limited by § 6972(b). The Environmental Protection Agency, by contrast, may sue for imminent hazard at any time. *See* § 6973(a).

n5 The Army's position on this issue is consistent with that espoused by the Environmental Protection Agency in *Shell Oil Company v. Environmental Protection Agency*, 292 U.S. App. D.C. 332, 950 F.2d 741 (D.C. Cir. 1991). In *Shell Oil*, the Agency represented to the D.C. Circuit that a Resource Conservation and Recovery Act permit would "narrow the opportunities" for citizen suits, though it would not preclude them entirely. 950 F.2d at 763. As a result, Plaintiffs' reliance on this decision is misplaced.

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We therefore conclude Plaintiffs' imminent hazard claim constitutes an impermissible collateral attack on Utah's decision to issue the Army a Resource Conservation and Recovery Act permit under its federally-delegated authority. Because we hold that the district court properly refused to recognize jurisdiction over this claim under § 6972(b), we do not address the Army's alternative argument that jurisdiction was properly declined on abstention grounds.

V.

Finally, Plaintiffs argue that the district court erred in dismissing their maximum protection and Operational Verification Testing counts for failure to state a claim upon which relief could be granted. Plaintiffs first contend that the 1986 Department of Defense Authorization Act provides an implied private right of action for their maximum protection claim because it is mandatory in tone and was especially created to benefit the general public, a class to which they belong. Plaintiffs further argue that absent an implied private right of action under the 1986 Act, Congress' maximum protection mandate will have no enforcement mechanism at all. Next, Plaintiffs contend that their maximum protection and Operational Verification [\*\*24] Testing counts state a claim under the Administrative Procedures Act because they challenge reviewable agency actions: the Army's decision to commence trial burns at Tooele and its completion and certification of operational testing at Johnston Atoll. According to Plaintiffs, the Army's decision to commence trial burns is reviewable under the Administrative Procedures Act as either an agency

order or informal agency action.

We review the district court's dismissal of Plaintiffs' maximum protection and Operational Verification Testing claims de novo. *Edwards*, 46 F.3d at 1050. In this instance, both claims arise out of language found in the 1986 Department of Defense Authorization Act, codified at 50 U.S.C. § 1521. Section 1521(c) of the 1986 Act requires the Army to provide "maximum protection for the environment [and] the general public" in destroying the nation's chemical warfare agent stockpile. 50 U.S.C. § 1521(c)(1)(A). Section 1521(k), which was added in 1989, requires the Army to complete operational testing at Johnston Atoll before destroying chemical weapons elsewhere and to certify to Congress through the Secretary of Defense that such testing has been successfully [\*\*25] completed. n6 §§ 1521(k)(1), (2). Because Plaintiffs fail to convince us that either of their claims present a cause of action under the 1986 Authorization Act or Administrative Procedures Act, we affirm.

n6 Plaintiffs' maximum protection claim alleges that the Army's incineration operations do not afford maximum protection to the environment and general public, while their Operational Verification Testing claim alleges that the Army's testing at Johnston Atoll is both inaccurate and incomplete.

We first consider Plaintiffs' contention that the 1986 Defense Authorization Act provides an implied private right of action for their maximum protection claim because, as discussed later, review under the Administrative Procedures Act is available only if there exists no other remedy in court. *See* 5 U.S.C. § 704. In determining whether an implied private right of action exists under a particular statute, the focus is solely on congressional intent. *Sonnenfeld v. City and County of Denver*, 100 F.3d 744, [\*\*26] 747 (10th Cir. 1996). Given the indications of congressional intent relied on by Plaintiffs to assert an implied private right of action under the 1986 Authorization Act, we conclude that the Supreme Court's decision in *California v. Sierra Club*, 451 U.S. 287, 68 L. Ed. 2d 101, 101 S. Ct. 1775 (1981), is sufficiently analogous to control on this point of appeal.

[\*1494] In *Sierra Club*, the Court held the 1899 Rivers and Harbors Appropriation Act did not imply a private right of action, despite the fact that the plaintiffs in that action were members of the class for whom the statute was passed: the general public. 451

*U.S. at 294-95*. Commenting on its earlier decision in *Cort v. Ash*, 422 U.S. 66, 45 L. Ed. 2d 26, 95 S. Ct. 2080 (1975), the Court explained, "the question is not simply who would benefit from the Act, but whether Congress intended to confer federal rights upon those beneficiaries." *Sierra Club*, 451 U.S. at 294. The Court then concluded the general proscription stated in the 1899 Act was intended to be enforced through "a general regulatory scheme" administered under the then Secretary of War, not through the vindication of private rights. 451 U.S. at 298.

Given the decision in *Sierra* [\*\*27] *Club*, Plaintiffs have not persuaded us the 1986 Defense Authorization Act provides an implied private right of action just because it is mandatory in tone and was passed to benefit the general public. Because Plaintiffs provide no indication that Congress intended to confer federal rights upon the beneficiaries it identified in the 1986 Act, we cannot conclude it intended for the Army's mandate to be privately enforceable.

Similarly, Plaintiffs are incorrect that absent an implied private right of action, Congress' 1986 maximum protection mandate would be completely unenforceable. Like the 1899 Act considered in *Sierra Club*, Congress' 1986 maximum protection mandate is fully enforceable through a general regulatory scheme, comprised in this instance by the myriad of environmental statutes that regulate the Army's incineration operations at Tooele. Recognizing that the Court has been "especially reluctant to imply causes of actions under statutes that create duties on the part of persons for the benefit of the public at large," *Cannon v. University of Chicago*, 441 U.S. 677, 693 n.13, 60 L. Ed. 2d 560, 99 S. Ct. 1946 (1979), we affirm the district court's determination that the 1986 Defense [\*\*28] Authorization Act does not imply a private right of action for Plaintiffs' maximum protection claim.

We also affirm the district court's determination that it lacked jurisdiction to consider Plaintiffs' maximum protection and Operational Verification Testing claims under the Administrative Procedures Act. Judicial review under the Administrative Procedures Act is available only for "agency action made reviewable by statute and final agency action for which there is no other adequate remedy in a court." 5 U.S.C. § 704. "Agency action" under the Act is defined as "the whole or a part of an agency rule, order, license, sanction, relief, or the equivalent or denial thereof, or failure to act." § 551(13). The term "order" is defined as "the whole or part of a final disposition, whether affirmative, negative, injunctive, or declaratory in form, of an agency in a matter other than rule making but including licensing." § 551(6).

Because Plaintiffs' maximum protection and testing claims are not reviewable by statute, they must challenge "final agency action" to confer upon the district court jurisdiction under the Administrative Procedures Act.

Given the Administrative Procedures Act's [\*\*29] definition of the terms "agency action" and "order," we conclude Plaintiffs' maximum protection claim is not reviewable under that statute. Assuming Plaintiffs sufficiently apprised the district court of the particular agency action they challenge, we nevertheless fail to see how the Army's decision to commence trial burns at Tooele qualifies as final agency action. Plaintiffs provide no indication that the Army has ever revisited the question of how precisely it planned to destroy the chemical weapons at Tooele since its 1989 Final Environmental Impact Statement. That being the case, we have no basis upon which to conclude the Army's actions at Tooele after 1989 constitute a "final disposition ... in a matter," rather than the implementation of a "final disposition" already made. See § 551(6). Because Plaintiffs do not deny 28 U.S.C. § 2401's six-year statute of limitations applies to suits under the Administrative Procedures Act, they are also unable to challenge the Army's 1989 Final Environmental Impact Statement conclusions. See also *Sierra Club v. Penfold*, 857 F.2d 1307, 1315 (9th Cir. 1988) (six-year general [\*\*1495] statute of limitations applies to actions under [\*\*30] the Administrative Procedures Act). We therefore hold that the district court's dismissal of Plaintiffs' maximum protection claim under the Administrative Procedures Act was proper because it failed to challenge a reviewable agency order.

Plaintiffs' reliance on *Anderson v. U.S. Department of Housing and Urban Development*, 701 F.2d 112 (10th Cir. 1983), to argue in the alternative that the Army's incineration operations constitute

"informal agency action" reviewable under the Administrative Procedures Act is misplaced. Although the court in *Anderson* characterized a decision by the Department of Housing and Urban Development as "informal agency action," *id. at 113*, it did not hold that the Department's decision was therefore something other than "agency action" as defined by the Administrative Procedures Act. To the contrary, the decision not to accept a mortgage assignment could easily be construed as a "final disposition ... in a matter," thereby qualifying as an agency order under the Administrative Procedures Act.

Plaintiffs' Operational Verification Testing claim under the Administrative Procedures Act is equally without merit because they fail [\*\*31] to explain how the Army's operational testing at Johnston Atoll constitutes a "rule, order, license, sanction, relief, or the equivalent or denial thereof, or failure to act." See 5 U.S.C. § 551(13). We also fail to comprehend how the Army's completion of operational testing can qualify as final agency action under the Administrative Procedures Act. Construing the agency action challenged as the Secretary of Defense's certification to Congress that testing was complete is similarly unhelpful. See *American Trucking Assoc. v. United States*, 755 F.2d 1292, 1297 (7th Cir. 1985) (agency reports do not constitute "agency action" under Administrative Procedures Act because they do not change law or policy); *Industrial Safety Equip. Ass'n, Inc. v. Environmental Protection Agency*, 267 U.S. App. D.C. 112, 837 F.2d 1115, 1120 (D.C. Cir. 1988) (same). We therefore affirm the district court's dismissal of both claims asserted under the Administrative Procedures Act, along with its rulings on Plaintiffs' first three points of appeal.

AFFIRMED.



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BEFORE THE UTAH SOLID AND HAZARDOUS  
WASTE CONTROL BOARD

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IN THE MATTER OF:

The Tooele Chemical Agent  
Disposal Facility's Permit  
and Permit Modifications

\*  
\* ORDER  
\*

EPA ID No. UT5210090002  
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This matter came before the Utah Solid and Hazardous Waste Control Board (the Board) for hearing on March 18-20 and April 17, 1997 on the First and Second Requests for Agency Action by the Petitioners, Chemical Weapons Working Group, Inc., Sierra Club and the Vietnam Veterans of America Foundation. Also participating were the Respondents, U.S Department of the Army (Army) and EG&G Defense Materials, Inc. (EG&G), and the Executive Secretary. The parties were represented by counsel. A quorum of Board members was present and voted on the motions resulting in this Order. The hearing was conducted as a formal hearing under the authority of the Utah Administrative Procedures Act, Utah Code Ann. section 63-46b-1 et seq. (1953, as amended), and Utah Admin. Code R315.

The Board, having reviewed the record in this matter, and upon consideration of the pleadings, evidence and arguments of counsel, voted to deny the First and Second Requests for Agency Action, for the reasons on that day orally assigned. The Board hereby issues its written Findings of Fact, Conclusions of Law, Statement of Reasons for Decision, and Order, as required by Utah Code Ann. section 63-46b-12.

## FINDINGS OF FACT

### EG&G As Co-Permittee

1. When the Executive Secretary of the Utah Solid and Hazardous Waste Control Board (Executive Secretary) approved a hazardous waste facility operation plan (plan or permit) for the Tooele Chemical Agent Disposal Facility (TOCDF) in 1989, he issued the permit to the Tooele Army Depot as owner and operator. Since the Army had ultimate responsibility for ownership and operation of the facility, the Executive Secretary properly determined that EG&G need not be included in the permit as a co-permittee.

2. The Executive Secretary, at his discretion, approved a permit modification on or about June 18, 1996, adding EG&G, a contractor working for the Army at TOCDF, as co-permittee.

### Falsification of Temperature Reading

3. On or about January 9, 1997, an employee of TRC Environmental Corporation, a subcontractor to EG&G, intentionally recorded false information in connection with a temperature reading during a trial burn. The incident was investigated after being discovered by a state inspector and EG&G representatives, and the trial burn data for that incident were discarded and not used. EG&G ordered its subcontractor to permanently remove the employee from TOCDF. TRC agreed and did so.

### Approval of Trial Burn Plans and TOCDF Operations

4. On June 18, 1996 and June 26, 1996, respectively, the Executive Secretary approved the Deactivation Furnace and Liquid Incinerator Agent Trial Burn Plans. Prior to approval of the trial burn plans, the Executive Secretary required the successful completion of surrogate trial

burns in both the Deactivation Furnace System (DFS) and the Liquid Incinerator (LIC). The plans for these surrogate trial burns were published for a public comment period with public meetings scheduled during the comment period. After considering the public comments, the Executive Secretary approved the surrogate trial burn plans. The Board finds and concludes that the Executive Secretary properly approved the trial burns and TOCDF agent operations for the TOCDF facility.

5. In their Second Request for Agency Action, Petitioners alleged four bases for setting aside the Executive Secretary's approval of the trial burn plans. These allegations were that the TOCDF: (1) poses an imminent threat to human health and the environment; (2) that it could not prevent or minimize releases; (3) that it could not achieve the required Destruction and Removal Efficiency (DRE); and (4) that it did not meet emergency preparedness requirements.

6. Before becoming fully operational, TOCDF has scheduled four trial burns for the DFS: (1) a "shakedown burn" with no agent; (2) an "R&D burn" with no agent; (3) a "shakedown burn" with agent; and (4) a "demonstration burn" with agent. TOCDF completed the first two burns in the DFS prior to August 22, 1996. The successful completion of these burns formed a strong basis to believe that TOCDF would complete the agent trial burns successfully.

7. Before agent operations, pursuant to a permit (the "R&D Permit") issued by the U.S. Environmental Protection Agency (EPA) under the federal Toxic Substances Control Act (TSCA), TOCDF conducted a trial burn which was intended to test, and ultimately did show, that the DFS was capable of incinerating PCBs to the regulatory 99.9999% ("six nines") level.

8. TOCDF also completed surrogate trial burns (STB) in the Liquid Incinerator #1

("LIC-1") and the DFS, and a TSCA research and development test burn in the DFS. The LIC-1 STB was conducted in June-July, 1995, and the DFS STB was conducted in October, 1995. The destruction removal efficiency achieved for each test was in excess of the six-nines required. The results of the tests were summarized in reports submitted to the Executive Secretary and the Utah Division of Solid and Hazardous Waste (DSHW).

9. The Executive Secretary issued the required approvals to initiate agent shakedown operations in preparation for trial burns with GB-filled M55 rockets. This approval included, but was not limited to, finalization of the screening risk assessment and approval of the LIC and the DFS agent trial burn plans. A letter summarizing approval to start agent shakedown operations was signed by the Executive Secretary on June 26, 1996.

10. The Board finds that the facility does not pose an imminent threat to human health and the environment, that TOCDF can prevent or minimize releases, that the facility can achieve the required DRE, and that it meets emergency preparedness requirements. With proper responses to incidents or concerns, appropriate reviews and changes in or temporary suspensions of operations, the Army and EG&G have operated the facility in such a way as to minimize the release of hazardous waste and to avoid imminent hazards and mitigate any impacts to public health.

#### Screening Health Risk Assessment

11. Prior to approving trial burns of chemical agent at TOCDF, DEQ through its contractor, A.T. Kearney, performed a Screening Health Risk Assessment (SRA) which analyzed the impacts of the expected TOCDF emissions on human health and the environment. The SRA followed applicable EPA guidance.

12. In keeping with the EPA guidance and current risk assessment practice, the SRA used conservative assumptions to determine the resulting risk estimates, including for example: (1) DEQ used maximum JACADS emissions levels, which it increased to account for the greater capacity of TOCDF, to model TOCDF air emissions; (2) DEQ assumed that emissions at TOCDF would be twice the JACADS detection limits in the cases where compounds were not detected; and (3) DEQ calculated the risks from exposure for up to thirty years of TOCDF emissions, when in fact, the facility is planned to operate for only about seven years.

13. The SRA examined the potential exposures to a hypothetical adult and child residing at the point of maximum off-site emissions, three different farmers modeled upon site-specific data and a subsistence fisherman. Each of these individuals was modeled to live north of TOCDF, which is downwind of the facility for 350 days of the year. For each of these six individuals, assuming simultaneous and continuous operation of all five furnaces and other TOCDF and CAMDS facilities for thirty years, the overall cancer and non-cancer risks were at or below EPA risk levels.

14. With respect to cancer effects of dioxin, the risk assessment used EPA's current conservative methodology to calculate overall cancer risks from TOCDF emissions and found that the overall cancer risks do not exceed EPA guidance levels for ten, fifteen and thirty-year operating periods. The SRA did not include a calculation of non-cancer effects of dioxin exposure because EPA had not adopted a reference dose for dioxin. Respondent's expert, Dr. Finley, calculated average daily intakes of dioxin for the six risk assessment scenarios used by DEQ in the SRA, and testified that these exposures should be below the level of concern for non-cancer effects.

15. Dr. Finley also calculated the cancer and non-cancer risks for a likely one-year trial burn period and determined that conservatively estimated risks were orders of magnitude below EPA target levels. He also declared that the conservatively estimated doses of dioxin to a breast fed infant were below the level of concern.

16. Respondents' medical expert, Dr. Guzelian, testified that low level environmental exposures to dioxin are unlikely to produce adverse human health consequences. EPA's Science Advisory Board also has reported that the scientific evidence compiled by EPA does not support a conclusion that adverse effects in humans may be occurring near the current exposure levels. There is insufficient evidence to conclude that low level exposures to dioxin that may be caused by operation of the facility will cause, or are likely to cause, adverse human health effects.

#### Quantitative Risk Assessment

17. Using an independent contractor, the Army arranged for preparation of both a quantitative risk assessment for the first two disposal campaigns and a comprehensive quantitative risk assessment for all TOCDF operations, performed using information specific to TOCDF, as recommended by the National Research Council. These assessments quantified the actual probability of occurrence for events leading to an accidental release of chemical agent and evaluated the potential consequences of such releases in terms of fatalities. The analysis, completed in December, 1996, confirmed the Army's earlier determination that the risks of fatalities associated with storage greatly exceed those associated with TOCDF operations. The total risks of accidental fatalities for an assumed 7.1 year period of TOCDF operations are equivalent to the risks associated with only thirty-four days of continued storage. With respect to individuals living closest to TOCDF, the risks resulting from continued storage are one hundred

times greater than the risks resulting from disposal operations.

#### Revocation/Termination of Plan Approval: Non-Compliance Issues

18. Petitioners have challenged the Executive Secretary's issuance of the plan approval and certain modifications thereto on grounds of the permittees' non-compliance with the law and the permit, and with an allegation that the Executive Secretary's actions were unsupported by substantial evidence or were arbitrary and capricious. Petitioners did not present evidence that either the Army or EG&G has had a poor compliance history on safety and environmental issues or has failed to comply with legal or permit requirements in connection with TOCDF. The Board finds no evidence sufficient to justify revocation or termination of the Army and EG&G's permit on these grounds.

#### Revocation/Termination of Plan Approval: Operational Incidents

19. Petitioners allege that the permit should be revoked or otherwise terminated because of certain incidents described in the evidence presented to the Board, namely: agent migration into filter vestibules, cracks in a concrete floor, agent migration into an observation corridor, facility response to a loss of site electrical power, fire suppression system test and temporary HVAC imbalance, agent quantification anomaly, improper hot cut-outs and the question of agent emissions in the TOCDF stack effluent gases. The Board finds no evidence sufficient to justify revocation or termination of the Army and EG&G's permit on these grounds.

20. Operations at TOCDF during the shakedown period have proceeded deliberately to ensure that full-scale operations will be conducted in a manner that maximizes the protection of TOCDF workers, the public and the environment. DSHW has engaged in extensive oversight of TOCDF operations. DSHW has an office on the facility, has conducted oversight on almost a

daily basis, and has a real-time computer link which transmits data to a computer terminal at DSHW's offices in Salt Lake City.

21. During the shakedown period, three events occurred that caused Respondents to immediately shut down operations: detection of low levels of agent in two filter unit containment vestibules, leakage of a small quantity of decontamination fluid passing through hairline cracks in a second level cement floor to a first floor electrical room, and minor agent migration into an observation corridor. Two of the incidents involved trace amounts of chemical agent migrating to unintended areas. None resulted in harm to TOCDF personnel, the public or the environment. Descriptions of the events and corrective actions taken in response to each event have been adequately explained to the Board and the Executive Secretary, and were adequately addressed by the Army and EG&G.

22. With regard to the other incidents described in paragraph 19 above, the Board finds that: adequate backup generators are in place at TOCDF, and there has never been an occasion when the backup power system failed to operate upon loss of power; the fire suppression system test and temporary HVAC imbalance was properly responded to and TOCDF personnel have received corrective training; the agent quantification system anomaly has been corrected; hot cut out procedures are a normal part of facility operations, and appropriate workers are equipped with protective equipment; and stack effluent gases are appropriately monitored by ACAMS and DAAMS systems and the agent readings in the ACAMS TREND reports were challenges to the monitoring equipment and not releases of agent.

#### CONCLUSIONS OF LAW AND REASONS FOR DECISION

1. In approving the permit in 1989, the Executive Secretary acted in accordance with



applicable rules and statutes, and acted in a manner that was appropriate and timely. The Board recognizes that it is not unusual for a hazardous waste facility to have subcontractors or contractors participating in operating the facility. The existence of such contractors does not necessarily mean that they are "operators" of the facility within the meaning of the Utah Solid and Hazardous Waste Act and rules issued thereunder. As the Army had ultimate responsibility for ownership and operation of the facility, the Executive Secretary properly determined that EG&G, a contractor for the Army, need not be included in the permit as a co-permittee.

2. While not legally required to add the Army's contractor, EG&G, as co-permittee, the Executive Secretary acted within his discretion and in accordance with applicable rules and statutes, including RCRA section 3005, 42 U.S.C. section 6925, and the Utah Solid and Hazardous Waste Act, Utah Code Ann section 19-6-108, and acted in a manner that was appropriate and timely, in approving the permit modification adding EG&G as co-permittee in 1996. The Executive Secretary acted properly and well within his discretion regarding the timing and processing of the TOCDF permit given the generalized nature of the applicable statutory and regulatory requirements. At no time was TOCDF constructed or operated without the required permit(s).

3. The January 9, 1997 recording of false information regarding a temperature reading by an employee of TRC during a trial burn was discovered by EG&G and DSHW personnel on that same day. The temperature readings did not affect the burn itself, but related to the temperature needed to preserve a sample. EG&G quality assurance staff immediately recorded the incident and commenced preparation of a deficiency report. At that time, EG&G ordered its subcontractor to permanently remove the employee from TOCDF. TRC agreed and did so. TRC

also indicated that the employee acted alone and took full responsibility for its employee's misconduct. TRC agreed to pay for the repeat of the trial burn run, given that the results of the January 9 run were discarded. In addition, as further corrective action to avoid any repeat of the incident, TRC conducted extensive ethics training for its employees working at TOCDF. EG&G's Risk Management Department Director, Tom Kurkky, testified that the problem has not reoccurred.

4. The Petitioners have failed to provide data or present evidence indicating that the Executive Secretary's approval of trial burns was inappropriate or not in accordance with law. The Board recognizes the importance of trial burn data relative to understanding any emissions at TOCDF and for purposes of approval of full-scale activity at TOCDF once the trial burns are completed. The Board finds and concludes that the Executive Secretary and DSHW acted properly in approving the trial burns and in the collection of data during the trial burns.

5. Rule R315-3-20 of the Utah-Administrative Code establishes the standard to issue a hazardous waste incinerator plan approval (permit). Under the provisions of R315-3-20(b)(5), the Executive Secretary shall approve a plan if: (1) the trial burn is likely to determine whether the incinerator performance standard can be met; (2) the trial burn itself will not present an imminent hazard to human health or the environment; (3) the trial burn will help the Executive Secretary determine operating requirements; and the information sought in items (1) and (2) cannot reasonably be developed through other means. In their Second Request for Agency Action, Petitioners alleged four bases (listed in paragraph 5 above) for setting aside the approval of the trial burn plans. The Board concludes that Petitioners have failed to present evidence on these issues sufficient to justify revocation, termination or modification of the plans by the

Board.

6. The Board finds and concludes that the Screening Risk Assessment (SRA) was performed using applicable EPA guidance and met all requirements for a health risk assessment. The SRA indicates that TOCDF can be operated as designed within the risks established by EPA for emissions as set forth in the design and construction. With respect to open burning / open detonation (OB/OD) activities, the Executive Secretary has prohibited the Army from conducting OB/OD until such time as a combined health risk assessment for both TOCDF operations and OB/OD is completed and indicates that the combined health risk is within acceptable limits.

7. The Petitioners failed to present evidence refuting the conclusions of the SRA, and the Board finds and concludes that the Executive Secretary acted appropriately in approving operations based on information in the SRA. The SRA was not a required study but was done at the discretion of the Executive Secretary and the Army because of their concern for human health and the environment, and the SRA will continue to be revised in the future as appropriate, for example, in the event of OB/OD activities simultaneous with TOCDF incineration operations. The risks of continued storage outweigh the risks from TOCDF operations, as outlined in the QRA.

8. The Board concludes that the preponderance of the evidence supports the Executive Secretary's approval of TOCDF's trial burn plans, permit and permit modifications, and denies Petitioners' First and Second Requests for Agency Action.

9. In further support of its decision, the Board hereby incorporates into these Conclusions of Law and Reasons for Decision all of the Findings of Fact set forth above, and also incorporates by reference the transcript of the Board members' comments and deliberations

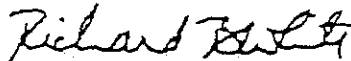
on this matter on April 17, 1997 (Transcript of Hearing, Volume No. 4).

ORDER

Based upon the foregoing Findings of Fact and Conclusions of Law, IT IS HEREBY ORDERED that the relief requested in Petitioners' First and Second Requests for Agency Action is hereby denied, and that the TOCDF permits and permit modifications approved by the Executive Secretary are upheld and shall remain in effect unless amended, revoked or otherwise affected by the Executive Secretary or by further order of the Board.

DATED this 22nd day of July, 1997.

UTAH SOLID AND HAZARDOUS WASTE  
CONTROL BOARD



By: Richard B. White, Board Chairman

NOTICE

Under Utah Code Ann. section 63-46b-13, any party may request that this Order be reconsidered by the Board. Any such request must be in writing, must be filed with the Board (with a copy to each party) within twenty days after the date shown on the attached mailing certificate, and must state specific grounds upon which relief is requested.

Judicial review of this Order may be sought in the Utah Court of Appeals under

applicable statutes and court rules, including Utah Code Ann. sections 63-46b-14 and -16 and 78-2a-3 and Rule 14, Utah Rules of Appellate Procedure, by the filing of a proper petition within thirty days of the date shown on the attached mailing certificate for this Order (or, if applicable, within thirty days after a request for reconsideration is denied).

CERTIFICATE OF SERVICE

I hereby certify that on the 22 day of July, 1997 a true and correct copy of the foregoing ORDER was mailed first-class, postage prepaid to:

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Laura J. Lockhart

CHEMICAL WEAPONS WORKING GROUP, INC., SIERRA CLUB, and  
VIETNAM VETERANS OF AMERICA FOUNDATION, Plaintiffs, vs. UNITED  
STATES DEPARTMENT OF THE ARMY, UNITED STATES DEPARTMENT  
OF DEFENSE, and EG&G DEFENSE MATERIALS, INC., Defendants.

Civil No. 2:96-CV-0425C

UNITED STATES DISTRICT COURT FOR THE DISTRICT OF UTAH,  
CENTRAL DIVISION

990 F. Supp. 1316; 1997 U.S. Dist. LEXIS 20499; 28 ELR 20246

October 10, 1997, Decided

October 14, 1997, Filed

**DISPOSITION:**

[\*\*1]. Defendant's motion for summary judgment on  
Count 10 GRANTED.

**COUNSEL:**

Mick Harrison, Berea, Kentucky, for Plaintiffs.

Richard E. Condit, Esq., Greenlaw, Inc., Washington,  
DC, for Plaintiffs.

Robert Ukeiley, Denver, CO, for Plaintiffs.

R. Paul Van Dam, Esq., Jones, Waldo, Holbrook &  
McDonough, Salt Lake City, Utah, for Plaintiffs.

Alan Greenberg, Robert Foster, U.S. Department of  
Justice, Denver, CO, for United States, Defendant.

Lt. Col. Robert Lewis, U.S. Army Litigation Center,  
Arlington, VA, for Department of Army.

David W. Tundermann, Craig D. Galli, H. Douglas  
Owens, Parsons Behle & Latimer, Salt Lake City,  
Utah, for EG&G, Inc., Defendant.

**JUDGES:**

TENA CAMPBELL, United States District Judge.

**OPINIONBY:**

TENA CAMPBELL

**OPINION:**

[\*1317] ORDER

This matter is before the court on defendant  
EG&G's motion to dismiss Count 10. Because the  
defendant has submitted matters in support of its  
motion that are outside the pleadings, the court shall  
treat this motion as one for summary judgment.  
F.R.C.P. 12(c). Having determined that oral argument  
would not materially assist in the resolution of this  
matter, DUCivR7-1(f), the court now enters the  
following order based upon the submissions of [\*\*2]  
the parties and applicable legal authority:

**Background**

On or about June 18, 1996, the Utah Division of  
Solid & Hazardous Waste (the "Division") added  
EG&G as a co-permittee to the Department of the  
Army's license to operate the Tooele Chemical  
Demilitarization Facility ("TOCDF").

On July 18, 1996, the plaintiffs in this action  
petitioned the Utah Solid and Hazardous Waste Control  
Board (the "Board") to reverse the Division's action.  
Plaintiffs alleged, among other things, that EG&G had  
violated 42 U.S.C. § 6925 and Utah Code Ann. § 19-  
6-108(3)(a) by operating TOCDF from 1989 to 1996  
without the necessary permits. In light of this long  
history of alleged noncompliance, plaintiffs argued that  
it was arbitrary and capricious for the Division to  
approve EG&G as a co-permittee in 1996.

Between March 18 and April 17 of this year, the  
Board heard approximately 22 hours of testimony and  
argument on this matter. At these hearings, plaintiffs  
had an opportunity to examine personnel from the  
Division who were responsible for the decision to add  
EG&G as a co-permittee on the Army's license.

[\*1318] Following the hearing, plaintiffs submitted proposed findings of fact and conclusions of law. [\*\*3] These proposed findings supported plaintiffs' contention that the Division had acted capriciously when it "added EG&G to the TOCDF permit as an operator late in the game, after EG&G had operated TOCDF without a permit for a substantial period of time." Plaintiffs also requested that "the Board ... suspend approvals for agent operations until the Army can make changes in ... [its] operator ...." (Petitioners' Post-Hearing Brief and Proposed Findings of Fact and Conclusions of Law at 1-2.)

On July 22, 1997, the Board issued its findings of fact and conclusions of law. The first finding of fact by the Board reads in relevant part as follows:

1. When the Executive Secretary ... approved a hazardous waste facility operation plan ... for the [TOCDF] in 1989, he issued the permit to the Tooele Army Depot as owner and operator. Since the army had ultimate responsibility for ownership and operation of the facility, the Executive Secretary properly determined that EG&G need not be included in the permit as a co-permittee.

The first conclusion of law reads in relevant part as follows:

1. In approving the permit in 1989, the Executive Secretary acted in [\*\*4] accordance with applicable rules and statutes, and acted in a manner that was appropriate and timely. The Board recognizes that it is not unusual for a hazardous waste facility to have subcontractors or contractors participating in operating the facility. The existence of such contractors does not necessarily mean they are "operators" of the facility within the meaning of the Utah Solid and Hazardous Waste Act and rules issued thereunder. As the Army had ultimate responsibility for ownership and operation of the facility, the Executive Secretary properly determined that EG&G, a contractor for the Army, need not be included in the permit as co-permittee.

(Board Order at 2, 9). Based upon these findings of fact and conclusions of law, the Board determined that the Division's decision to add EG&G as a co-permittee on the Army's license in 1996 was neither arbitrary or capricious.

#### Discussion

The defendant, EG&G, seeks summary judgment on the ground that the legal and factual issues raised by the plaintiffs in Count 10 have already been decided by State of Utah Solid and Hazardous Waste Control

Board ("Board"). According to EG&G, under the principles of collateral estoppel, [\*\*5] the Board's decision bars litigation of Count 10 in this court. This court must give preclusive effect to the Board's decision if it would be accorded such effect by the courts of Utah, the state of its origin. *Saavedra v. City of Albuquerque*, 73 F.3d 1525, 1534-35 (10th Cir. 1996).

The Utah Supreme Court has held that the following elements must be satisfied before a party may be collaterally estopped from relitigating issues already decided in another forum:

(1) The issue decided in the prior adjudication must be identical to the one presented in the action in question; (2) there must be a final judgment on the merits, (3) the party against whom the plea is asserted must be a party in privity with a party to the prior adjudication; and (4) the issue in the first action must be completely, fully, and fairly litigated.

*Career Serv. Review Bd. v. Department of Corrections*, 942 P.2d 933, 322 Utah Adv. Rep. 8, 10 (Sup.Ct., July 22, 1997) (citing *Searle Bros v. Searle*, 588 P.2d 689, 691 (Utah 1978)). If those elements are satisfied, however, the Utah courts will give preclusive effect to court judgments and agency decisions alike. Id.

#### I. Identity [\*\*6] of Issues.

On July 18, 1996, plaintiffs petitioned the Board to revoke EG&G's permit to operate TOCDF. As grounds therefore, plaintiffs stated that EG&G had violated the requirement of Utah Code Ann. § 19-6-108(3)(a) by operating TOCDF without the necessary Division permit from 1989 to 1996.

Count 10 of the plaintiffs' Second Amended Complaint in the present case simply renews plaintiffs' claim before the Board. Count 10 alleges that EG&G violated Utah Code Ann. § 19-6-108(3)(a) by operating TOCDF from 1989 to 1996 without a permit from the Division. (Second Amended Complaint at 53-54.)

[\*1319] Despite the obvious similarity of the claims presented to the Board and to this court, plaintiffs insist that the issues are merely "related," but not identical. First, plaintiffs assert that the question before the Board was whether the Division acted capriciously in adding EG&G to the license as a co-permittee in 1996. Plaintiffs ignore, however, that the Division's decision to add EG&G as a co-permittee would have been capricious only if EG&G had operated TOCDF without the required permit from



1989 to 1996. In resolving plaintiffs' capriciousness claims, therefore, the Board necessarily determined [\*\*7] that EG&G was not required to obtain a permit during the 1989-96 period.

Second, plaintiffs argue that even if the Board considered the same state claims that are advanced here, Count 10 also seeks redress for alleged violations of the federal statute, a matter over which the state Board had no jurisdiction. 42 U.S.C. § 6925. With respect to these federal law violations, plaintiffs argue that they cannot be collaterally estopped by the state proceedings.

Plaintiffs are correct that exclusive jurisdiction over suits alleging violations of the federal Resource Conservation and Recovery Act is lodged in the federal district courts. 42 U.S.C. § 6972(a). It is equally true, however, that once the Environmental Protection Agency authorized the State of Utah to administer and enforce a hazardous waste program in lieu of the federal program, 49 Fed.Reg. 39693 (Oct. 10, 1984), the federal statute was no longer applicable. See, e.g., *Murray v. Bath Iron Works Corp.*, 867 F. Supp. 33, 42 (D.Me. 1994) ("a direct action under section 6972(a)(1)(A) is unavailable where the applicable federal requirements of RCRA have been superseded by an EPA-authorized state hazardous waste program pursuant [\*\*8] to 42 U.S.C. § 6926(b)"); *Dague v. City of Burlington*, 732 F. Supp. 458, 465 (D.Vt. 1989) ("a plaintiff seeking to challenge the operation of a hazardous waste site in an EPA authorized state may bring an action under state law, not federal law ..."). Thus, the Board considered the only claims which plaintiffs may actually advance, i.e., those based on state law.

The court therefore finds that the issues presented by Count 10 are identical to those presented to the Board.

## II. Final Judgment on the Merits.

Plaintiffs argue that so long as the Board's decision may be reversed by the Utah Court of Appeals, the decision is not final for purposes of collateral estoppel. The Tenth Circuit has held to the contrary: "Utah law provides that, unless it is reversed on appeal, a judgment is final for issue preclusion purposes." *Atiya v. Salt Lake County*, 988 F.2d 1013, 1020 (10th Cir. 1993). The Tenth Circuit's determination is binding on this court. Therefore, despite the pendency of plaintiffs' appeal, the Board's decision is final for purposes of this motion.

## III. Identity of Party Against Whom Plea is Asserted.

Defendant asserts that the plaintiffs in this action [\*\*9] were also the plaintiffs in the administrative hearing before the board. Plaintiffs do not dispute this fact.

## IV. Opportunity for Full and Fair Litigation.

Utah case law does "not require either a motion or a hearing for full and fair litigation but says only that 'the parties must receive notice under all the circumstances, to apprise them of the pendency of the action and afford them an opportunity to present their objections.'" *Career Serv. Review Bd.* 322 Utah Adv. Rep. at 10 (quoting *Copper State Thrift & Loan v. Bruno*, 735 P.2d 387, 391 (Utah App. 1987)). See also, *Kremer v. Chemical Const. Corp.*, 456 U.S. 461, 481, 72 L. Ed. 2d 262, 102 S. Ct. 1883 (1982) ("state proceedings need do no more than satisfy the minimum procedural requirements of the Fourteenth Amendment's Due Process Clause in order to qualify for the full-faith-and-credit guaranteed by federal law").

Plaintiffs received all the opportunity for full and fair litigation that Utah law or the federal constitution require. In addition to filing various pleadings, plaintiffs were allowed over twelve hours of time to present witnesses. Plaintiffs also conducted cross-examination or voir dire of several [\*\*10] witnesses called by EG&G. Although even more time and process might have been desirable from plaintiffs' perspective, the process actually accorded them was sufficient for purposes of the collateral estoppel analysis.

[\*1320] Plaintiffs also argue that they lacked the incentive to litigate fully in front of the Board because the Board could not impose fines or penalties under the federal statute. This contention is without merit. First, as explained above, no court has the power to impose penalties on EG&G under the federal statute; it has been superseded by the state regulatory scheme. Second, had plaintiffs prevailed in front of the state agency, EG&G might well have been ordered to cease its operations at TOCDF. It is hard to conceive, in light of plaintiffs' vigorous efforts to prevent operations at TOCDF (including two preliminary injunction hearings before this court), that the potential halt of test burns at TOCDF did not provide them with adequate incentives to litigate the issue. The court therefore finds that this element of the collateral estoppel test is satisfied.

## Conclusion

Each of the elements necessary for collateral estoppel under Utah law has been satisfied. Plaintiffs [\*\*11] are estopped from relitigating the issue of

EG&G's licensure in this forum when that question was already decided against them in front of the Board. The court's resolution of this matter makes consideration of defendant's Burford abstention argument unnecessary.

Defendant's motion for summary judgment on Count 10 is hereby GRANTED.

SO ORDERED this 10 day of October, 1997.

BY THE COURT:

TENA CAMPBELL

United States District Judge

EQC Meeting May 18, 2000  
Attachment S, Page S-56

518

Sierra Club, Chemical Weapons Working Group, and Vietnam Veterans of America Foundation, Petitioners, v. Utah Solid and Hazardous Waste Control Board, Respondent, and United States Army and EG&G Defense Materials, Inc., Intervenor.

Case No. 971313-CA

COURT OF APPEALS OF UTAH

350 Utah Adv. Rep. 13; 964 P.2d 335; 1998 Utah App. LEXIS 74

August 20, 1998, Filed

**PRIOR HISTORY:**

[\*\*1] Original Proceeding in this Court.

**DISPOSITION:**

Declined to disturb the Board's order.

**COUNSEL:**

Mick G. Harrison, Berea, Kentucky, for Petitioners.

Jan Graham, Laura Lockhart, and Raymond Wixom, Salt Lake City, for Respondent.

Alan D. Greenberg and Robert H. Foster, Denver, Colorado, for Intervenor United States Army.

David W. Tunderman and Craig D. Galli, Salt Lake City, for Intervenor EG&G Defense Materials, Inc.

**JUDGES:**

Before Gregory K. Orme, Judge. WE CONCUR: James Z. Davis, Presiding Judge, Michael J. Wilkins, Associate Presiding Judge.

**OPINIONBY:**

GREGORY K. ORME

**OPINION:**

[\*337] OPINION

ORME, Judge:

Sierra Club, Chemical Weapons Working Group, and Vietnam Veterans of America Foundation (collectively referred to herein as Sierra Club) petition this court for review of a final order of the Utah Solid and Hazardous Waste Control Board pertaining to the Tooele Chemical Agent Demilitarization Facility

(referred to by the parties and herein as TOCDF) located at the Deseret Chemical Depot, formerly known as Tooele Army Depot South. We decline to disturb the Board's order.

[\*338] FACTS

The Deseret Chemical Depot is one of eight sites in the continental United States housing the nation's chemical weapons [\*\*2] stockpile. The country's entire stockpile consists of approximately 30,000 tons of chemical agent. Housed at the Depot is over two-fifths of the stockpile--more than 13,000 tons. These chemicals include the nerve agents GB (sarin) and VX, and the blister agents H, HD, and HT (mustard gas). The chemicals are contained in weapons, such as rockets, artillery shells, bombs, and mines, and in one-ton storage devices called "ton containers." The Army stores these materials at Tooele in earth-covered magazines called "igloos," in fenced storage yards, and in warehouses.

The risk from continued storage of these agents has been a matter of long-standing concern. In 1989, the Board's Executive Secretary approved the Army's hazardous waste plan for construction of a hazardous waste treatment facility to destroy the chemical weapons stockpiled at the Depot. The Executive Secretary issued the authorizing permit only to the Depot, although the United States Army, TOCDF's owner, had contracted with EG&G Defense Materials, Inc. to operate TOCDF, and EG&G began doing so in 1993.

In July 1993, the Army completed construction of TOCDF, which is comprised of five separate incinerators: two liquid incinerators [\*\*3] used to burn liquid agent that has been drained from munitions and bulk containers; a Deactivation Furnace System used to

incinerate munitions that have been drained of agent but are still contaminated; a Metal Parts Furnace used to decontaminate metal parts that have been drained of agent; and a Dunnage Incinerator used to burn non-agent contaminated and agent contaminated dunnage, such as pallets and spent carbon filters.

Before TOCDF operations could begin, the permit and federal and state law required the Army to conduct a series of "trial burns" to ensure that the facility could operate safely. In late 1995, the Army submitted trial burn plans to the Executive Secretary for approval. After requiring the Army to conduct surrogate trial burns with surrogate chemicals, in June 1996 the Executive Secretary approved the trial burn plans for the liquid incinerators and the Deactivation Furnace System. The Army scheduled four trial burns for these incinerators: a "shakedown" burn with no chemical agent, an "R & D" burn with no agent, a shakedown burn with chemical agent, and a "demonstration" burn with chemical agent. In August 1996, TOCDF began the shakedown burn with chemical agent. [\*\*4]

In conjunction with trial burn approval, the State Division of Environmental Quality, through a contractor, conducted a Screening Health Risk Assessment (SRA) which analyzed the expected effects of theoretically high TOCDF emissions on human health and the environment. The Division conducted the SRA to address two primary concerns: whether TOCDF emissions would cause cancer and whether they would cause other types of illness. The SRA, following United States Environmental Protection Agency (EPA) guidelines, examined the potential exposure to six hypothetical groups living downwind of TOCDF: adults and children residing at the point of maximum emissions, three types of farmers, and subsistence fishermen. The Division incorporated conservative assumptions into the SRA, such as calculating the risks from exposure for up to thirty years of TOCDF emissions even though TOCDF is expected to operate for only seven years. The Division found, inter alia, that the overall cancer risks from dioxin exposure do not exceed EPA guidance levels for ten, fifteen, and thirty year operating periods. The SRA did not calculate the noncancer effects of dioxin exposure because the EPA has not adopted a reference [\*\*5] dose for dioxin.

#### AGENCY DISPOSITION

In June 1996, the Executive Secretary granted the Army's request to modify the permit by adding intervenor EG&G as a permittee and operator of TOCDF. This modification prompted Sierra Club to file its First Request for Agency Action on July 18, 1996, in which it asked the Board to withdraw its

modification of the permit which [\*\*339] authorized EG&G to be a permittee and operator of TOCDF. Sierra Club subsequently filed a Second Request for Agency Action on July 22, 1996, in which it attacked the Executive Secretary's June 1996 approval of the agent trial burn plans for the liquid incinerators and the Deactivation Control Furnace. In its second request, Sierra Club claimed that TOCDF cannot be operated safely and that respondents failed to demonstrate compliance with legal requirements for hazardous waste incineration. Sierra Club therefore sought reversal of the Executive Secretary's approval of the trial burns and a Board order enjoining respondents from beginning any chemical incineration at TOCDF.

The Board held a hearing on Sierra Club's requests on March 18-20 and April 17, 1997. The Board ordered that Sierra Club would have twelve hours to [\*\*6] present its case, the Army and EG&G would collectively have ten hours, and the Executive Secretary would have five hours. On April 17, the Board orally denied Sierra Club's two requests and issued its written order on July 22, 1997. Sierra Club then filed with this court a petition for review of the Board's order denying its two requests for agency action. The Army and EG&G subsequently intervened in this proceeding.

#### ISSUES

Sierra Club raises three principal arguments. n1 First, Sierra Club contends that the Board erred in failing to terminate or revoke the TOCDF permit in the face of evidence of substantial noncompliance with the Utah Solid and Hazardous Waste Act and endangerment to human health and the environment. Second, Sierra Club argues that the Board erred in allowing EG&G to operate TOCDF because EG&G is unable to operate the facility safely and in compliance with law. Third, Sierra Club contends that the Board violated its procedural Due Process rights by unreasonably limiting Sierra Club's time to present evidence and to cross-examine witnesses at the hearing. The Board, in addition to responding to Sierra Club's allegations, argues that Sierra Club lacks standing [\*\*7] to petition this court for review. We first address the Board's standing argument.

n1 At oral argument, counsel for Sierra Club acknowledged that he had not moved for pro hac vice admission before this court, reasoning that he had so moved before the agency below. Technically, the case here is not an appeal but an original proceeding in this court. See generally Utah Code Ann. § 63-46b-

16(1) (1997); Utah R. App. P. 3(c), 14(a). Counsel for Sierra Club should therefore have moved for pro hac vice admission in this proceeding. Rule 40(d) of the Utah Rules of Appellate Procedure provides as much: "An attorney who is licensed to practice before the bar of another state or a foreign country but who is not a member of the Bar of this state, may appear, upon motion, pro hac vice." Although counsel for Sierra Club failed to comply with this requirement, we nonetheless suspend the rule for the convenience of the opposing parties and the court. Despite this suspension, counsel is directed to comply with Rule 40(d) in the future.

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#### STANDING

The Board argues that, although Sierra Club's standing was not considered below, n2 Sierra Club has failed to demonstrate that it has standing to petition this court for review because it cannot meet any of the three recognized standing criteria. The Board's argument is unpersuasive, and we conclude that Sierra Club has standing to petition this court for review because it raises issues of significant public importance.

n2 "Either party, or the court on its own motion, may properly raise the issue of standing for the first time on appeal." *Wade v. Burke*, 800 P.2d 1106, 1108 (Utah Ct. App.), cert. denied, 800 P.2d 1105 (Utah 1990). Accord *Terracor v. Utah Bd. of State Lands*, 716 P.2d 796, 798 (Utah 1986) (stating that appeals court can address standing issue sua sponte); *Sierra Club v. Department of Env'tl. Quality*, 857 P.2d 982, 984 (Utah Ct. App. 1993) (same).

"[A] plaintiff may maintain a suit against governmental action in those limited circumstances in which a case raises [\*\*9] issues that are so 'unique and of such great importance that they ought to be decided in furtherance of the public interest.'" *National Parks & Conservation Ass'n v. Board of State Lands*, 869 P.2d 909, 913 (Utah 1993) (quoting *Terracor v. Utah Bd. of State Lands*, 716 P.2d 796, 799 (Utah 1986)). Under this standard, "the dispute must (1) raise a statutory or [\*340] constitutional issue of substantial public import, (2) be presented by adverse parties, and (3) otherwise be suitable for resolution by the courts." *Id.*

In *Sierra Club v. Department of Environmental*

*Quality*, 857 P.2d 982 (Utah Ct. App. 1993) (*Sierra Club I*), a somewhat similar case involving Sierra Club's challenge to an operating permit for a Tooele County commercial hazardous waste incinerator, we raised sua sponte Sierra Club's lack of standing and dismissed its petition for review. See *id.* at 983. In *Sierra Club I*, Sierra Club took issue with the Executive Secretary's approval of the operation-plan application for the incinerator. See *id.* at 984. Specifically, Sierra Club alleged that the applicant failed to provide evidence that emergency response plans had been coordinated with emergency personnel [\*\*10] and that the application was otherwise incomplete. See *id.* Sierra Club alleged that these two errors in the application-approval process impaired its members' enjoyment of Western Utah because the incinerator, once it began operating, would generate pollution. See *id.* at 986.

In addition to concluding that Sierra Club lacked standing on two other asserted grounds, we held that it failed to raise any issues of significant public importance:

Sierra Club is challenging determinations by the Board that constitute internal procedural decisions preceding any public involvement in the permit process. The issues, at this stage, are not of great public importance and it is not in the public interest to seek review of the Board's internal operating procedures.

*Id.* at 987.

The same cannot be said of the present case. In contrast to *Sierra Club I*, in this case the Executive Secretary has approved trial burns with chemical agents, the Army has conducted such burns since August 1996, and the Board has fielded public comment. Sierra Club also alleges several violations of Utah law, challenges the Division's and the Army's safety assessment measures upon which burn approvals [\*\*11] were based, and identifies specific accidents at TOCDF involving actual chemical agent. Sierra Club's arguments are therefore of great public importance and their resolution is inarguably in the public interest.

TOCDF is a matter of significantly greater public concern, both locally and nationally, than was the permit prematurely challenged in *Sierra Club I*. TOCDF is the first facility of its kind in the continental United States, and it processes some of the deadliest substances on earth in relatively close proximity to a major metropolitan area. Consequently, the safety of TOCDF operations, which will continue for seven years, are of undeniably significant public importance.

Our Supreme Court's ruling in *National Parks &*

*Conservation Ass'n v. Board of State Lands*, 869 P.2d 909 (Utah 1993), strongly supports our conclusion that the issues raised by Sierra Club are of substantial public concern. National Parks dealt with a proposed land swap and development within Capitol Reef National Park and along the Burr Trail. See *id.* at 913. The National Parks and Conservation Association (NPCA) challenged the proposal and the Utah Supreme Court ultimately held that NPCA had **[\*\*12]** standing because it raised issues of significant public importance. See *id.* at 913-14. Those issues included the State's discharge of its fiduciary duties in administering school trust lands and in preserving scenic, recreational, archaeological, and paleontological values related to those lands. See *id.* In comparing the issues in National Parks to those Sierra Club raises in this case--namely, allegedly substantial risks to human health and safety--the issues in this case clearly qualify as issues of significant public importance.

We conclude that Sierra Club has standing to petition this court for review. Given our conclusion, we need not address the alternative bases for standing.

#### NONCOMPLIANCE WITH UTAH LAW & ENDANGERMENT

##### TO HUMAN HEALTH & THE ENVIRONMENT

Sierra Club first argues that the Board erred in failing to terminate or revoke the TOCDF permit in light of evidence of substantial noncompliance with the Utah Solid and Hazardous Waste Act and evidence that **[\*341]** TOCDF emissions endanger human health and the environment.

##### Standard of Review

In its opening brief, Sierra Club contends that its petition challenges the Board's factual findings and therefore **[\*\*13]** its claims should be reviewed under the "substantial evidence" standard of review. The Board argues that Sierra Club failed to marshal the evidence, as is required for challenges to fact findings. In its reply brief and at oral argument, Sierra Club restated its position, claiming it is not challenging the Board's findings of fact but is instead challenging the Board's allegedly erroneous application of law to fact. In light of Sierra Club's clarification of its position, we necessarily accept the Board's factual findings as uncontested and therefore address only the Board's application of the law to the uncontested facts.

When a petitioner challenges an agency's application of law to fact, we apply a standard of

review that is not static, but is instead determined on a sliding scale: "[An] agency's application of the law to the facts may, depending on the issue, be reviewed by an appellate court 'with varying degrees of strictness, falling anywhere between a review for "correctness" and a broad "abuse of discretion" standard.'" *Drake v. Industrial Comm'n*, 939 P.2d 177, 181 (Utah 1997) (quoting *Langeland v. Monarch Motors, Inc.*, 1996 Utah LEXIS 112, 307 Utah Adv. Rep. 3, **[\*\*14]** 4 (Utah 1996), withdrawn, 952 P.2d 1058 (Utah 1998)). See *State v. Pena*, 869 P.2d 932, 937-939 (Utah 1994). Thus, in deciding upon the level of discretion we accord to the agency in such situations, we consider "factors such as policy concerns and an agency's expertise." *Drake*, 939 P.2d at 181 n.6.

The present case involves highly technical, specialized scientific knowledge which is uniquely within the Board's expertise. Cf. *Professional Staff Management, Inc. v. Department of Employment Sec.*, 953 P.2d 76, 79 (Utah Ct. App. 1998) (concluding that court would review agency decision with only moderate deference because applying relevant law required little specialized knowledge uniquely within agency's expertise); *Allen v. Department of Employment Sec.*, 781 P.2d 888, 890 n.4 (Utah Ct. App. 1989) (same). We therefore accord the Board a relatively high degree of deference in reviewing its application of the law to the facts in this case.

##### Analysis

Sierra Club contends that the trial burns with agent present a hazard to human health or the environment, and therefore the Board should have revoked TOCDF's trial burn permit. The applicable rule provides:

The **[\*\*15]** Executive Secretary shall approve a trial burn plan if it finds that:

- (i) The trial burn is likely to determine whether the incinerator performance standard ... can be met;
- (ii) The trial burn itself will not present an imminent hazard to human health or the environment;
- (iii) The trial burn will help the Executive Secretary to determine operating requirements to be specified ...; and
- (iv) The information sought ... cannot reasonably be developed through other means.

Utah Admin. Code R315-3-20(b)(5) (Supp. 1997). Sierra Club therefore challenges the second of the four criteria which must be satisfied before the Executive Secretary may approve a trial burn plan. More

specifically, Sierra Club uses the SRA's alleged deficiencies to attack the subsequent trial burn approvals. Sierra Club's opening brief takes a shotgun approach to this issue, an approach Sierra Club refined at oral argument by limiting its challenge to the SRA's inadequacy in four discrete areas: (1) dioxin risk to infants from TOCDF emissions; (2) effects of TOCDF emissions on consumers of locally produced dairy products; (3) effects of open burning/open detonation emissions when combined with TOCDF [\*\*16] stack emissions; and (4) effects of mustard gas emissions from the stack that ventilates the waste handling areas (HVAC stack).

#### a. Dioxin Risk to Infants

Sierra Club contends that the SRA failed to address two concerns relating to the risk to infants from TOCDF dioxin emissions: the actual level of infant dioxin exposure [\*342] from TOCDF emissions and the safe level of infant dioxin exposure from TOCDF emissions. Specifically, Sierra Club argues that in an early draft of the SRA, the Division calculated that the dioxin exposure risk to subsistence farmers' breast-fed infants was over fifty times greater than the acceptable dose. Sierra Club claims that after reaching this conclusion, the Division then deleted this data from the SRA, rather than further addressing this dioxin risk to subsistence farmers' breast-fed infants. Sierra Club therefore maintains that the Division violated its affirmative duty to protect the public by omitting this data from the SRA. Sierra Club asks this court, at a minimum, to remand these issues to the Board for it to determine the actual and acceptable dioxin risks to breast-fed infants.

Given the deference we owe the Board's decision, we reject Sierra [\*\*17] Club's allegations that TOCDF trial burn operations present an unacceptable dioxin exposure risk to nursing infants and that the Division should have addressed this risk in the SRA. Several considerations support this conclusion.

First, we note that there is considerable debate in the scientific community concerning safe levels of dioxin exposure and therefore the fact that Sierra Club can point to some studies suggesting an unacceptably high dioxin risk is not determinative, especially given the conflicting testimony before the Board. Given the level of debate over safe dioxin dosage, the Division's omission of analysis concerning breast-fed infant dioxin exposure is not unreasonable. The Board was in no way misled. It heard testimony that such an analysis was not included in the SRA because no reference dose for breast-fed infants has been generally accepted and that omitting analysis in the absence of a reference dose accords with EPA guidance and is standard

practice for risk assessments of the type conducted here. Moreover, the Board heard testimony that the EPA did not recommend using one of the reference doses proposed by Sierra Club and that, just as there are conservative [\*\*18] breast-milk ingestion models, like those asserted by Sierra Club, there are also more liberal models.

Second, Sierra Club did not present the Board with credible evidence that any deficiencies in the SRA pointed up imminent hazards to human health or the environment as a result of trial burn operations. More specifically, what is at issue here is not the health risk from full long-term operation of TOCDF--the only type of operation the SRA addressed--but rather the risk from the preliminary trial burns, which must be conducted before the Executive Secretary can approve full operation of TOCDF. In other words, despite the fact that the SRA's outlook was ten, fifteen, and thirty years of operation, Sierra Club wishes to translate possible dioxin risk from such long-term operation to the relatively short-term trial burns at issue here. Moreover, Sierra Club's argument is contrary to testimony by an expert to the effect that when the SRA dioxin calculations are applied to the shorter term trial burn period, the results indicate no appreciable risk to human health.

Additionally, Sierra Club bases its dioxin arguments largely upon the SRA which, by its very nature, was never intended [\*\*19] to provide accurate, specific numbers regarding actual TOCDF operations. The expert explained that the purpose of a screening risk assessment is to "provide a conservative estimate of the possible risk of health hazards posed by chemical emissions from a facility" and that "conservative" means the assessment includes "numerous assumptions or calculation procedures that result in a broad margin of safety between the calculated risk estimate ... and the likely risk to human health." In other words, the assessment makes assumptions that "intentionally overstate what is known to be true." Because of this broad safety margin, it is not appropriate to interpret the assessment's risk estimates as "true" or "absolute." Instead, a screening risk assessment "is a method for determining plausible upper limits of risk, not actual probability or risk of harm." If the assessment, given all the conservative worst-case assumptions, shows that there is no risk, no further study is required. Conversely, if the assessment indicates that a potential risk exists, more refined and specific analysis is conducted.

[\*343] The Division's SRA incorporated a number of conservative assumptions. For example, it addressed [\*\*20] operating periods not only much

longer than the trial burns at issue here, but also much longer than TOCDF's expected operating life; the SRA assumed that TOCDF would emit all seventeen toxic types of dioxin even though this would not be the case, see *Chemical Weapons Working Group, Inc. v. United States Dep't of the Army*, 935 F. Supp. 1206, 1213 (D. Utah 1996), aff'd, 111 F.3d 1485 (10th Cir. 1997), and it assumed simultaneous full-scale operation of all the incinerators, around-the-clock, for 365 days per year.

Thus, considering the scientific debate over dioxin exposure, and the SRA's long-term focus and conservative assumptions, Sierra Club failed to present any persuasive evidence that dioxin emissions from TOCDF trial burn operations present an imminent hazard to human health or the environment. Thus, given the evidence before the Board and the deference we accord it, we see no error in the Board's decision in this regard. n3

n3 This is not to say, of course, that the actual and acceptable levels of infant dioxin exposure are not appropriate topics of future study by the Division before the Board approves full operations at TOCDF. In fact, a Division employee testified that the Division will do future assessments and update already-conducted assessments as appropriate, thereby incorporating new data and any new EPA guidance. Thus, for instance, should the EPA arrive at a dioxin reference dose for infants, the Division would presumably incorporate the appropriate analysis in a risk assessment.

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#### b. Local Dairy Products

Sierra Club also contends that the Division omitted from the SRA the effects of TOCDF emissions on consumers of locally produced dairy products. Sierra Club argues that because the risk estimate for nonsubsistence farmers fell right at the State/EPA acceptable level, if the SRA risk estimate had included local dairy consumption, the cancer risk estimate would have necessarily exceeded the State and EPA standards. Sierra Club further alleges that an EG&G survey showed that a local dairy producer actually existed but wished to remain anonymous, and that the Division therefore improperly omitted any local dairy analysis from the SRA. Sierra Club contends that the Division should have subpoenaed EG&G's source, verified the existence of the local dairy producer, and included local dairy analysis in the SRA. In response, the Army argues that the Division surveyed local

farming practices and did not locate anyone consuming locally produced milk.

We conclude that the Board acted within its sound discretion in rejecting Sierra Club's arguments concerning the omission of dairy products from the SRA. We note that Sierra Club presented no witnesses who engaged [\*\*22] in, or knew of anyone who engaged in, dairy farming in TOCDF's vicinity. We therefore agree with the statement of the United States District Court for the District of Utah in rejecting a similar argument in an associated case: "Although ... the assumptions applied in the [SRA] may indicate a higher level of risk for some hypothetical persons, this does not constitute a showing that there is an actual risk to some person or persons posed by the emissions levels predicted for [TOCDF]." *Chemical Weapons Working Group*, 935 F. Supp. at 1214. Sierra Club failed to present to the Board any strong evidence that any local dairy producers existed.

While Sierra Club did not present evidence of local dairy production, the Board heard testimony that the Division could not find any individuals who were milking for 100% of their own consumption or for sale to neighbors; that some residents had milked in the past but were no longer doing so; that commercial dairy operations in the area were not feasible; and that the document which allegedly shows the Division knew of local dairy consumption was not prepared by the Division and was viewed by it as a "rough draft or a place to start as far [\*\*23] as ... inquiry into the [local dairy] practices in Rush Valley."

Moreover, many of the same observations we made regarding infant dioxin risk also apply here, particularly the limited nexus between the short trial burn period and the SRA and the SRA's inherently conservative assumptions. In view of the foregoing, we [\*344] conclude that the Board did not err in rejecting Sierra Club's dairy consumption arguments.

#### c. Open Burning/Open Detonation & Mustard Emissions

Sierra Club argues the Division failed to address in the SRA the effects of open burning/open detonation of chemical weapons and that the cumulative effect of open burning/open detonation and TOCDF emissions would exceed the State/EPA standard. We note that the Division has prohibited open burning/open detonation until a risk assessment modeling the risks of such activity is conducted and the risks are shown to be acceptable. Moreover, the Board heard testimony that if such an assessment indicated that the cumulative effect of open burning/open detonation and TOCDF



emissions presented a risk, the Division would not permit open burning/open detonation while TOCDF is operating. The Board therefore clearly acted [\*\*24] within its discretion in rejecting Sierra Club's argument because any risks associated with open burning/open detonation are not yet imminent.

Sierra Club also contends that the SRA is flawed because it fails to adequately address the effect of mustard gas emissions from the stack that ventilates the waste handling areas (HVAC stack). Specifically, Sierra Club contends that the Division arbitrarily lowered the estimated mustard emissions from the HVAC stack after that estimate showed a high risk from such emissions. As is the case with open burning/open detonation, the Executive Secretary has not yet approved mustard agent incineration. Consequently, the Board did not err in rejecting Sierra Club's arguments concerning these matters.

#### OMISSION OF EG&G FROM PERMIT, ACCIDENTS AT TOCDF

Sierra Club contends that the Board erred in refusing to revoke EG&G's permit to operate TOCDF. Specifically, Sierra Club argues that the Board should have revoked EG&G's permit in light of EG&G's permitless operation of TOCDF for six months in violation of the Utah Solid and Hazardous Waste Act, specifically Utah Code Ann. § 19-6-108(3)(a) (Supp. 1997), n4 and in light of alleged accidents at TOCDF [\*\*25] while the facility was under EG&G's control. Sierra Club further asserts that the Executive Secretary erred in adding EG&G to the permit in June 1996. In response, the Board and intervenors contend that the Executive Secretary reasonably interpreted section 19-6-108(3)(a) in concluding that hazardous waste facilities frequently employ contractors and subcontractors and that EG&G's status as a contractor for the Army does not mean that EG&G was an "operator" within the statute's meaning. Therefore, they argue, EG&G did not need a permit and the Executive Secretary's later decision to add EG&G to the permit, though not legally required, was a reasonable exercise of his discretion.

n4 As a convenience to the reader, and because the provisions in effect at the relevant times do not differ materially from the statutory provisions currently in effect, we cite to the most recent statutory codifications throughout this opinion, unless otherwise noted.

Standard of Review

Whether EG&G is an "operator" within [\*\*26] the meaning of section 19-6-108(3)(a)--and therefore required to obtain a permit--is an issue of statutory construction. "We review the agency's statutory construction as a question of law under a correction-of-error standard unless the statute expressly or impliedly grants the agency discretion to interpret the statutory language." *Epperson v. Utah State Retirement Bd.*, 949 P.2d 779, 781 (Utah Ct. App. 1997). See *O'Keefe v. Utah State Retirement Bd.*, 929 P.2d 1112, 1114 (Utah Ct. App. 1996), aff'd on other grounds, 956 P.2d 279 (Utah 1998); *Allred v. Utah State Retirement Bd.*, 914 P.2d 1172, 1174 (Utah Ct. App. 1996). In this case, the Solid and Hazardous Waste Act does not grant the Board such discretion, and therefore we review its decision for correctness. See generally *Epperson*, 949 P.2d at 781; *O'Keefe*, 929 P.2d at 1115. "Under the correction-of-error standard, this court affords no deference to the agency's interpretation or application of statutory terms." *Allred*, 914 P.2d at 1174.

[\*345] Whether the Board erred in refusing to revoke EG&G's permit in light of accidents and mishaps at TOCDF involves the Board's application of law to fact, see *Drake v. [\*\*27] Industrial Comm'n*, 939 P.2d 177, 181 & n.6 (Utah 1997); *State v. Pena*, 869 P.2d 932, 937-939 (Utah 1994), subject to the intermediate standard of review we discussed above. For essentially the same reasons as those previously discussed, we accord the Board a relatively high degree of deference in reviewing its application of law to the facts of this case.

#### Analysis

The statute at issue provides: "No person may own, construct, modify, or operate any facility or site for the purpose of ... treating, storing, or disposing of hazardous waste without first submitting and receiving the approval of the executive secretary for a hazardous waste operation plan for that facility or site." Utah Code Ann. § 19-6-108(3)(a) (Supp. 1997). See also Utah Admin. Code R315-3-1(a) (Supp. 1997) ("No person shall own, construct, modify, or operate any facility for the purpose of treating, storing, or disposing of hazardous waste without first submitting, and receiving the approval of the Executive Secretary for, a hazardous waste operation plan for that facility."). Thus, the issue is relatively straight-forward: Did EG&G "operate" TOCDF within the statute's meaning? If so, section [\*\*28] 19-6-108(3)(a) required EG&G to have a permit. n5

n5 We follow the parties' lead in using "permit" synonymously with the statutory

phrase "receiving the approval of the executive secretary for a ... hazardous waste operation plan."

"When interpreting statutes, [an appellate] court is guided by the long-standing rule that a statute should be construed according to its plain language. Thus, where the statutory language is plain and unambiguous, [the court] will not look beyond it to divine legislative intent." *Utah Sign, Inc. v. Utah Dep't of Transp.*, 896 P.2d 632, 633-34 (Utah 1995) (citations omitted). Accord *Brinkerhoff v. Forsyth*, 779 P.2d 685, 686 (Utah 1989); *Epperson*, 949 P.2d at 782. See also *Johnson v. Utah State Retirement Bd.*, 770 P.2d 93, 95 (Utah 1988) ("A fundamental principle of statutory construction is that unambiguous language in the statute itself may not be interpreted so as to contradict its plain meaning.").

Even though the Executive Secretary conceded that EG&G is [\*\*29] an operator of TOCDF, and even though the intervenors refer in their brief to EG&G as an operator of TOCDF, the Board and the intervenors contend that EG&G is somehow not an operator within the statute's meaning because EG&G is a contractor hired by the Army. They further contend that the Army is the only party required to hold a permit because the Army bears "ultimate responsibility for construction and operation of the facility."

"The terms of a statute should be interpreted in accord with their usual and accepted meanings." *Clover v. Snowbird Ski Resort*, 808 P.2d 1037, 1045 (Utah 1991). Accord *Mt. Olympus Waters, Inc. v. Utah State Tax Comm'n*, 877 P.2d 1271, 1273 (Utah Ct. App.) (presuming statutory terms are used in their ordinary sense and should be interpreted according to usual and commonly accepted meanings), cert. denied, 890 P.2d 1034 (Utah 1994). Section 19-6-108(3)(a) uses the term "operate," which, as conceded by the Executive Secretary and the intervenors, encompasses the services EG&G performs at TOCDF. EG&G "operates" that facility under the common meaning of the term, regardless of whether it does so as a contractor, a partner, a joint venturer, or a volunteer. [\*\*30] The Board and intervenors would have us construe "operate" to somehow exclude contractors hired by owners, even if they are hired--as is the case here--to "operate" the owner's facility. Such a construction does not accord with the plain meaning of the statute, nor with the "usual and accepted" meaning of the term "operate." If the Legislature intended that permits be obtained by only those "bearing ultimate responsibility for construction and operation" of hazardous waste facilities, as the intervenors assert, the statute would not require parties that "construct,

modify, or operate" hazardous waste facilities to obtain a permit, in addition to those who "own" such facilities. It is inarguable, given the statute's plain [\*346] language, that EG&G violated section 19-6-108(3)(a) by operating TOCDF without a permit, and the Board erred in concluding that EG&G did not need a permit.

Sierra Club contends that because EG&G violated the Solid and Hazardous Waste Act by operating TOCDF without a permit, the Board should have sanctioned EG&G by refusing to add them to the permit. However, it appears that EG&G's omission from the permit was largely due to the Executive Secretary's erroneous interpretation [\*\*31] of the term "operate," not to any connivance or evasion by EG&G. The fact that the Executive Secretary eventually added EG&G to the permit indicates that he came to realize the potential problem and took appropriate corrective action. Because the problem has been corrected, we cannot say the Board was unreasonable in declining to punish EG&G for not being named in the permit earlier by barring it from being included in the permit now.

As a second ground for seeking revocation of EG&G's permit, Sierra Club claims that a series of "mishaps, accidents, and violations" n6 at TOCDF show that EG&G cannot operate the facility in an acceptably safe manner. The Solid and Hazardous Waste Act provides that "approval of a ... hazardous waste operation plan may be revoked, in whole or in part, if the person to whom approval of the plan has been given fails to comply with that plan." Utah Code Ann. § 19-6-108(12) (Supp. 1997) (emphasis added). Permit revocation is therefore a matter within the Board's discretion and is by no means mandatory. Here, while it found that accidents had occurred at TOCDF, the Board also found that the Army and EG&G took corrective steps after each mishap and that [\*\*32] none of the incidents have recurred.

n6 Specifically, Sierra Club alleges that an employee of an EG&G subcontractor provided falsified trial burn data; that nerve agent leaked into permeable vestibules outside the HVAC filters; that nerve agent decontamination solution leaked through an airlock; that fires have occurred in the liquid incinerator area; and that EG&G workers are inadequately trained.

Sierra Club does not dispute that the Army and EG&G have taken such corrective measures. Moreover, these accidents occurred during what is known as the "shakedown" period--the central purpose of which is to "identify possible mechanical difficulties, ensure that [TOCDF] has reached

operational readiness and achieve steady-state operating conditions prior to conducting the trial burns." One of the purposes of this phase of TOCDF operations is therefore to shake out possible bugs before the facility begins full-scale operations. Based on the foregoing, we cannot say that the Board abused its discretion or otherwise [\*\*33] erred in refusing to revoke EG&G's permit due to these operational mishaps.

#### DENIAL OF DUE PROCESS RIGHTS

In a prehearing order dated September 19, 1996, about six months before the hearing began, the Board ordered that Sierra Club would be given twelve hours to argue and conduct direct and cross-examination before the Board; EG&G and the Army would be limited to a collective total of ten hours; and the Executive Secretary would be limited to five hours.

Sierra Club argues that the Board violated its state and federal procedural Due Process rights n7 by unreasonably limiting its time to present its case and cross-examine adverse witnesses. n8 Intervenors and respondent contend that Sierra Club was afforded ample opportunity to present its case and to cross-examine witnesses, but that Sierra Club failed to efficiently use its allotted time and failed to exploit the available opportunities for otherwise getting evidence before the Board.

n7 Because "Utah's constitutional guarantee of due process is substantially the same as the due process guarantees contained in the Fifth and Fourteenth amendments to the United States Constitution," *In re Worthen*, 926 P.2d 853, 876 (Utah 1996), we need not undertake separate federal and state analysis. [\*\*34]

n8 During the hearing, Sierra Club also objected to the Board's decision to charge Board members' questions against the parties' allotted time.

#### [\*347] Standard of Review

"Questions regarding whether an administrative agency has afforded a petitioner due process in its hearings are questions of law. We therefore do not give deference to the agency's actions." *Lopez v. Career Serv. Review Bd.*, 834 P.2d 568, 571 (Utah Ct. App.), cert. denied, 843 P.2d 1042 (Utah 1992).

Analysis

"The requirements of due process depend upon the specific context in which they are applied because 'unlike some legal rules due process is not a technical conception with a fixed content unrelated to time, place, and circumstances.'" *V-1 Oil Co. v. Department of Env'tl. Quality*, 939 P.2d 1192, 1196 (Utah 1997) (quoting *Cafeteria Workers Union v. McElroy*, 367 U.S. 886, 895, 81 S. Ct. 1743, 1748, 6 L. Ed. 2d 1230 (1961)). Due Process is therefore "flexible and requires such procedural protections as the particular situation demands." *Worrall v. Ogden City Fire Dep't*, 616 P.2d 598, 602 (Utah [\*\*35] 1980).

We conclude that under the circumstances of this case, the Board did not deny Due Process to Sierra Club. The Utah Administrative Procedures Act (APA) provides that "the presiding officer [of an administrative hearing] shall regulate the course of the hearing to obtain full disclosure of relevant facts and to afford all the parties reasonable opportunity to present their positions." Utah Code Ann. § 63-46b-8(1)(a) (1997). The APA further provides that "the presiding officer shall afford to all parties the opportunity to present evidence, argue, respond, conduct cross-examination, and submit rebuttal evidence." *Id.* § 63-46b-8(1)(d).

While the Board's time limitations do appear somewhat parsimonious, under the APA the Board was entitled to regulate the course of the hearing, which necessarily included its duration. Here, the Board limited every party's time, with Sierra Club receiving the largest block of all. Sierra Club knew of the time limits far in advance of the actual hearing date yet failed to object until the hearing was well underway. The Board also offered the parties numerous opportunities to present their positions in forms other than through time-consuming [\*\*36] testimony, i.e., pre- and post-hearing briefs, affidavits, deposition transcripts, transcripts from a companion case in federal court, and witness diaries.

Moreover, when it became apparent that Sierra Club had used the vast bulk of its time presenting its case and therefore had little time left for cross-examination of witnesses, the Board granted forty-five minutes of extra time to Sierra Club, and both the Army and the Executive Secretary ceded Sierra Club part of their allotted times. Finally, the Board permitted Sierra Club to take additional, unlogged time on cross-examination and voir dire of several witnesses. All told, Sierra Club used over fifteen hours by the end of the proceeding. The Executive Secretary used one hour and the Army and EG&G collectively used less than nine hours.

In support of its contention that, due to the time

limits imposed by the Board, Sierra Club was denied its Due Process right to cross-examine adverse witnesses, Sierra Club primarily relies on two Utah cases where agencies violated the right to cross-examine witnesses. See *Tolman v. Salt Lake County Attorney*, 818 P.2d 23 (Utah Ct. App. 1991); *D.B. v. Division of Occupational & Prof'l Licensing*, [\*\*37] 779 P.2d 1145 (Utah Ct. App. 1989). These cases are readily distinguishable from the one before us.

In *Tolman*, the petitioner argued that he was denied Due Process when the agency admitted highly prejudicial hearsay testimony, testimony which petitioner could not challenge without cross-examining the declarant, who did not testify. See 818 P.2d at 28-29. In *D.B.*, the administrative law judge refused to permit the petitioner to cross-examine any of the three witnesses presented against him. See 779 P.2d at 1147. We found denials of Due Process in both cases because these petitioners were denied any right to cross-examine the witnesses at issue. Such was not the case here.

In this case, the Board subjected Sierra Club to a time limit, not an outright denial of its right to cross-examine specific witnesses. "An administrative agency has broad discretion to reasonably regulate the time periods afforded parties to present evidence." *Clark* [\*\*348] *v. Board of Dirs.*, 915 S.W.2d 766, 773 (Mo. Ct. App. 1996). See also *Childs v. Copper Valley Elec. Ass'n*, 860 P.2d 1184, 1190 (Alaska 1993) (stating review board "may place reasonable time limits on testimony in order [\*\*38] to manage its own docket"). The fact that Sierra Club ran short on time does not mean it was denied its constitutional right to cross-examine witnesses, as occurred in *Tolman* and *D.B.* The right to Due Process in an agency hearing does not translate into an absolute right to take as much time in presenting its case as a participant desires.

A further distinction between this case and those cited by Sierra Club is that in both *Tolman* and *D.B.*, the petitioners showed they suffered substantial prejudice from these outright denials of the right to cross-examine. *D.B.*, 779 P.2d at 1149; *Tolman*, 818 P.2d at 30-31. Sierra Club does not make such a showing here. Aside from generally alleging that it lacked time to cross-examine several witnesses, Sierra Club does not state what evidence it needed to get in but did not, nor does it show that the case would have come out differently had it been given more time.

Moreover, it appears from the record that any shortfall

in cross-examination time was partially due to Sierra Club's failure to budget its time. "All parties [to an agency hearing] ... must be given opportunity to cross-examine witnesses, to inspect [\*\*39] documents and to offer evidence in explanation or rebuttal." *D.B.*, 779 P.2d at 1146 (emphasis added) (quoting *State Dep't of Community Affairs v. Utah Merit Sys. Council*, 614 P.2d 1259, 1262 (Utah 1980)). Here Sierra Club had the opportunity to cross-examine every witness--it merely failed to make the most of that opportunity through judicious use of its allotted time.

Based on the foregoing, we conclude that the Board's time limitations were not unreasonable and that Sierra Club was not denied its constitutional rights to Due Process.

## CONCLUSION

We first conclude that Sierra Club has standing to bring this appeal because the issues raised are matters of substantial public importance. Second, we conclude that the Board did not err in refusing to revoke the trial burn permit in the face of Sierra Club's allegations of hazards to human health and the environment. Third, we conclude that the Board erred in finding that EG&G was not an "operator" of TOCDF under Utah Code Ann. § 19-6-108(3)(a) (Supp. 1997), but that the Board did not abuse its discretion in refusing to revoke EG&G's permit on that basis. Additionally, we conclude the Board acted within its discretion in [\*\*40] refusing to revoke EG&G's permit based on the accidents which have occurred at TOCDF. Fourth, we conclude that Sierra Club was not denied its federal and state Due Process rights by the time limits imposed by the Board.

Accordingly, we decline to disturb the Board's order.

Gregory K. Orme, Judge

WE CONCUR:

James Z. Davis,

Presiding Judge

Michael J. Wilkins,

Associate Presiding Judge

CHEMICAL WEAPONS WORKING GROUP, et al., Plaintiffs, v. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, Defendant.

Misc. Action No. 98-156 (AER)

UNITED STATES DISTRICT COURT FOR THE DISTRICT OF COLUMBIA

185 F.R.D. 1; 1999 U.S. Dist. LEXIS 2644

January 19, 1999, Decided

January 19, 1999, Filed

**DISPOSITION:**

[\*\*1] Plaintiffs' motion to compel production of documents denied.

**COUNSEL:**

For CHEMICAL WEAPONS WORKING GROUP, INC (CWWG), SIERRA CLUB, VIETNAM VETERANS OF AMERICA FOUNDATION, plaintiffs: Richard E. Condit, Washington, DC.

For US ENVIRONMENT PROTECTION AGENCY, defendant: Robert Foster, U.S. DEPARTMENT OF JUSTICE, Denver, CO.

**JUDGES:**

Aubrey E. Robinson, Jr., United States District Judge.

**OPINIONBY:**

Aubrey E. Robinson, Jr.

**OPINION:**

[\*1] MEMORANDUM OPINION

Presently before the Court is Plaintiffs' motion to compel production of documents. Upon consideration of the entire record, and for the reasons stated below, the Court will deny the motion. n1

n1 The Court finds that the affidavits submitted by Defendant are adequate to establish the privilege, making an *in camera* examination of the documents unnecessary. See *EPA v. Mink*, 410 U.S. 73, 93, 93 S. Ct. 827, 35 L. Ed. 2d 119 (1973).

**Background**

Plaintiffs have subpoenaed documents which represent drafts of EPA's revisions to its 1994 Review Draft of the Dioxin Reassessment. n2 The Dioxin Reassessment [\*\*2] represents EPA's best effort to analyze and synthesize [\*2] the available scientific data to provide to EPA policy makers and program officials an assessment of the risk to human health and the environment of dioxins.

n2 The subpoena requested all final versions as well, but the agency states that there are no final versions. Decl. of William H. Farland at 4.

The current reassessment began in 1991. A "Review Draft" was published in 1994 for public comment and peer review by the Science Advisory Board (SAB). As a result of the public comment and the SAB's recommendations, the agency is currently in the process of the revising the Review Draft to take account of the public comment and latest science. In addition, portions of the Review Draft are undergoing more extensive revision and will be submitted to additional peer review. n3 For at least one major component of the Review Draft, the additional peer review has been completed, and the agency is now revising the draft to address the issues raised by the review.

n3 As portions of the review draft are submitted for independent peer review, the agency releases those drafts to the public. Decl.

of William H. Farland at 8-9.

[\*\*3]

Plaintiffs seek all of the draft revisions to the Review Draft which have not been publically released. Defendant, the United States Environmental Protection Agency (EPA), has resisted production and asserted the deliberative process privilege. n4

n4 The Court notes that Plaintiffs object to EPA's privilege log. The Court finds that EPA reasonably interpreted Plaintiffs' subpoena under the circumstances. Furthermore, EPA provided sufficient information to enable Plaintiffs and the Court to assess the applicability of the privilege as to all documents. Fed. R. Civ. P. 45(d)(2).

#### Analysis

To be protected by the deliberative process privilege a document must be both "predecisional" and "deliberative." *Coastal States Gas Corp. v. Department of Energy*, 199 U.S. App. D.C. 272, 617 F.2d 854, 866 (D.C. Cir. 1980). There is no contention here that the draft revisions to the Dioxin Reassessment are not predecisional. The entire purpose of the revision process is to create a final Reassessment document which the [\*\*4] agency can use in carrying out its statutory mandates. Plaintiffs appear to contend, however, that the documents are not sufficiently "deliberative" to qualify for the privilege.

The deliberative process privilege protects "all communications which, if revealed, would expose to public view the deliberative process of an agency." *Russell v. Department of the Air Force*, 221 U.S. App. D.C. 96, 682 F.2d 1045, 1049 (D.C. Cir. 1982). Thus, factual materials are frequently ineligible for the privilege. See *EPA v. Mink*, 410 U.S. 73, 87-88, 93 S. Ct. 827, 35 L. Ed. 2d 119 (1973); *Russell*, 682 F.2d at 1048. Plaintiffs seize on this notion to argue that the draft revisions to the Dioxin Reassessment are not privileged because they "are summaries of scientific facts, observations, and studies and scientific analysis of those facts. While scientific inferences and conclusions are drawn in the documents ... these inferences are still scientific and factual rather than policy recommendations." Pls.'s Mem. in Support of Motion to Compel at 3.

The Court notes that it is not at all clear that the information Plaintiffs seek is "factual." See *Quarles v. Department of the Navy*, 282 U.S. App. D.C. 183, 893

F.2d 390, [\*\*5] 392-3 (D.C. Cir. 1990) (cost estimates for homeporting battleships opinion not fact). Like any health risk assessment, the Dioxin Reassessment "involves evaluating scientific studies, deciding what weight to give their results, making scientific judgments regarding data gaps, and applying science policy to put the whole into a meaningful framework." Decl. of William H. Farland at 11-12. The result of this process, the "inferences and conclusions," may be scientific, but they are not purely factual. Although risk estimates, like cost estimates, often "have a surface precision that may lead the unsophisticated to think of them as fixed ... estimates such as these are far from fixed ...." 893 F.2d at 393. Rather, "they derive from a complex set of judgments ... They partake of just that elasticity that has persuaded courts to provide shelter for opinions generally." *Id.*

While much of the information sought by Plaintiffs may not be "factual," the ultimate question in deciding whether the deliberative process privilege applies is not whether the material is "factual" or not. [\*\*3] Courts have found the privilege applicable to information which is heavily factual. See *Russell*, 682 [\*\*6] F.2d at 1049 (privilege protects twenty pages of Air Force history not included in final draft); *Montrose Chemical Corp. v. Train*, 160 U.S. App. D.C. 270, 491 F.2d 63, 71 (D.C. Cir. 1974) (privilege protects agency summaries of facts in public hearing record).

Instead, the critical question is whether "disclosure of the materials would expose an agency's decision-making process in such a way as to discourage candid discussion within the agency and thereby undermine the agency's ability to perform its functions." *Dudman Communications v. Department of the Air Force*, 259 U.S. App. D.C. 364, 815 F.2d 1565, 1568 (D.C. Cir. 1987).

In deciding whether the deliberative process privilege applies, courts consider the facts of the case in light of the policies behind the privilege. *Wolfe v. Department of Health and Human Servs.*, 268 U.S. App. D.C. 89, 839 F.2d 768, 774 (D.C. Cir. 1988).

There are essentially three policy bases for this privilege. First, it protects creative debate and candid consideration of alternatives within an agency, and, thereby, improves the quality of agency policy. Second, it protects the public from the confusion that would result from premature [\*\*7] exposure to discussions occurring before the policies affecting it had already been settled upon. And third, it protects the integrity of the decision-making process itself by confirming that "officials should be judged by what they decided(,) not for matters they considered before

making up their own minds."

*Russell*, 682 F.2d at 1048 (quoting *Jordan v. United States Department of Justice*, 192 U.S. App. D.C. 144, 591 F.2d 753, 772-3 (D.C. Cir. 1978)). The Court finds that all three of these policies justify the application of this privilege to the documents sought by Plaintiffs.

First, the Court finds creditable the agency's assertion that the release of draft information would be likely to chill the free exchange of ideas within the agency. See Decl. of William H. Farland at 12; *Coastal States*, 617 F.2d at 866 (privilege applies if "public disclosure is likely in the future to stifle honest and frank communication within the agency").

Risk assessments, and in particular the Dioxin Reassessment, may be very controversial. Thus, EPA has "much at stake in the [final product], and documents like it, being the product of 'candid debate and creative consideration [\*\*8] of the alternatives'" within the agency. *Russell*, 682 F.2d at 1048. Just as the Air Force in *Russell* was entitled to protect the work of individual authors in order to encourage them "to provide the best, most honest, and scholarly products they are capable of producing[.]" so the EPA is entitled to protect the draft work of its individual authors. If anything, the case for protection is even stronger here than it was in *Russell*, because the agency has not completed its revisions. Thus, as EPA points out, any release of draft information might have the unfortunate effect of encouraging interested parties to pressure the agency to change its position even before the agency has adopted one.

Likewise, the Court finds highly creditable the agency's assertion that release of draft information could mislead the public. Decl. of William H. Farland at 12-13. "The public may misinterpret information in the drafts as the most up-to-date information on dioxin toxicity available from the Agency, even though the documents do not reflect official EPA views, but only the preliminary views of the primary authors." *Id.* at 13. In fact, it appears that Plaintiffs seek the documents

[\*\*9] precisely because they believe it is the latest EPA information on the health effect of dioxins. See Pls.'s Motion to Compel at 2-3. Again, the situation is very like the one in *Russell*, where the court said,

We recognize the tendency of the public to assume that a memorandum generated within an agency of the government reflects the position of the agency, regardless of whether the memorandum is designated as an "official" document. Therefore [the deliberative process privilege] acts in this case to prevent the public from misconstruing the views of an individual [agency official] to be the views of [the agency].

*Russell*, 682 F.2d at 1049.

Finally, the Court finds that disclosure of the draft material would "violate the integrity [\*4] of the decision-making process." *Id.* Release of draft revisions now would inevitably enable parties to learn which preliminary ideas and findings the Agency had accepted, which it had refined, and which it had rejected. "But such disclosures of the internal workings of the agency is exactly what the law forbids." *Id.* (quoting *Lead Indus. Ass'n v. OSHA*, 610 F.2d 70, 86 (2d Cir. 1979)).

#### Conclusion

The Court [\*\*10] finds that the documents sought by the Plaintiffs are protected by the deliberative process privilege. Release of the documents would likely stifle candid communication within the agency, lead to public confusion, and violate the integrity of the decision-making process. Accordingly, the Court will deny the motion to compel. An appropriate order issues this same day.

Aubrey E. Robinson, Jr.

United States District Judge

Dated: January 19, 1999

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IN THE UNITED STATES COURT FOR THE DISTRICT OF UTAH

CENTRAL DIVISION

BY: [Signature]  
DEPUTY CLERK

CHEMICAL WEAPONS WORKING  
GROUP, INC., et al.,

Plaintiffs,

vs.

UNITED STATES DEPARTMENT OF THE  
ARMY, et al.,

Defendants.

FINDINGS OF FACT AND  
CONCLUSIONS OF LAW

Case No. 2:96-CV-425C

Plaintiffs Chemical Weapons Working Group, Inc., Sierra Club, and Vietnam Veterans of America filed this suit in May 1996, challenging the operation of the Tooele Chemical Agent Disposal Facility ("TOCDF") by the defendants United States Department of the Army, Department of Defense, and EG&G.<sup>1</sup> According to plaintiffs, the defendants' past operation of TOCDF violated various environmental statutes and its continued operation presents an imminent and substantial endangerment to human health and the environment. A trial was held to the court, sitting without a jury, in June 1999. The court now enters its Findings of Fact and Conclusions of Law, as required by Fed. R. Civ. P. 52(a), and directs that judgment be entered in

<sup>1</sup>For convenience, all defendants will be referred to collectively as "defendants" although the court recognizes that the responsibilities and actions of the federal defendants and the private defendant were often not the same.

favor of the defendants on all claims against them.

## FINDINGS OF FACT

In 1996, destruction of chemical agent began at TOCDF.<sup>2</sup> Since the process began, 21% of the chemical agent stockpile has been destroyed. As explained below, the evidence at trial established that no agent-related injuries have been sustained and no agent has been released into the environment outside TOCDF.

Generally, plaintiffs' claims fall into two categories: incidents that have occurred during the operation of TOCDF and emissions from the TOCDF common stack that have entered the outside environment.<sup>3</sup> The court also discusses plaintiffs' allegations that defendants concealed certain information.<sup>4</sup>

### A. Operational Incidents

#### 1. March 30, 1998

On this date, an MC-1 bomb was incompletely drained of chemical agent GB. The placement of the incompletely-drained bomb into the metal parts furnace ("MPF") caused an overfeed of the MPF. The facts leading up to this occurrence are not seriously in dispute.

The MPF is a two-chambered furnace: combustion takes place in the primary chamber,

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<sup>2</sup>In several previous decisions by this court and the Tenth Circuit Court of Appeals, the background of the chemical warfare agent stockpile stored at Desert Chemical Depot (formerly known as the Tooele Army Depot) and the physical facility at TOCDF, including various safety systems and features, are extensively discussed. The court will not repeat this information except as necessary to explain its decision here.

<sup>3</sup>The common stack releases emissions from TOCDF to the outside environment.

<sup>4</sup>As discussed below, the concealment allegations are relevant to plaintiffs' claims brought under the National Environmental Protection Act.

and gasses from the primary chamber flow into an afterburner chamber. When the gasses leave the afterburner, they pass through a pollution abatement system. The procedure for feeding an MC-1 bomb to the MPF begins when a bomb is brought on a conveyer to the bulk drain station ("BDS"), located in the munitions processing bay above the MPF. At the BDS, two holes are punched in the bomb. A drain tube is then placed in the bomb, and agent is drained from the bomb. The system is designed so that all but 11 pounds of agent, or 5% of the agent, is drained from the bomb.<sup>3</sup> Once a bomb is drained, it is sent on a tray to the MPF.

Shortly before midnight on March 29, 1998, a bomb was sent to the BDS, holes were punched in the bomb, and draining of GB began. After 15 seconds, draining was stopped so that workers could take a sample of the agent and perform maintenance. During the maintenance operations, one of the workers noted problems with the drain probe and suggested to the control room operator that the drain probe might be out of adjustment.

The BDS operator, directed by the control room supervisor, made several more attempts to drain the bomb. Following these attempts, the BDS operator received conflicting data concerning the amount of agent that had been drained from the bomb: certain measurements indicated that the required 95% of agent had been drained, other measurements indicated that it had not. A decision was then made to "bypass" the repeat drain cycle and send the bomb to the MPF. At approximately 3:25a.m. on the morning of March 30, the bomb was fed to the MPF. The bomb contained approximately 75-80 pounds of GB.

Once inside the MPF, the undrained GB in the bomb quickly vaporized, causing a rapid

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<sup>3</sup>Before draining, the bombs contain 220 pounds of agent.

increase in the temperature of the MPF. At 3:39a.m., an alarm sounded, indicating that the temperature in the afterburner was above the extreme temperature limit. The burners and the afterburner automatically shutdown, and a quench water spray was applied to the primary chamber. However, within minutes, TOCDF personnel decided that the best course of action was to continue incinerating the bomb, and the quench water spray was stopped. At 3:44a.m., the temperature in the afterburner had dropped below the extreme temperature limit and shortly thereafter, the afterburner was relighted.

The Automatic Continuous Air Monitoring System ("ACAMS") and the Depot Area Agent Monitoring System ("DAAMS") are monitoring systems used throughout TOCDF to detect the presence of chemical agent. The ACAMS consists of self-contained chromatographs which collect samples of gasses at various locations throughout TOCDF. The ACAMS are numbered to identify their location. At the time of the March 30th incident, ACAMS 703 was located in the duct leading from the MPF to the common stack. ACAMS 701A, ACAMS 701B, and ACAMS 701C were the three ACAMS located in the common stack.

Each ACAMS operates on a three minute cycle with 110 seconds of the cycle spent collecting air samples and 70 seconds analyzing the samples. In the common stack, the cycles of the ACAMS are required to be set so that one ACAMS is always collecting a sample. This is called "staggering the ACAMS."

When an ACAMS detects the presence of agent above a certain concentration, it will "go into alarm," that is, it will trigger an audible alarm in the control room. (Because the ACAMS operate in "near realtime," the machine will not alarm until it has completed its cycle). On March 30, at 3:45a.m., ACAMS 703 went into alarm. However, the three ACAMS in the stack

did not go into alarm.

The second monitoring system in place at TOCDF is the DAAMS. The DAAMS units collect air onto an absorbent material inside a testing tube over an extended period of time. The DAAMS tubes are periodically collected and the contents analyzed for the presence of chemical agent. Sometime after 4a.m. on March 30, after ACAMS 703 had gone into alarm, a TOCDF employee collected the DAAMS tubes from the common stack. These were the DAAMS tubes that had been in place, or "on line" during the incident. Unfortunately, following the general practice, the common stack DAAMS tubes were not kept separate from the DAAMS tubes collected from other locations in TOCDF. In order to determine whether any agent had migrated through the common stack, therefore, workers had to examine all the DAAMS tubes. When all of the DAAMS tubes were analyzed, no agent was detected.

At 3:46a.m., immediately after ACAMS 703 went into alarm, Clayton Hall, the plant shift manager, directed that the site masking alarm, which signals all TOCDF personnel to don their gas masks, be triggered. When Hall observed that the ACAMS in the common stack had not gone into alarm, he gave the direction that gas masks could be removed.

At trial, defendants' expert, James Cudahy, an environmental engineer specializing in high temperature equipment for the treatment of wastes, gave his opinion that no GB was released from the common stack. Cudahy explained that during a one-minute period, from 3:39a.m. until 3:40a.m., there was no oxygen, and consequently, no combustion in the MPF. However, Cudahy concluded that the temperature in the MPF never dropped below 1,965 degrees Fahrenheit (a temperature of 1,350 degrees is needed to destroy GB). Cudahy's review of the data collected from the MPF led him to the conclusion that during this one-minute period,

the conditions in MPF were such that the agent would have been destroyed. It was also Cudahy's opinion that during this one-minute period, an unknown material was formed ("an interferent") and caused ACAMS 703 to go into alarm.

Cudahy opined that if any of the GB had survived the high temperatures of the MPF, which he believed highly unlikely, it would have passed into the pollution abatement system, reacted with the hot caustic brine in the system, and been chemically neutralized.

Defendants have made changes to ensure that there will not be a repeat of the March 30 incident. Drain probes have been marked to allow the BDS operator to visually determine whether the probes are in the correct position. Procedures have been implemented so that when questions arise about whether a bomb has been sufficiently drained of agent, several supervisors must evaluate the problem before the questioned bomb will be fed to the MPF. In addition, defendants have revised and improved the DAAMS tracking system and made modifications to the ACAMS to guarantee continuous, staggered monitoring in the common stack.

## 2. December 1998

As a result of a maintenance error, 140 gallons of chemical agent leaked into a sump. Because of another, unrelated error, the ACAMS did not alarm. When a control room operator discovered the spill, the system was shut down and no injury resulted. Changes have been made in various procedures to prevent reoccurrences.

## 3. May 21, 1999

TOCDF employees were working in the explosive containment room, a Level A area.<sup>6</sup>

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<sup>6</sup>Areas in TOCDF are designated as either Level A, B, or C, according to whether chemical agent is expected to be present. An area is designated Level A or B if chemical agent is expected to be present. Level C areas are those where chemical agent is not expected to be present. Protective clothing must be worn in A and B

Simultaneously, in another area known as the "unpack-area," other employees were feeding ton containers through an airlock into the explosive containment vestibule. Agent migrated from the explosive containment room, through the airlock, and into the unpack area.

Following the incident, the employees from the unpack area were examined at the TOCDF medical clinic, and given blood tests. There was no indication that the workers had suffered "exposure" or injury.

4. May 24, 1999

TOCDF employees, dressed in Level B protective clothing, were removing nose plugs or closures from projectiles. Beneath the nose closure of each projectile is a hollow area known as the "burster well." The burster well is usually sealed to prevent leaks of agent from the surrounding agent cavity into the burster well.

On this date, one of the nose closures was removed and chemical agent migrated from the burster well. The employees immediately left the area and were taken to the TOCDF clinic. There was no indication of injury to the employees.

5. June 4, 1999

TOCDF has an emergency power system for use if the local power company experiences a power outage. The emergency system has two components: first, a battery backup system, called the "uninterruptible power supply," which supplies power for control systems and agent monitors; second, emergency generators that provide power for critical operating systems, such

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areas. TOCDF personnel working in A areas wear the highest degree of protective clothing.

<sup>7</sup>The Army definition of "exposure to chemical agent" is a measurable reduction of cholinesterase, an enzyme found in blood plasma.

as the heating, ventilation, and air-conditioning system ("HVAC").<sup>8</sup>

TOCDF has experienced problems with the emergency power system. The most significant took place on June 4, 1999, when a thunderstorm caused an outage. The emergency system failed to come online automatically and had to be manually started, resulting in an eight to twelve minute period when TOCDF was without electrical power. During this period, various safety and monitoring systems were out of operation, including the HVAC system, thereby allowing chemical agent to migrate into a Level C unpack area. No injury resulted from the failure of the emergency system.

Defendants have taken measures to improve the emergency power system, including the addition of a third generator.

#### 6. Waste Characterization

Defendants are required by their Utah State permits to analyze and characterize the agent waste before it is incinerated. In January 1997, analysis of the brine from the pollution abatement system showed that the brine contained 12.3 parts per million of arsenic, far in excess of the 5 parts per million allowed by TOCDF's permit. Plaintiffs claim that the presence of this amount of arsenic shows that the defendants have been incinerating chemical agent lewisite, which TOCDF's permit does not allow.

In 1997, in an effort to discover the source of the arsenic in the brine, the Army began investigating the history of the ton containers being used at TOCDF. The investigation showed that certain ton containers had contained Freon and mustard, before being used by the Army at

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<sup>8</sup>TOCDF's HVAC is designed, through the use of negative air pressure, to prevent agent migration.



TOCDF.

Defendants, in conjunction with the State of Utah, created a program to take samples of a representative number of the ton containers to determine if any of the containers were now contaminated with lewisite. The analysis revealed no lewisite contamination. The waste tracking forms now indicate, and have since 1998, that the waste contains arsenic.

Through the sampling program, defendants discovered that the agent in some of the ton containers had a low pH value, and was therefore highly acidic. The defendants have partially incinerated the contents of one of these ton containers in the MPF, not the liquid incinerator. The State of Utah granted defendants a temporary emergency permit to incinerate the low pH agent, which allows defendants to incinerate the contents of seventeen pressurized ton containers. Defendants do not know for sure, but they believe that no other ton containers contain low pH agent.

## 7. Miscellaneous Operational Claims

### a. Hot Cut-Outs

Plaintiffs claim, as a general matter, that decontamination procedures, including "hot cut-outs," are inadequate and expose TOCDF employees to chemical agent.

TOCDF personnel working in Level A areas wear demilitarization protective ensemble ("DPE") suits. These plastic suits are completely sealed from the outside environment and must be physically cut to be removed. A normal cut-out occurs when a suit is removed in an area where the Time Weighted Average ("TWA") is 40 units<sup>9</sup> or less. Removal of a DPE suit in an

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<sup>9</sup>TWA is an agent concentration exposure measurement established by the Office of the Surgeon General. An average individual can be exposed to one TWA for eight hours per day, forty hours per week, for his or her lifetime, without suffering adverse health effects

area where agent concentration is higher than 40 TWA, is described as a "hot cut-out."

Following a hot cut-out, the person is examined at the TOCDF medical clinic. There was no evidence that any employee has been injured as a result of a hot cut-out.

**b. Bags Containing Hazardous Waste**

Twice, shortly before trial, TOCDF employees were working in the vicinity of bags containing hazardous waste. Apparently, on each occasion, one or more of the bags was torn, allowing agent vapor to escape and causing the ACAMS to alarm. There was no indication that the employees were injured. Employees working in the vicinity of bags containing contaminated waste now wear the highest level of protective clothing.

**c. Visitors to TOCDF**

On May 25, 1997, a group of visitors toured TOCDF. During the tour, the visitors entered an area where MC-1 bomb casings were stored. Due to an error in the documentation that had accompanied the bomb casings when they were delivered to TOCDF from Deseret Chemical Depot, one of the casings was not completely decontaminated.

The evidence indicated that the visitors were not exposed to agent. No ACAMS alarm was triggered in the area and a later blood test of an employee who had spent a far greater amount of time than the visitors in the vicinity of the contaminated MC-1 bomb showed no evidence of exposure. The defendants now exclude visitors from entering areas where possibly contaminated materials are stored.

**d. Staggered ACAMS**

As discussed previously, to ensure continuous monitoring, the ACAMS in the common stack must be staggered. There have been at least five times when the ACAMS were not

staggered. No evidence was presented of injury resulting because of these five failures.

Since April 1998, at the direction of the State of Utah, the ACAMS are monitored to ensure that they remain staggered. If the ACAMS are not staggered, an alarm sounds in the control room, the waste feed to the furnaces automatically shuts down, and no agent is fed to the furnaces.

**e. Agent Gelling**

Defendants have discovered that in the remaining stockpile, agent is gelling or crystallizing in the rockets and is less easily drained. Defendants have asked the State of Utah for permission to feed rockets that contain more than a 5% heel (the "heel" is the amount of agent remaining in a munition after it has been drained). To ensure that the total amount of agent fed to the furnace does not exceed the amount demonstrated as part of the TOCDF trial burns (and therefore be within the limits of the TOCDF permits), defendants have proposed to the State that they be allowed to feed one rocket with a greater than 5% heel per hour to the MPF rather than 42 rockets with a 5% heel per hour as currently allowed.

**B. Emissions from the Common Stack**

**1. Risk from Dioxin**

Defendants' expert witness, James Cudahy, explained that the term "dioxin" refers to a family of 210 compounds that can be dangerous to human health, including causing an increased risk of cancer. Each of the 210 members of the dioxin family is called a "congener." The molecular structure of each congener is unique. The Environmental Protection Agency ("EPA") has identified seventeen of the congeners as toxic, although the level of toxicity among the seventeen congeners varies. The EPA assesses the toxicity of the seventeen congeners by a

method known as "toxic equivalent factors." (June 16 Tr. at 22-23).

Under its permits with the State of Utah, TOCDF was required to conduct a series of trial burns to determine whether it can destroy agent and other materials without releasing, above specified limits, toxic materials into the air. The defendants have conducted trial burns on the four furnaces that now operate at TOCDF. Cudahy testified that he had examined the results of the trial burns from the four TOCDF furnaces that are in operation and found that most of the seventeen toxic congeners were not found in concentrations above the detection limit. The most toxic—2,3,7,8 tetrachloro dibenzo-p-dioxin—was not found above the detection limit.

In 1996, the State of Utah Department of Environmental Quality prepared a Screening Health Risk Assessment ("Assessment").<sup>10</sup> The Assessment evaluated the risks, cancerous and non-cancerous, that emissions from TOCDF would pose to human health. Because the Assessment was prepared before TOCDF began incineration of chemical agent, the Assessment modeled TOCDF emissions by using maximum levels taken from the data drawn from JACADS, the prototype facility located at Johnston Atoll in the South Pacific. The Assessment concluded that

[a]ssuming simultaneous operation of all five furnaces at TOCDF [only four furnaces are in operation at TOCDF], the overall cancer and non-cancer risks were at or below EPA screening risk levels. As far as the cancer effects of dioxin, the risk assessment found that EPA guidance levels were not exceeded for 10, 15, and 30 year operating periods. The risk assessment did not calculate non-cancer effects of the dioxin exposure because there is currently no applicable reference dose for dioxin . . . .

Chemical Weapons Working Group, Inc. v. United States Dep't of the Army, 935 F.Supp 1206,

<sup>10</sup>In an earlier order, the court discussed the Assessment at length. See Chemical Weapons Working Group, Inc. v. United States Dep't of the Army, 935 F.Supp. 1206, 1213-14 (D. Utah 1996).

1213 (D. Utah 1996).

At trial, the defendants called Dr. Brent Kerger, an expert witness in toxicology and risk assessment. Dr. Kerger had updated the Assessment with data from the TOCDF trial burns and new EPA toxicity criteria. The trial burn data used by Dr. Kerger were more comprehensive than the JACADS data: approximately 235 individual chemicals were analyzed in the trial data compared to 69 in the JACADS. In addition, the trial burn data produced congener-specific dioxin levels, while the JACADS data did not. With the congener-specific dioxin levels, Dr. Kerger was able to focus on the congeners which, because of their toxicity, can be dangerous to health.

Using the updated information, Dr. Kerger concluded that the Assessment substantially overstated the degree of risk that would be caused by the TOCDF emissions. In Dr. Kerger's opinion, the low level of emissions resulting from operation of TOCDF was several orders of magnitude below levels known to be harmful to human health.

Plaintiffs presented no credible evidence in support of their contention that dioxin emissions from TOCDF would cause adverse health effects in humans. In support of their argument, plaintiffs heavily relied on a draft document entitled "Health Assessment Document for 2,3,7,8 Tetrachloro dibenzo-p-dioxin," issued by the EPA in 1994. That document, however, clearly states that it is just a draft, and therefore is not a final conclusion by the EPA.

## 2. Destruction of PCBs

The M-55 rocket shipping and firing tubes incinerated in the Deactivation Furnace System ("DFS") at TOCDF contain polychlorinated biphenyls ("PCBs"). Under the terms of its Toxic Substances Control Act Permit, Defendants must demonstrate that the DFS will destroy

PCBs to a one part in one million, or 99.9999 %, destruction removal efficiency (commonly referred to as "6-9s DRE").

To date, the DRE has been measured in two demonstration burns. The second demonstration burn demonstrated that the DFS met the 6-9s DRE. The results were not so clear in the first demonstration burn. The first demonstration burn consisted of three runs or trials. While the first two runs were successful, the data from the third run showed that the 6-9s DRE was not met. The EPA, therefore, did not approve the first burn. However, the evidence indicated that an interferent caused the failure to meet the 6-9s standard and the DFS furnace performed properly.

Cudahy testified that he had examined the structure and design of the DFS, and in light of his familiarity of PCB test burns conducted at other facilities, it was his opinion that the DFS would meet the 6-9s DRE.

Based on the above evidence, the court concludes that the DFS will meet the 6-9s DRE.

### C. Concealment of Information

Plaintiffs have asserted claims under the National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4332 et seq.<sup>11</sup> By previous order, the court dismissed plaintiffs' allegation that the failure to prepare a supplemental Environment Impact Statement ("EIS") violated NEPA. The only issue remaining at trial on plaintiffs' NEPA claims was whether plaintiffs' challenge to the

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<sup>11</sup>Plaintiffs' NEPA claims are directed at two environmental impact statements. In 1988, the Department of the Army completed a three-volume final programmatic environmental impact statement ("1988 FPEIS") on the disposal of stockpiled munitions and chemical agent. A Record of Decision ("ROD") was signed on February 23, 1988. On-site incineration was selected as the process to dispose of the stockpiled chemical weapons.

The following year, the Army prepared a site-specific environmental impact statement ("1989 EIS") for the Tooele facility. On August 30, 1989, a ROD was signed, and on-site incineration was selected. The 1989 EIS incorporated the 1988 FPEIS.

1988 and 1989 EISs is barred by the statute of limitations. The plaintiffs contend that defendants actively concealed relevant information that should have been included in the 1988 and 1989 documents and that, therefore, the doctrine of equitable tolling allowed plaintiffs' NEPA claims to go forward.

According to the plaintiffs, the defendants concealed information about three subjects: the cause of sheep deaths in Skull Valley, Utah; the synergistic effects of pesticides; and the existence of a dioxin reference dose.<sup>12</sup>

#### 1. Sheep Deaths

On March 13, 1968, as part of an overflight spray test, an Airforce F-4E aircraft released approximately 2500 pounds of chemical agent VX over the Dugway Proving Grounds, near Skull Valley, Utah. Almost immediately, thousands of sheep that had been grazing near the Dugway Proving Grounds fell ill and died.

News articles reflected the suspicion that chemical agent was the cause of the deaths. For example, the headline of an article in the Washington Post read: "Did U.S. Army Nerve Gas Kill the 6400 Sheep in Utah?" (Article of Mar. 23, 1968, cited in Defendants' Ex. A-1136 at 571). Similarly, the Los Angeles Times reported that "Army Chemical Suspected" in the sheep deaths. (Article of Mar. 21, 1968, cited in Defendants' Ex. A-1136 at 540). The Army initially denied any link between the release of chemical agent and the sheep deaths.

Despite their initial denial of responsibility, however, federal authorities, including the Army, soon began an investigation into the cause of the sheep deaths. In April 1968, under the

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<sup>12</sup>The evidence presented at trial consisted solely of documents, most of which were presented by defendants.

direction of Brigadier General William Stone, the Army released a two-volume report ("the Stone Report") which detailed the results of the investigation. The Stone Report was initially classified and not available to the public, but declassified in January 1976. Reference to the Stone Report appears in the Army's administrative record for the 1988 FPEIS.

In 1969 and 1970, the Journal of American Veterinary Medical Association published articles on the sheep deaths. Material from both articles appeared in the FPEIS. ("[S]heep were poisoned at Skull Valley, Utah from eating VX-contaminated forage . . . ." App. O at 26, Defendants' Ex. A-1143). Other reports of investigations and studies of the sheep deaths were referred to in the FPEIS.

## 2. Synergistic Effects of Pesticides

During the investigation into the sheep deaths, an experiment was conducted to determine if pesticides that had been used for aerial crop spraying in the vicinity of Skull Valley might have interacted with the chemical agent that had been released. The 1988 FPEIS disclosed the details and the results of this experiment, concluding that "[t]he animals [four sheep] were observed continuously for effects, but no toxic signs or indications of synergism were produced. The sheep were completely normal during the 48-hour observation period." (Defendants' Ex. A-1140 at 35). The investigation also explored the effects of other insecticides on sheep. (*Id.* at 36-37). This material was referred to in the 1988 FPEIS.

## 3. Dioxin Reference Dose

Plaintiffs contend that the defendants concealed information that the EPA had, before 1988, calculated a reference dose of 1 pg/kg/day for dioxin exposure and that this information was not disclosed in the NEPA documents. Although plaintiffs are apparently correct that this



information was not disclosed in the NEPA documents, it is undisputed that the information on a possible reference dose was known and available to the public in 1984.

### CONCLUSIONS OF LAW

The court has jurisdiction over this action pursuant to 42 U.S.C. § 6972(a), 15 U.S.C. § 2619(a), and 28 U.S.C. § 1331. Venue is not disputed.

Remaining for resolution at trial were plaintiffs' claims brought under the Resource Conservation and Recovery Act ("RCRA"), 42 U.S.C. § 6941 et seq.; the Toxic Substances Control Act ("TSCA"), 15 U.S.C. § 2601 et seq.; and NEPA.

#### A. RCRA Claims

RCRA's citizen suit provisions are found at 42 U.S.C. § 6972. Under § 6972(a)(1)(A), any person may bring suit "against any person (including . . . the United States . . .) who is alleged to be in violation of any permit, standard, regulation, condition, requirement, prohibition, or order which has become effective pursuant to this chapter . . . ." 42 U.S.C. § 6972(a)(1)(A).

Section 6972(a)(1)(B) authorizes suit "against any person, including the United States . . . who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment . . . ." 42 U.S.C. § 6972(a)(1)(B).

##### 1. Section 6972(a)(1)(A) claims

Plaintiffs have pointed to a number of incidents and events that they claim show that defendants have violated their RCRA permits, and therefore have violated § 6972(a)(1)(A). The court concludes that plaintiffs have not prevailed on any of their claims under this subsection because either the claim is barred by the Gwaltney Doctrine or the evidence at trial did not

establish the claimed violation.

a. Claims barred by the Gwaltney Doctrine

In Gwaltney of Smithfield, Ltd., of Chesapeake Bay Foundation, Inc., et al., 484 U.S. 49 (1987), the Court held that while citizens may bring suit against dischargers whom they believe to be violating the Clean Water Act, a district court does not have subject matter jurisdiction over a citizen suit for wholly past violations. In arriving at this conclusion, the Court focused its attention on the language of the citizen suit provision of the Clean Water Act, 33 U.S.C. § 1365(a), which permits a private cause of action only against persons who are “alleged to be in violation” of the Act. The Court held that the “prospective orientation” of the phrase indicated that Congress had authorized only prospective relief. Gwaltney, 484 U.S. at 57. The Court observed that Congress has used identical language in the citizen suit provisions of several other environmental statutes, including § 6972(a)(1)(A), “that authorize only prospective relief.” Id. The Court pointed out, citing § 6972(a)(1)(B) as an example, that Congress knows how to draft a statute that “explicitly targets wholly past violations.” Id. n.2.

Although the Tenth Circuit has not addressed the question of whether claims based on wholly past violations can be brought under § 6972(a)(1)(A), other courts have found that the Supreme Court’s language in Gwaltney prohibits suits under § 6972(a)(1)(A) for wholly past violations. See, e.g., Carroll v. Litton Systems, Inc., 47 F.3d 1164, 1995 WL 56862 (4th Cir. 1995); Ascon Properties v. Mobil Oil Co., 866 F.2d 1149, 1159 (9th Cir. 1989); Raymond K. Hoxsie Real Estate Trust v. Exxon Education Foundation, 81 F.Supp.2d 359, 363 (D. R.I. 2000); Aurora National Bank v. Tri Star Marketing, Inc., 990 F.Supp. 1020, 1024 (N.D. Ill. 1998). Pennsylvania Real Estate Investment Trust v. SPS Technologies, Inc., 1995 WL 687003, \*6

(E.D. Pa. 1995); Murray v. Bath Iron Works Corp., et al., 867 F.Supp. 33, 42 (D. Me. 1994); Chartrand v. Chrysler Corporation, 785 F.Supp. 666, 670 (E.D. Mich. 1992).<sup>13</sup> Accordingly, because plaintiffs have failed to establish that the following violations were on-going or likely to reoccur, judgment is granted on plaintiffs' § 6972(a)(1)(A) claims:

- i. The March 30, 1998; overfeed of agent to the MPF;
- ii. The failure to stagger the common stack ACAMS on five occasions between November 1996 and April 1997;
- iii. The operation of TOCDF by EG&G without a license. (EG&G was added to the operating permit on June 18, 1996).
- iv. The failure to file a hazardous waste minimization plan and obtain the corresponding certification during the first year of operation at TOCDF. (Defendants have been properly certified since August 1996).

**b. Claims not supported by evidence**

The court further concludes that the evidence presented at trial was not sufficient to establish the following:

- i. that chemical agent has been released into the environment outside TOCDF;
- ii. that any TOCDF personnel or visitors have been injured through exposure to chemical agent;
- iii. that the safety practices of TOCDF violate the terms of the TOCDF permits;
- iv. that the gelling of agent in rockets and defendants' proposal to the State of Utah to incinerate rockets containing more than a 5% heel is in violation of defendants'

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<sup>13</sup>The court has found no courts that have permitted suits under this subsection for wholly past violations.

permits or poses a threat to health and the environment;

- v. that the low pH factor of some of the chemical agents and defendants' means of incinerating it violates defendants' permits or poses a threat to health and the environment;
- vi. that defendants have failed to properly categorize agent waste; and
- vii. that defendants have failed to comply with the terms and the requirements of their permits from the State of Utah.

## 2. Section 6972(a)(1)(B) claims

In order to prevail under this subsection, plaintiffs must show that defendants' actions "present an imminent and substantial endangerment to health or the environment." 42 U.S.C. § 6972(a)(1)(B).

Plaintiffs allege that the various operational events and incidents at TOCDF and the emissions from the common stack described above satisfy the requirements of this subsection. The court holds that the evidence at trial does not support such a conclusion.

Although there have been problems in the operation of TOCDF, there was no evidence that TOCDF personnel, the public, or the environment have been harmed by these operations. Further, the evidence at trial indicated that when an operational incident occurred, defendants took steps to improve procedures and implement additional safety measures to prevent similar incidents from occurring. There was no evidence at trial that chemical agent has ever been released from the common stack into the environment and the evidence demonstrated that the release of non-agent emissions from the common stack have been, and continue to be, well within regulatory guidelines.

Since plaintiffs failed to demonstrate that defendants' actions present an imminent and substantial endangerment to health or the environment, their claims under § 6972(a)(1)(B) must fail.

#### B. TSCA claims

Plaintiffs brought suit under the citizens' suit provision of TSCA, 15 U.S.C. § 2619, claiming that defendants had violated TSCA by failing to meet the 6-9s DRE required for the destruction of PCBs. The evidence at trial demonstrated that TOCDF has, and continues to, meet the 6-9s DRE. Therefore, plaintiffs have not prevailed on their TSCA claim.

#### C. NEPA Claims

NEPA does not have a private right of action. Challenges to NEPA decisions are governed by the Administrative Procedures Act ("APA"). See Chemical Weapons Working Group v. Dep't of the Army, 111 F.3d 1485, 1494 (10th Cir. 1997). Plaintiffs' NEPA claims must fall within the six-year statute of limitations of 28 U.S.C. § 2401, which applies to suits under the APA. See id. As the court has previously held, unless plaintiffs can demonstrate that the limitations periods should be equitably tolled, plaintiffs' challenges to the 1988 FPEIS and the 1989 EIS are time-barred. Plaintiffs contend that the statutes of limitations have been tolled by the defendants' concealment of information concerning the sheep deaths in Skull Valley, Utah, the synergistic effect of pesticides, and a possible reference dose for dioxin. To prevail on these claims, plaintiffs must demonstrate that the defendants "engaged in 'active deception' which caused [their] filing to be untimely." Purington v. Univ. of Utah, 996 F.2d 1025, 1030 (10th Cir. 1993) (internal citations omitted).

Plaintiffs acknowledge that the defendants "did disclose selected other portions of the

available information regarding the sheep kill." (Plaintiffs' Proposed Findings of Fact and Conclusions of Law on NEPA Issues at 3). Plaintiffs assert that equitable tolling should apply because "these disclosures are only peace-meal [sic], bits and pieces of a puzzle that are disclosed without the existence of the puzzle itself being known to the public." (*Id.* at 4). Plaintiffs' equitable tolling argument, then, is based on the adequacy of the discussion of the sheep deaths and the information in the NEPA documents. Plaintiff's allegations simply do not rise to the level of active deception, particularly in view of the fact that the Stone Report, which extensively discussed the sheep deaths, was available in 1976.

Similarly, plaintiffs' arguments regarding a possible dioxin reference dose and the synergistic effects of pesticides fall short of establishing active deception by the defendants. Plaintiffs admit that as early as 1988, information was available from the EPA concerning a possible reference dose for dioxin. (*Id.* at 5). In addition, the synergistic effects of pesticides was contained in the FPEIS.

Accordingly, plaintiffs' NEPA claims are time-barred.

For the above reasons, judgment is granted for the defendants on all claims against them brought by plaintiffs.

DATED this 14 day of April, 2000. 554

BY THE COURT:

*Tena Campbell*

TENA CAMPBELL  
United States District Judge

## ATTACHMENT T

***“Evaluation of Demonstration Test Results of Alternative Technologies  
for Demilitarization of Assembled Chemical Weapons: A Supplemental  
Review,” National Research Council, 2000***

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# Evaluation of Demonstration Test Results of Alternative Technologies for Demilitarization of Assembled Chemical Weapons

*A Supplemental Review*

REPRINTED WITH PERMISSION OF THE  
NATIONAL ACADEMY OF SCIENCES

EQC Meeting May 18, 2000  
Attachment T, Page T-1

NATIONAL RESEARCH COUNCIL

# **Evaluation of Demonstration Test Results of Alternative Technologies for Demilitarization of Assembled Chemical Weapons**

## **A Supplemental Review**

Committee on Review and Evaluation of Alternative Technologies  
for Demilitarization of Assembled Chemical Weapons

Board on Army Science and Technology

Commission on Engineering and Technical Systems  
National Research Council

NATIONAL ACADEMY PRESS  
Washington, DC

EQC Meeting May 18, 2000  
Attachment T, Page T-2

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## Preface

The United States has been in the process of destroying its chemical munitions for over a decade. The U.S. Army, with expertise from numerous bodies including the National Research Council (NRC), originally decided to use incineration as the method of destruction at all storage sites. However, citizens in states with storage sites have opposed incineration on the grounds that it is impossible to determine the exact nature of the effluents, in particular, effluents from the stacks. Nevertheless, the Army has continued to pursue incineration at most sites. In the last few years, influenced by growing public opposition to incineration and after numerous studies, including a 1996 study by the NRC entitled *Review and Evaluation of Alternative Chemical Disposal Technologies*, the Army is developing a chemical neutralization process to destroy chemical agents stored only in bulk ton containers at two sites: VX at Newport, Indiana, and mustard (HD) at Aberdeen Maryland.

Persuaded by public opposition to incineration at the Lexington, Kentucky, and Pueblo, Colorado, sites, Congress in 1996 enacted Public Law 104-201 instructing the Department of Defense (DOD) to "conduct an assessment of the chemical demilitarization program for destruction of assembled chemical munitions and of the alternative demilitarization technologies and processes (other than incineration) that could be used for the destruction of the lethal chemical agents that are associated with these munitions." The Army established a Program Manager for Assembled Chemical Munitions Assessment (PMACWA) to respond to this instruction. Unlike prior activities, the PMACWA involved the public in every aspect of the program including the procurement process. A nonprofit organization, the Keystone Center, was hired to facilitate public involvement.

After requesting and receiving proposals from industry for complete technology packages to destroy stored assembled chemical weapons, the Army initially selected seven industry teams, denoted as technology providers in this report. In later selections, these seven were reduced to six, and then three to

proceed to the demonstration phase of the assessment program. When the NRC's Committee on Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons (ACW Committee) first report was written, the committee did not have the benefit of evaluating the results of the demonstrations.

Subsequently, the PMACWA requested that the committee evaluate both the technology providers' test reports and the Army's evaluations to determine if the demonstrations changed the committee's earlier findings or recommendations. This report is a supplemental review evaluating the impact of the three demonstration tests on the committee's original findings and recommendations.

I wish to acknowledge with great gratitude the members of the ACW Committee who have continued to serve as volunteers throughout this extended study and who completed this supplemental study in the relatively short time allocated by the PMACWA. They provided the necessary expertise in chemical processing, permitting and regulations, energetic materials and public acceptance to continue this task. I remain, by far, the least capable of this group.

The committee recognizes and appreciates the assistance of the Army ACWA team, which provided support and the necessary reports. We also appreciate the openness and the cordiality of the technology providers.

A study such as this requires extensive support. We are all indebted to the NRC staff for their logistic support. I would particularly like to acknowledge the close working relationship between the committee and Bruce Braun, who undertook the task of acting study director along with his other duties as director of the NRC Board on Army Science and Technology. Mr. Braun also provided the resources and staff to complete this study in record time for an NRC report. The efforts of Harrison Pannella, who acted as assistant study director, were invaluable. He put in long hours on evenings and weekends to prepare, edit, and format this report. In addition, Rebecca Lucchese and Jacqueline Johnson

provided logistic support to the committee, allowing us to concentrate on our task. Also, an acknowledgement is due for Carol Arenberg, who edited the final draft of the report. Everyone worked under a short deadline and great stress during a period that included a holiday season.

I gratefully acknowledge the support of my colleagues in the Chemistry Department at the University of Southern

California, who willingly assumed my teaching duties while I traveled on behalf of this study.

Robert A. Beudet, *chair*  
Committee on Review and Evaluation of  
Alternative Technologies for Demilitarization  
of Assembled Chemical Weapons



# Acknowledgment

This report has been reviewed by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the authors and the NRC in making the published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The contents of the review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their participation in the review of this report:

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While the individuals listed above have provided many constructive comments and suggestions, responsibility for the final content of this report rests solely with the authoring committee and the NRC.

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# Acronyms

ACWA	Assembled Chemical Weapons Assessment (program)
ARAR	appropriate, relevant, and applicable rule
BOD	biological oxygen demand
CAA	Clean Air Act
CAMDS	Chemical Agent Munitions Disposal System
CATOX	catalytic oxidation
CFM	cubic feet per minute
COD	chemical oxygen demand
CSTR	continuously stirred tank reactor
DAAMS	depot area air monitoring system
DMMP	dimethyl methyl phosphonate
DOD	U.S. Department of Defense
DPE	demilitarization protective ensemble (suit)
DRE	destruction and removal efficiency
DSHS	dunnage shredding/hydropulping system
EDC	energetics deactivation chamber
EMPA	ethyl methylphosphonic acid
EPA	Environmental Protection Agency
ERH	energetics rotary hydrolyzer
GB	type of nerve agent
GC	gas chromatography
GC/MS	gas chromatography/mass spectrometry
HD	distilled mustard agent
HEPA	high-efficiency particulate air
HRA	health risk assessment
ICB	immobilized cell biotreatment
IMPA	isopropyl methylphosphonic acid

M	molar concentration
MPT	metal parts treater
NRC	National Research Council
PCG	plasma converted gas
PMACWA	Program Manager for Assembled Chemical Weapons Assessment
ppm <sub>v</sub>	parts per million (volumetric)
PWC	plasma waste converter
RCRA	Resource Conservation and Recovery Act
RDX	cyclotrimethylenetrinitramine
RFP	request for proposal
scf	standard cubic feet
SCWO	supercritical water oxidation
TCLP	toxicity characteristic leachate procedure
TNT	trinitrotoluene
TWA	time weighted average
UV	ultraviolet
VOC	volatile organic compound
VX	type of nerve agent
WHEAT	water hydrolysis of explosives and agent technology
3X	level of decontamination (suitable for transport for further processing)
5X	level of decontamination (suitable for commercial release)

# Executive Summary

In 1996, the U.S. Congress enacted two laws, Public Law 104-201 (authorization legislation) and Public Law 104-208 (appropriation legislation), mandating that the U.S. Department of Defense (DOD) conduct an assessment of alternative technologies to the baseline incineration process for the demilitarization of assembled chemical munitions. In December 1996, DOD appointed Mr. Michael Parker, Technical Director of the Soldier Biological Chemical Command, to be the program manager for assembled chemical weapons assessment (PMACWA). The program manager published a request for proposals for the complete destruction of assembled chemical weapons. On July 29, 1998, three technology packages were selected for the demonstration phase of the ACWA program. Constrained by both time and resources, the PMACWA selected the unit operations deemed "most critical [and] least proven" for demonstration testing.

The PMACWA had previously requested that the National Research Council (NRC) perform and publish an independent evaluation of the seven technologies packages that had been selected during earlier phases of the Assembled Chemical Weapons Assessment (ACWA) program and deliver a report by September 1, 1999. However, to meet that deadline, the NRC Committee on Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons (ACW Committee) had to terminate its data-gathering activities on March 15, 1999, prior to the completion of demonstration tests. In September 1999, the PMACWA requested that the ACW Committee examine the reports of the demonstration tests and determine if the results changed the committee's original findings, recommendations, and comments. This report documents the committee's reassessment of the findings and recommendations in the original report, *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons*.

In this supplemental report, the committee limited its review to the demonstration test reports prepared by the

technology providers and the PMACWA's *Supplemental Report to Congress*, which included the PMACWA's technical evaluation of the tests as a separate appendix. The committee limited its evaluation to the effects of the demonstration test results on the earlier report.

The three technology demonstrations are reviewed in separate chapters in this report; in each chapter, the demonstrated unit operations are considered one at a time. Following a short description of the demonstration tests and commentary by the committee, the findings and recommendations from the original report that bear on the demonstrations are then evaluated. In general, very few of the original findings and recommendations were influenced by the demonstrations. In some cases, the original findings and recommendations were confirmed. A number of new findings and recommendations resulted from the demonstrations, however, and these are presented below.

## SUPPLEMENTAL FINDINGS AND RECOMMENDATIONS

### Burns and Roe Demonstration Tests

**Finding BR-1.** The plasma torch apparatus, as demonstrated by the Burns and Roe team, is not qualified for further consideration for the demilitarization of assembled chemical weapons. The torch design appears to be unreliable for extended use. Furthermore, the design increases the possibility of a catastrophic water leak, which could produce a significant increase in pressure in the plasma waste converter (PWC), and possibly cause an explosion, which, in turn, could expose personnel to chemical agent. Moreover, the effectiveness of the monitoring and control sensors was not demonstrated.

**Finding BR-2.** Even after more than a year of research and development, the technology provider has not been able to

TABLE ES-1 Summary Evaluation of the Maturity of Demonstrated Unit Operations and Processes<sup>a</sup>

Unit Operation/Process	Hydrolysates			Agent Munitions			Other
	VX/GB	HD	Energetics	VX/GB	HD	Energetics	
Burns and Roe Plasma waste converter <sup>b</sup>	C	C	D	D	D	E	C, d, e
General Atomics Hydrolysis				A	A		
Rotary hydrolyzer						C	
Shredding/hydropulping							A <sup>c</sup>
SCWO	B	B	C				C <sup>c</sup>
Parsons-AlliedSignal Munitions accessing				B	B	B	
Hydrolysis				A	A	C	
Biotreatment	D	A	A				
Catalytic oxidation							B <sup>e</sup>
Metal parts treater				B	B	D	B <sup>d</sup>

Note: Environmental and safety issues were considered in assigning maturity categorizations. Schedule and cost issues were not considered.

<sup>a</sup> The letter designations are defined as follows (a blank space indicates categorization was not applicable for that material).

- A Demonstration provides sufficient information to allow moving forward to full-scale design with reasonable probability of success.
- B Demonstration provides sufficient information to allow moving forward to the pilot stage with reasonable probability of success.
- C Demonstration indicates that unit operation or process requires additional refinement and additional demonstration before moving forward to pilot stage.
- D Not demonstrated; more R&D required.
- E Demonstrated unit operation or process is inappropriate for treatment.

<sup>b</sup> Includes integrated gas polishing system to support demonstration

<sup>c</sup> Dunnage

<sup>d</sup> Metal parts

<sup>e</sup> Effluents

show that its small PWC can adequately destroy agent simulants or that nitrogen is the best gas to use for the plasma feed. If oxygen leaks into the reactor, it could react violently with hydrogen. If air were used for the plasma feed gas, regulatory compliance issues would arise, as well as questions of public acceptance.

**Finding BR-3.** In the absence of any data for processing effluents from agent runs, the committee could not validate the ability of the proposed system to handle and stabilize effluent products arising from agent processing.

### General Atomics Demonstration Tests

**Finding GA-1.** Testing on the hydrolysis of energetic materials contaminated with agent will be necessary before a full-scale system is built and operated.

**Finding GA-2.** Testing will be required to verify that the larger diameter supercritical water oxidation (SCWO) reactor feed nozzles will be capable of accepting the dunnage material as shredded (i.e., without additional classification

and segregation) and that the reactor will perform reliably under these conditions.

**Recommendation GA-1.** Operation of the size reduction and slurring system, and long-term operation of the supercritical water oxidation (SCWO) reactor with slurry, should be conducted before proceeding with a full-scale system.

**Recommendation GA-2.** Before construction of a full-scale supercritical water oxidation (SCWO) system, additional evaluations of construction materials and fabrication techniques will be necessary because corrosion and plugging prevent continuous operation with the present design. If the new construction materials do not solve these problems, then alternative SCWO reactor designs should be investigated.

**Recommendation GA-3.** To determine the operability of the supercritical water oxidation (SCWO) reactor and the reliability of the materials of construction, long duration runs of a SCWO reactor should be conducted with slurry, with energetics hydrolysate, and with agent hydrolysate before full-scale implementation proceeds.



**Recommendation GA-4.** The efficacy and safety of the additional step to remove aluminum hydroxide from the hydrolysate produced from rocket propellants should be evaluated prior to construction of a full-scale supercritical water oxidation (SCWO) system.

**Recommendation GA-5.** Decontamination of solid munitions materials by flushing and immersion should be demonstrated prior to full-scale implementation.

**Recommendation GA-6.** The air emissions data from the demonstration tests should be used in a screening risk assessment. The results of the air effluent samples should be subject to (1) a human health risk assessment following the Human Health Risk Assessment Protocol (HHRAP) for Hazardous Waste Combustion Facilities from the Environmental Protection Agency (EPA) [EPA530-D-98-001(A,B,C)], and (2) an ecological risk assessment following a protocol that will be released by EPA in the very near future.

#### Parsons-AlliedSignal Demonstration Tests

**Finding PA-1.** The mustard demonstration tests were very encouraging and showed that the process is ready for the next scale-up.

**Finding PA-2.** The nerve agent demonstration tests had serious problems. However, if the previous tests at the technology provider's laboratory and the results of the demonstration tests are combined, the aggregate results are inconclusive. The reason for the poor demonstration results might be as simple as poor aeration in the bioreactor (see Recommendation PA-1).

**Recommendation PA-1.** Before proceeding to a further scale-up of GB and VX biotreatment processing, the committee recommends that the following steps be taken:

- The biotreatment process should be examined carefully at bench scale to determine the factors that are critical to success.
- An investigation of analytical techniques should be undertaken to provide more reliable process information.

#### Supplemental General Findings

The results of the demonstration tests did not significantly affect the committee's original general findings and recommendations and, in some cases, confirmed them. The committee's review of the results of the demonstration tests, however, led to the following new general findings.

**General Finding 1.** Based on the committee's assessment of the maturity of the various unit operations (as summarized in Table ES-1), none of the three technology packages is ready for *integrated* pilot programming, although certain unit operations are sufficiently mature to bypass pilot testing (e.g., hydrolysis of agent).

**General Finding 2.** The demonstration tests were not operated long enough to demonstrate reliability and long-term operation.

**General Finding 3.** The committee reiterates that none of the unit operations has been integrated into a complete system. The lack of integration remains a major concern as a significant obstacle to full-scale implementation.

## Introduction

### BACKGROUND

In 1996, the U.S. Congress enacted two laws, Public Law 104-201 (authorization) and Public Law 104-208 (appropriation), mandating that the U.S. Department of Defense (DOD) conduct an assessment of alternative technologies to the baseline incineration process for the demilitarization of assembled chemical weapons and that not less than two technologies be demonstrated. The law included the following stipulations:

- All funds for the construction of destruction facilities at Blue Grass Depot in Richmond, Kentucky, and at Pueblo Chemical Depot in Pueblo, Colorado, should be frozen.
- DOD should select a program manager who was not and had never been associated with the ongoing incineration destruction.
- DOD should "coordinate" with the National Research Council.

In December 1996, DOD appointed Michael Parker, technical director of the Soldier Biological Chemical Command, to be the program manager for the Assembled Chemical Weapons Assessment (ACWA) Program (PMACWA). On July 28, 1997, after organizing a staff and establishing a program plan, the PMACWA published a Request for Proposals (RFP) for a "total system solution" for the destruction of assembled chemical weapons without using incineration. Twelve proposals were submitted in September 1997. Of these, seven were found to have proposed total system solutions and to have passed the threshold requirements stipulated in the RFP. On July 29, 1998, after an elaborate multi-tiered selection process, three technology packages were selected for demonstration testing. Detailed descriptions of the selection process and all seven technologies are available in the PMACWA's two annual reports to Congress (DOD, 1997, 1998).

Constrained by both time and budgetary resources, the

PMACWA identified unit operations for the three technology packages that were "most critical [and] least proven" for the demonstration tests. These unit operations had not previously been used in the disposal of chemical munitions had they been integrated into a complete system for application. Two of the three technology packages use hydrolysis as the primary treatment step to destroy energetic materials. Because most of the uncertainties concerning these technology packages pertain to the treatment of products from the primary treatment, PMACWA provided hydrolysates for nerve agent GB and VX and mustard agent HD for testing. Approximately 1,100 gallons of GB hydrolysate and 400 gallons of hydrolysate were produced at the Army's Chemical Munitions Disposal System (CAMDS) experimental facility at the Desert Chemical Depot in Utah. Approximately 4,200 gallons of HD hydrolysate were produced at the Army's Aberdeen Proving Ground in Maryland. The hydrolysates provided a representative feedstock for the demonstration tests and enabled characterization of the intermediate product stream for residual agent, including Schedule 2 compounds (agent precursor compounds defined by the international Chemical Weapons Convention).

Various types and amounts of energetic materials contained in the weapons were reacted with caustic solutions similar to those specified in the technology package proposals of the respective providers. These materials were available for the demonstrations. Unit operations of the technology packages were set up, and systemization (operational testing) was conducted from January to March 1999. The actual demonstrations began in March 1999 and were completed in May 1999. The technology providers submitted their reports on the demonstration tests to PMACWA on June 30, 1999 (Burns and Roe, 1999a; General Atomics, 1999a; Parsons-AlliedSignal, 1999a). The PMACWA used these reports and other information to prepare a *Supplemental Report to Congress*, which was submitted on September 30, 1999 (DOD, 1999a).

The committee commends the PMACWA and his staff, as well as the support contractors and technology providers, for completing the demonstrations within the very tight time schedule. The committee recognizes that everyone involved worked long hours, including weekends, to fulfill their tasks.

## ROLE OF THE NATIONAL RESEARCH COUNCIL

The PMACWA requested that the National Research Council (NRC) perform and publish an independent evaluation of the technologies by September 1, 1999, a month before the Army's report to Congress was due. The NRC and DOD reached agreement on the Statement of Task in March 1997, and the study was officially begun on May 27, 1997. The committee chose to evaluate all seven technology packages that had passed the threshold requirements stipulated in the RFP. The Statement of Task did not require that the NRC recommend a best technology or compare any of the technologies to the baseline incineration process in use at some storage sites. Although members of the committee visited the demonstration sites prior to systemization of the unit operations in January 1999, in order to produce its final report by September 1, 1999, data-gathering activities had to be terminated on March 15, 1999, prior to receiving the results of the demonstration tests. The committee's report was submitted for peer review on May 1, 1999, and was released to the sponsor and the public on August 25, 1999 (NRC, 1999).

In September 1999, the PMACWA requested that the tenure of the committee be extended to review the results of the demonstrations. The committee was asked to determine if and how the demonstration results affected the committee's commentary, findings, and recommendations, as well as the steps required for implementation (NRC, 1999). In October 1999, the committee began its evaluation of the results of the demonstrations and a determination of the impact of these results on its initial report. The present report is an addendum to the initial report documenting the committee's review of the demonstration test results and the impact of those results on its initial report.

## STATEMENT OF TASK

The Statement of Task for this report is as follows:

At the request of the DOD's Program Manager for Assembled Chemical Weapons Assessment (PMACWA), the NRC Committee on Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons will continue its independent scientific and technical assessment of the three demonstrated alternative technologies for assembled chemical weapons located at the U.S. chemical weapons storage sites. The continuation of the NRC study will involve the review and evaluation of the demonstration results from the Burns and Roe, General Atomics, and Parsons-AlliedSignal tests performed by the PMACWA. The specific tasks to be performed are:

- use the following as the basis of information:
  - PMACWA's *Supplemental Report to Congress* issued September 30, 1999, and the "Technical Evaluation Report" (an appendix to the former report)
  - the demonstration test reports produced by the ACWA technology providers and the associated required responses of the providers to questions from the PMACWA
  - the PMACWA's demonstration testing database (CD-ROM);
- perform an in-depth review of the data, analyses, and results of the unit operation demonstration tests contained in the above and update as necessary the committee's 1999 NRC report, *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons* (the ACW report);
- determine if the Burns and Roe, General Atomics, and Parsons-AlliedSignal technologies are viable to proceed with implementation of a pilot-scale program that would employ any of these technologies;
- produce a supplemental report for delivery to the Program Manager for Assembled Chemical Weapons Assessment.

## SCOPE OF THIS STUDY

The committee limited its review to assessing the reports mentioned in the Statement of Task. For each technology package, the committee commented on findings from the initial report that were impacted by the demonstrations (technology-specific findings not related to a demonstrated unit operation are merely noted). This report also includes new findings that may not have been apparent before the demonstration data became available. The committee did not evaluate the extent to which the demonstration tests fulfilled all of the test objectives set by the PMACWA. However, the committee commented on these objectives when they were related to the findings in the initial report (NRC, 1999).

## ORGANIZATION OF THIS REPORT

This report consists of five chapters. This chapter has presented background information on the ACWA program and the NRC's involvement in that program. Chapters 2, 3, and 4 discuss the results of the demonstrations for each of the three technology packages. In each chapter, demonstration test objectives are quoted for each unit operation that was demonstrated. (The demonstration objectives are intended to provide contextual technical background [analogous to the Description of the Technology Package sections in the committee's initial report]). Pertinent original findings are discussed, and a concise rationale is given for each of the committee's conclusions on the basis of its review of the documents listed in the Statement of Task. Chapter 5 provides a discussion of the impact of demonstration test results on the original general findings and recommendations. Some new general findings based on the demonstration test results are also provided.

# Burns and Roe Plasma Arc Process

The plasma arc process proposed by the Burns and Roe team uses modified baseline disassembly for munitions access. Agent, energetics, metal parts, and shredded dunnage are all treated in plasma waste converters (PWCs). The PWCs use plasma arc technology—electrically driven torches with various gases that produce an intense field of radiant energy and high temperature ions and electrons that cause the dissociation of chemical compounds. Materials are processed with steam in the absence of air to produce a plasma converted gas (PCG) that could be used as a synthetic fuel after cleanup and testing.

The integrated PWC system used for the demonstration tests consisted of a PWC—a 300-kW unit capable of operating with a variety of gases (Ar, N<sub>2</sub>, CO<sub>2</sub>, etc.) in either of two modes: a nontransferred mode (arcing from electrode to electrode on the torch) and a transferred mode (arcing from torch electrode to the melt) (DOD, 1999b). A steam injection system was used for feeding liquids, and a box feed module with a horizontal ram feed was used for feeding solids via a conveyor to the PWC. The gas polishing system, a pollution abatement system, consisted of a quench, a venturi scrubber, a caustic (NaOH) scrubber, a demister, and a high-efficiency particulate air (HEPA) filter.

The PWC system was the only unit operation that was tested. Other components used in the demonstration but not intended to demonstrate a specific unit operation are listed below (DOD, 1999b):

- a liquid feed module
- thermal oxidizers to characterize the effluent from burning PCG
- an energetics deactivation chamber (EDC) for generating and supplying the expected energetics off-gas feed to the PWC

## PLASMA WASTE CONVERTER

Demonstration test campaigns of the PWC were planned for treatment of (1) energetics, (2) dunnage and secondary waste, (3) agent, and (4) projectile agent heels.

### Energetics Campaign

The energetics campaign was required to validate that the PWC can destroy off-gas from a proposed EDC, which is used for thermal initiation of high explosive components (bursters and fuzes). The following test objectives were established for this campaign (DOD, 1999b):

- Demonstrate the feasibility of the proposed energetics destruction strategy using the integrated EDC demonstration unit and PWC system for high explosives and the PWC system for M28 propellant.
- Validate that the integrated EDC and PWC unit operations can achieve a destruction and removal efficiency (DRE) of 99.999 percent for energetics Comp B and tetrytol.
- Validate that the PWC unit operations can achieve a DRE of 99.999 percent for M28 propellant.
- Characterize the detonation gases and residues from Comp B and tetrytol from the EDC demonstration unit for suitability for processing in the PWC.
- Characterize the deflagration gases from the M28 propellant feed to the PWC system.
- Compare the detonation gases from the EDC demonstration unit to the deflagration gases from the M28 propellant in the PWC system.

The energetics campaign was only designed to show that the PWC could destroy off-gas from the EDC. During the

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demonstration, 16 grams each of tetrytol and Comp B were burned in four test runs. Because the design of the detonation chamber was not the one intended for full-scale use, no attempt was made to evaluate its efficacy. Detonation gases were fed to the PWC. (Detonation usually efficiently destroys materials such as tetryl, TNT, and RDX.) The off-gases generated from the EDC were shown to be suitable for feeding to the PWC.

In the opinion of the committee, the use of the EDC would be a poor solution for the destruction of a large volume of energetic materials. During the demonstration tests, M28 propellant was not completely ignited, which was attributed to poor propagation from the initiator. The technology provider explains that initiation at full scale will be accomplished by heating the energetic to 1,100°F. Although a small amount of M28 propellant was introduced directly into the PWC during the demonstration tests, the committee concluded that the test results did not demonstrate conclusively that the direct introduction of propellants would be safe.

### Dunnage and Secondary Waste Campaign

The dunnage and secondary waste campaign was required to validate the destruction of solid and liquid secondary wastes and the decontamination of dunnage to a 5X level.<sup>1</sup> Characterization of gaseous, liquid, and solid effluents was required, as was verification of operating parameters. The demonstration tests had the following objectives (DOD, 1999b):

- Demonstrate that the PWC unit operation can process carbon filter media, demilitarization protective ensembles (DPEs), wooden pallets spiked with 4,000 parts per million pentachlorophenol, decontamination solution with carbon filter media, and M55 rocket shipping and firing containers.
- Characterize the process gases, liquids, and solids.
- Validate the ability of the PWC unit operation to meet a 5X condition for solid residues from these feeds.

The demonstration test runs were designed to evaluate the treatment of a variety of dunnage materials, including oak pallets, activated charcoal, fiberglass shipping and firing containers, and DPE materials. Although the test plan originally called for separate testing with each material, the plan was subsequently modified to using a mix of materials. The tests demonstrated the PWC could treat these materials as a mixture, could achieve 5X temperature

conditions, and could destroy the pentachlorophenol that had been spiked into the pallets.

The mixed dunnage tests were the only demonstration runs in which sufficient carbon, oxygen, and hydrogen were available in the feed to generate synfuel with appreciable fuel value. The average fuel value of the PCG exceeded 100 Btu/scf in only one of the six mixed dunnage test runs. In several runs, the measurement technique for fuel value failed; in others, the measured average fuel value was very low. In all runs, the oxygen content of the PCG ranged from 5 to 7 percent. This was attributed either to air leakage into the PWC or downstream components or to a lack of control of the oxygen content in the feed materials and gases. The presence of a combustible gas premixed with oxygen clearly represents an unsafe condition susceptible to ignition. Full-scale operation would require design features and/or procedures that would preclude these conditions.

The process did not produce PCG with an acceptable synfuel quality when a steady feed of carbon/hydrogen-containing material was used. Thus, the committee is concerned about the appropriateness, reliability, and robustness of the measurement and control systems. In addition, unless careful control of the steam-to-carbon ratio is maintained, excessive soot may form. Because the system does not include on-line monitoring of the carbon and hydrogen in the feed, the monitoring and control system must reliably measure fuel value and adjust parameters, such as steam flow, to achieve acceptable fuel quality. Such monitoring and control systems were not demonstrated during the test runs, and, therefore, must be developed to ensure the reliable operation of the system with variable feedstocks.

### Agent Campaign

The agent campaign was required to validate the destruction of chemical agents. Characterization of gaseous, liquid, and solid effluents was required, as was verification of operating parameters. The test objectives for this campaign are listed below (DOD, 1999b):

- Validate that the PWC process can achieve a DRE of 99.9999 percent for chemical agents HD, GB, and VX.
- Characterize the process gases, liquids, and solids.
- Balance the elemental carbon and heteroatoms from each agent, to the extent possible.

For various reasons, the equipment was not deemed ready for agent tests during the demonstration tests. Therefore, there was no direct demonstration of the ability of the proposed plasma technology to destroy chemical agents. The committee concluded that the variety of equipment problems encountered in the demonstration were due to the immaturity of the proposed integrated process and the particular demonstration equipment, and not due to a fundamental inability of plasma-based technologies to achieve acceptable

<sup>1</sup> Treatment of solids to a 5X decontamination level is accomplished by heating the material at 1,000°F for 15 minutes. This treatment results in completely decontaminated material that can be released for general use or sold to the general public in accordance with applicable federal, state, and local regulations.

results. The history of plasma-based systems for waste treatment indicates that they can destroy chemical agents. Nevertheless, the operability, reliability, and repeatability of the integrated plasma system have not been demonstrated due to equipment failures, system redesigns, and operational modifications. Also, the committee was concerned that some of the agent could bypass the reaction zone (see the discussion below of Finding BR-1 under Review of Previous Committee Findings).

Tests were conducted on the agent-surrogate, dimethyl methyl phosphonate (DMMP), and hydrolysates of HD and VX. In these tests, high DREs of both DMMP and hydrolysate compounds were achieved, increasing the confidence level that the proposed plasma-based process would be capable of destroying chemical agents. However, demonstration tests with neat chemical agents will be required to determine specific operational conditions, such as proper control of oxygen and steam, before pilot-scale evaluations can proceed. These tests will be particularly important for determining the formation of by-products, which is dictated by the materials processed, the stoichiometry for oxygen, steam, and carbon, and temperature conditions. The data on the by-products generated in the demonstration tests are of limited value because the tests were not run with agents.

### Projectile Heel Campaign

The projectile heel campaign was required to validate the destruction of chemical agent that had adhered to metal parts and to demonstrate removal of the melt from the PWC. Characterization of gaseous, liquid, and solid effluents was required, as was verification of operating parameters. The test objectives for this campaign are listed below (DOD, 1999b):

- Validate that the PWC process can achieve a DRE of 99.9999 percent for chemical agent GB heels in simulated projectile shells.
- Demonstrate that the PWC can process simulated projectile shell heels using chemical agent in pipe nipples.
- Demonstrate melting of uncontaminated 4.2-inch mortar shells.
- Validate that the PWC unit operation can meet a 5X condition for solid residues from this feed.
- Characterize the gases, liquids, and solids.
- Demonstrate that the melt from the PWC can be removed.

The first five objectives were not met because agent was not injected into the PWC. In addition, the sixth objective was not met because samples were manually removed.

### REVIEW OF PREVIOUS COMMITTEE FINDINGS

The committee's earlier findings concerning the Burns and Roe PWC technology package are quoted below and

their status following demonstration tests is examined (NRC, 1999):

**Finding BR-1.** No tests have been done involving actual chemical agent or propellant destruction in a PWC. Tests with agent and M28 propellant were planned for the demonstrations being conducted between February and May of 1999, but no data were available to the committee at the time of this writing.

The demonstration tests conducted on the agent surrogate DMMP (a GB simulant), HD hydrolysate, and VX hydrolysate provided only limited data. The DMMP was 99.99997 percent destroyed; trace levels of thiodiglycol were detected in two of the six HD hydrolysate tests; and the levels of ethyl methyl phosphonic acid and methyl phosphonic acid in the VX hydrolysate tests were very low.

Energetic materials (Comp B and tetrytol) were reported to be 99.9998 percent destroyed, but trace levels of RDX and TNT were detected. Components of M28 propellant were 99.97 percent destroyed (nitrocellulose) and 99.99998 percent destroyed (nitroglycerin). The detection of RDX and TNT in the PWC effluents is indicative that feedstocks can bypass the reaction zone and exit without complete reaction. Thus, if chemical agents were fed to the PWC, they could potentially also bypass the reaction zone and be found in the effluents. Solving this problem will require ensuring thorough mixing in the PWC.

**Finding BR-2** Scale-up from the small PWC units in existence to the very large units proposed is likely to present significant scientific and engineering challenges.

The numerous problems encountered in the demonstration described above confirmed this finding.

**Finding BR-3.** Tests performed with one plasma feed gas may not be indicative of PWC performance with a different gas. Because different plasma feed gases have different thermodynamic and chemical properties, the choice of the plasma feed gas could have a significant impact on the performance of the system. For example, the electrical power requirements will be determined, in part, by the plasma feed gas. Electrode wear may also depend on the type of gas, and product gas composition will vary.

Initially, the technology package proposal indicated that argon would be used as the plasma feed gas. This would distinguish the PWC from an incinerator because the inert gas is not an oxidizing agent. Citing the expense of argon, the technology provider subsequently shifted to carbon dioxide (CO<sub>2</sub>), which is cheaper, but introduces a source of oxygen. Computer calculations for various chemical agents introduced into a CO<sub>2</sub> plasma at ~ 3,000 K predicted that agents would undoubtedly be destroyed but also indicated that large amounts of carbon soot would be formed as the hot gaseous mixture cooled. The presence of particulates of high surface area (that are probably pyrophoric) in the product creates a new problem. Also, electrical power requirements for CO<sub>2</sub>-plasma operation would be greater than for argon-plasma operation.

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In the actual demonstration tests, nitrogen ( $N_2$ ) was used as the plasma gas. Although  $N_2$  is a nonoxidizing species, reaction products of environmental concern ( $C_2N_2$ , HCN, metal cyanides, etc.) were predicted and were detected in the demonstration tests. The power requirements for  $N_2$ -plasmas are acceptable.

In summary, the technology provider has explored a few alternatives for plasma gases but may not have found the best choice. Also, the problem of torch failure could be minimized by a better choice of metals or by alternative designs. For water-cooled plasma torches, the metals must not react with the plasma gases and must still have high melting points to prevent a sudden release of water into the PWC (see the discussion following Finding BR-5).

**Finding BR-4.** The technology provider's proposal for recycling the liquid-scrubber effluent through the PWC to vitrify the salts may not be practical. If scrubber liquor is fed to a PWC, some of the contaminants may simply volatilize. In addition, NaCl and NaF salts could react with  $SiO_2$  at high temperatures to form gaseous  $SiCl_4$  and  $SiF_4$ , respectively (both hazardous materials).

The demonstration tests did not address the ability of the PWC to vitrify salts from recycled scrubber liquor. Finding BR-4 remains unchanged.

**Finding BR-5.** The maintenance of negative pressure within the PWC has not been demonstrated under munition-processing conditions. Pressure excursions that produce positive pressure in the PWC vessel could release product gas to the surrounding room. Some upsets that could result in moderate to severe pressure excursions included:

- A leak in the torch-cooling system to release water into the PWC, and rapid steam formation could pressurize the vessel.
- Energetic material that remained in a mortar or projectile introduced into a PWC could detonate upon heating, which would generate a pressure pulse.
- An improper cut of the rocket motor could allow a larger-than-design piece of propellant to be introduced into the PWC. If the gas production rate from the propellant exceeds the capacity of the downstream PAS, the vessel could overpressurize.

The primary safety problem apparent from the demonstration tests is an inability to maintain negative pressure. Overpressurization occurred several times during the tests due both to plasma torch failure and poor engineering system design (e.g., ram feeder blow-back and leaks in the gas polishing system). The failure of the plasma torch caused cooling water to be released into the PWC, which could have resulted in catastrophic overpressure that could have released agent, if any had been present. Thus, substantial further engineering development will be necessary, along with design and administrative controls to ensure the safe use of this plasma torch technology.

According to the technology provider's proposal, rocket propellant would be sent directly to the PWC, whereas

explosives would be sent first to the EDC. Although a small amount of the propellant was tested in the PWC, the committee was concerned that larger amounts of propellant might detonate rather than deflagrate. The resolution of this issue has not been successfully demonstrated.

**Finding BR-6.** Combustion of plasma-converted gas in a boiler faces three major hurdles: (1) to avoid being permitted under RCRA as a boiler burning hazardous wastes, the gas may have to be delisted; (2) the gas may require significant scrubbing to remove compounds that are unsuitable as boiler feedstock; and (3) the boiler will have to be configured to burn gas that has a low heating value efficiently in order to avoid generating unacceptable emissions.

The Environmental Protection Agency (EPA) has recently established an exemption for synfuel produced from hazardous waste. Under the Comparable/Syngas Fuel Exclusion (40 CFR 261.38), syngases that meet certain specifications are not classified as hazardous wastes and, therefore, could be burned without Resource Conservation and Recovery Act (RCRA) permits in boilers and industrial furnaces (a Clean Air Act [CAA] permit would still be necessary). The synthesis gas fuel specification has the following criteria:

- a minimum Btu value of 100 Btu/scf
- less than 1 ppm<sub>v</sub> of total halogen
- less than 300 ppm<sub>v</sub> of total nitrogen other than diatomic nitrogen ( $N_2$ )
- less than 200 ppm<sub>v</sub> of hydrogen sulfide
- less than 1 ppm<sub>v</sub> of each hazardous constituent on a target list of 40 CFR 261 Appendix VIII constituents

These stringent requirements were not met in any of the demonstration tests. It was not clear that the tests were designed to evaluate this specification, even though it would be critical to the development of an alternative disposal technology using PCG. Without this exemption, the PCG synfuel could not be used in boilers without a RCRA/CAA hazardous waste combustor permit subject to boiler and industrial furnace rules (the so-called "BIF rules").

The demonstration tests revealed several potential problems with PCG meeting the Comparable/Syngas Fuel Exclusion. Only one material tested in the demonstration (mixed dunnage) was converted to synfuel with an appreciable fuel value. Even for this material, the minimum Btu value (> 100 Btu/scf) was only demonstrated in one test (out of six). For all other tested materials, the Btu value of the synfuel was very low (generally close to zero).

Furthermore, both the generation of hazardous air emissions and the conversion of carbon are strongly affected by carbon/oxygen stoichiometry. The generation of synfuel of insignificant Btu value in nearly all of the demonstration test runs casts doubt on the relevance of the emissions data to full-scale operation for most of the materials tested in the demonstration. The Comparable/Syngas Fuel Exclusion

specification for hazardous constituents would have to be demonstrated for the specific conditions that would yield a PCG with acceptable Btu value. In addition, a more complete profile of all 40 CFR 261 Appendix VIII compounds would have to be evaluated. Finally, the demonstration tests did not confirm that predictable control of the PCG heat content could be achieved, even when higher hydrocarbon feedstocks (such as mixed dunnage) are treated.

Another challenge to meeting the Comparable/Syngas Fuel Exclusion requirements for PCG is maintaining low levels of nitrogen and halogen compounds. The  $\text{NO}_x$ -level for every PCG material tested in the demonstration unit exceeded the criterion of less than 300 ppm<sub>v</sub> (~388 mg/m<sup>3</sup>) of total nitrogen other than diatomic nitrogen ( $\text{N}_2$ ). The removal of nitrogen compounds from the PCG synfuel is a critical process capability that was not demonstrated but is necessary for full-scale operation.

The PCG synfuel generated from all of the test materials (except tetrytol) exceeded the total halogen requirement of 1 ppm<sub>v</sub> (~1,500 µg/m<sup>3</sup>) for chlorine despite the use of an acid scrubber. For example, PCG generated from DMMP in the demonstration tests had 26,980 µg/m<sup>3</sup> (approximately 18 ppm<sub>v</sub>) of chlorine, which is 18 times the Comparable / Syngas Fuel Exclusion of 1 ppm total halogens. Thus, the demonstration unit also failed to demonstrate that it could generate synfuel that meets these critical synfuel exclusion criteria.

**Finding BR-7.** Although a PWC may not be considered to be an incinerator by permitting authorities, the most likely permitting procedures for a PWC would be similar to those used for incinerators.

A key component of the Burns and Roe demonstration tests was to determine the characteristics of the flue gas when the synfuel is burned in the thermal oxidizer. These characteristics can suggest the emissions from a boiler or industrial furnace burning the PCG. In other permitting actions relating to plasma units that generate gas burned in catalytic oxidizers (e.g., the ATG facility in Richland, Washington, EPA Region 10), the EPA and state regulators used appropriate, relevant, and applicable rules (ARARs) based on the hazardous waste combustion rules.

A comparison of the thermal oxidizer emission levels with the Hazardous Waste Combustion ARARs indicates that either additional cleanup of the PCG would be required or the emissions of the boiler/industrial furnace would require more rigorous scrubbing. This comparison is complicated by the highly dilute conditions in some of the thermal oxidizer exhaust (i.e., 12 to 20 percent oxygen). It is also worth noting that the thermal oxidizer used would not generally meet the carbon monoxide standard of 100 ppm<sub>v</sub>. A comparison of the hazardous waste combustion rules with the thermal oxidizer emissions data indicates that the combustion of PCG would not meet some standards, when corrected to the standard 7 percent oxygen, (e.g., the cadmium-plus-lead

emission for the system configuration used in the demonstration tests for M28 propellants, mixed dunnage, and VX hydrolysate). Mercury emission could be a problem for M28 propellants, and particulate matter would be a problem for the treatment of mixed dunnage. Chlorinated dioxin/furan was not found to be problematic for the configuration demonstrated when compared to the hazardous waste combustion standard. In summary, the demonstration tests did not show that the PWC system could adequately control emissions for the direct combustion of PCG in a boiler or industrial furnace.

## SAFETY ISSUES

In the earlier report, the committee made the following observation (NRC, 1999):

Cooling water is circulated through the plasma torch to keep it from melting at the high plasma temperatures. A leak in the cooling system could spray water into the plasma. If the leak is sudden, rapid vaporization could cause a pressure pulse that might overload the downstream gas-handling equipment. Then, untreated agent could be released into the surrounding room through the torch opening in the top of the PWC. Similar "puffing" has been observed in combustion equipment when excessive back pressure occurs. If the leak is gradual, the resulting steam would dissociate in the plasma forming hydrogen and oxygen gas that could recombine and explode if the mixture is in the flammable range above its autoignition temperature. The effect of liquid water introduced into a plasma in the presence of other species present in PWCs must be determined before larger scale experiments are performed. . . .

The technology provider is aware that torch failure is a concern, and the potential for an explosion has been reduced by the torch design and by redundant flow and pressure controls that would actuate fast-closing valves on the water feed as well as the waste feed in the event of a failure.

The committee reiterates its earlier observation that appropriate design and administrative controls can ensure the safety of plasma arc technology (NRC, 1999).

The technology provider proposes sending rocket propellant directly to the PWC, whereas, explosives will be sent first to the EDC. Although a small amount of the propellant was demonstrated to deflagrate in the PWC, the committee is concerned that larger amounts of propellant may detonate rather than deflagrate. The committee does not believe this issue has been successfully demonstrated.

The addition of nickel to the melt to form a conductive bed for the transferred arc operation constitutes another issue regarding worker safety (Burns and Roe, 1999a). Airborne nickel particulate is very hazardous and should be assessed further with respect to worker exposure during normal operations, anticipated transient conditions, maintenance, and accidents.

The recovery of molten metal may require more access



workers during operations, as well as increased maintenance. Increased access would also increase worker exposure to hazards over predemonstration estimates.

## REEVALUATION OF STEPS REQUIRED FOR IMPLEMENTATION

The committee's earlier report identified the following five steps required for implementation (NRC, 1999):

1. Determine the effect of sudden water injection into the plasma torch in the presence of argon, nitrogen, carbon dioxide, and other species present in the plasma system. Include an evaluation of the effect of gases present in the PWC on the flammability range of hydrogen gas.
2. Determine the likelihood of the release of untreated agent and other hazardous contaminants from the PWC if the gas generation rate is unexpectedly high (e.g., due to a cooling-water leak, the inadvertent introduction of explosive material into the chamber, or a rapid deflagration of propellant).
3. Conduct a thorough analysis of the product gas generated from each PWC using the plasma feed gas proposed for full-scale operation. This analysis should include the identification of organic intermediates that would be of concern in an HRA [health risk assessment].
4. Establish the efficacy of pollution-control equipment in removing hazardous compounds (e.g.,  $\text{NO}_x$ ,  $\text{SO}_x$ , HCl, and metals) from the product gas.
5. Perform a larger-scale demonstration of PWC operation that includes the hold-test-release step.

None of these steps was completed in the demonstration tests. Furthermore, the test results do not readily indicate how the concerns raised by the committee could be addressed.

Clearly, extensive testing with chemical agents will be necessary if PWCs as currently proposed by the technology provider are to be used. As discussed in Finding BR-5, serious doubts have been raised about the reliability of the torch

design and the maintenance of negative pressure in the system, and, hence, about the safety/efficacy of this system.

The committee believes a properly configured and operated plasma arc process would be a robust, indiscriminant thermal process capable of destroying chemical agents. However, on the basis of observations during two site visits to plasma arc installations (Ontario Hydro Technologies, Toronto, Ontario, and Aberdeen Providing Ground, Maryland), the results of the demonstration tests, and a review of the available demonstration data, the committee concurs with the Army's conclusion that the Burns and Roe process is too immature to be considered as a viable solution for the destruction of assembled chemical weapons at this time.

## SUPPLEMENTAL FINDINGS

**Finding BR-1.** The plasma torch apparatus, as demonstrated by the Burns and Roe team, is not qualified for further consideration for the demilitarization of assembled chemical weapons. The torch design appears to be unreliable for extended use. Furthermore, the design increases the possibility of a catastrophic water leak, which could produce a significant increase in pressure in the PWC, and possibly cause an explosion, which, in turn, could expose personnel to chemical agent. Moreover, the effectiveness of the monitoring and control sensors was not demonstrated.

**Finding BR-2.** Even after more than a year of research and development, the technology provider has not been able to show that its small PWC can adequately destroy agent simulants or that nitrogen is the best gas to use for the plasma feed. If oxygen leaks into the reactor, it could react violently with hydrogen. If air were used for the plasma feed gas, regulatory compliance issues would arise, as well as questions of public acceptance.

**Finding BR-3.** In the absence of any data for processing effluents from agent runs, the committee could not validate the ability of the proposed system to handle and stabilize effluent products from agent processing.

## 3

## General Atomics Technology Package

The General Atomics process uses a modified version of the baseline disassembly process and cryofracture of projectiles for munitions access. The agent and energetics are destroyed by hydrolysis. The hydrolysate is then treated by supercritical water oxidation (SCWO). Metal parts are subjected to caustic hydrolysis processing followed by 5X thermal treatment. Dunnage is shredded, mixed with caustic, and destroyed by SCWO.

Demonstration tests were conducted for the following operations:

- energetics rotary hydrolyzer (ERH)
- dunnage shredding and hydropulping
- SCWO

### ENERGETICS ROTARY HYDROLYZER

The objectives of the demonstration tests of the ERH are listed below (DOD, 1999b):

- Demonstrate the effective dissolution of aluminum and energetics in fuzes and bursters, as well as propellant in rocket motors, to allow downstream processing in the continuously stirred tank reactor, SCWO reactor, and heated discharge conveyor.
- Determine the deactivation of the energetics in fuzes and bursters and the propellant in rocket motors.
- Validate the retention times for aluminum and energetics in fuzes and bursters and propellant in rocket motors
- Characterize the gas, liquid, and solid process streams.

The General Atomics demonstration tests involved several different munition items and energetic materials. Complete destruction, (i.e., below the detection limit) was achieved for tetryl in M557 fuzes and M14 bursters and for tetrytol (tetryl/TNT) in M6 bursters. However, the following

problems arose during the handling of other energetics (General Atomics, 1999a):

- Small quantities of fuze-train components remained unhydrolyzed; these were destroyed in the hot muffle furnace.
- Unhydrolyzed energetic material adhered to a flight drum during an M83 burster (RDX/TNT) validation test and burst into flame.<sup>1</sup> (The technology provider claims that this was an artifact of the test; the flights in the ERH were designed to hold solids and liquids for sampling rather than to drop them into the hydrolyzing solution. An appropriate flight design will be used in the full-scale ERH).
- Excessive boiling and foaming was reported with the M83 burster, which could cause difficulties in processing.
- RDX and HMX were above the detection limit in the liquid analyte.
- Hydrolysis of M28 propellant in the motor casing was slower than anticipated; the NaOH solution concentration had to be raised to 12M. (The technology provider has suggested cutting the propellant into smaller pieces).
- During the processing of M28 rocket propellant, a yellow substance (identified as N-nitrosodiphenylamine) was generated and coated much of the interior of the explosive containment cubicle. The technology provider indicated that the coating was caused by the ventilation flow in that particular ERH test unit. The ventilation was sized to dilute hydrogen to below the lower explosive limit and was clearly inadequate to prevent

<sup>1</sup>The term "flight" refers to plates attached to the drum that hold the energetic pieces as the drum rotates. The entire apparatus is called a flight drum.

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fugitive emissions from the ERH. The technology provider reported that in the full-scale system, sufficient ventilation flow would be provided to prevent fugitive emissions (General Atomics, 1999b). The yellow material would be scrubbed from the ERH ventilation flow, and the scrubber solution would be combined with energetics hydrolysate and processed through the SCWO reactor. The committee was concerned that the proposed solution to the problem could result in the accumulation of similar energetic by-products in other parts of a full-scale system.

The committee's earlier report contained the following finding concerning hydrolysis of energetics (NRC, 1999):

**Finding GA-2.** Hydrolysis of energetics at the scales proposed by the technology provider is a relatively new operation. Chemically, it is possible to hydrolyze all of the energetic materials; however, the rate of hydrolysis is limited by the surface area and, therefore, depends on particle size. (Smaller particles are more desirable because they have a higher surface-to-volume ratio.) The proposed method of removing and hydrolyzing the energetics appears to be reasonable, but further testing is required to determine the hydrolysis rates and to confirm that throughput rates can be achieved.

The demonstration tests substantively confirmed this finding. The test results demonstrated that the ERH could deactivate and dissolve the energetics and aluminum found in M557 fuzes and M83 bursters and could deactivate the energetics found in M6 and M14 bursters in two to four hours. Test data on the M28 rocket motor sections show that a residence time of 10 hours at 12M caustic concentration and 230°F were required for complete hydrolysis of the M28 propellant.

The demonstration program did not include the treatment of agent-contaminated solids. In the opinion of the committee, the ability of the ERH system to hydrolyze solid pieces of propellant supports the conclusion that similar treatment could successfully clean contaminated solids to a 3X condition.<sup>2</sup> However, the demonstration results cannot be considered conclusive evidence that the required processing rates could be consistently achieved.

The committee's earlier report included the following finding (NRC, 1999):

<sup>2</sup>At the 3X decontamination level, solids are decontaminated to the point that agent concentration in the headspace above the encapsulated solid does not exceed the health-based, eight-hour, time-weighted average limit for worker exposure. The levels for HD, VX, and GB are, respectively, 3.0, 0.01, and 0.1 µg per cubic meter in air. Materials classified as 3X may be handled by qualified plant workers using appropriate procedures but are not suitable to the environment or for general public reuse. In specific cases which approval has been granted, a 3X material may be shipped to an approved hazardous waste treatment facility for disposal in a landfill or for further treatment.

**Finding GA-3.** The rotary hydrolyzer appears to be a mature reactor configuration that is well suited for this application.

Although no test data on the reaction rate were provided, the tests did qualitatively demonstrate that the ERH could destroy energetic materials. However, some results indicate that the ERH did not completely wet the energetics with hydrolysis solution, which allowed some solid energetic material to exit the ERH before hydrolysis was complete. The explanation given by the technology provider (i.e., the shape of the flights) and the design modification proposed by the provider to address this problem (i.e., modification of the pitch and shape of the flights) should, in the committee's opinion, decrease the amount of unexposed solid material that passes through the ERH.

No tests were conducted on the hydrolysis of energetics contaminated with agent; however, because of the long residence time in the ERH, the committee believes that chemical agent exposed to the caustic hydrolysis solution in the ERH would be hydrolyzed. Nevertheless, because the exact manner in which agent might penetrate energetic materials is not known, there is still some question as to whether chunks of unhydrolyzed energetic material, such as those that were found in the residue from the ERH, would be truly agent free. Agent embedded in the energetic solids might not have been exposed to the caustic solution and, hence, might not have reacted.

## DUNNAGE SHREDDING/HYDROPULPING SYSTEM

The purpose of the demonstration tests of the dunnage shredding/hydropulping system (DSHS) was to show that solid wastes (wooden dunnage, DPE suits, and butyl rubber) could be adequately reduced in size and pulped to a pumpable mixture. The objectives of the demonstration testing are listed below (DOD, 1999b):

- Validate that the shredders and hydropulper can adequately prepare the dunnage for downstream processing in the SCWO reactor.
- Qualitatively evaluate the operability (especially material handling) of the shredder/hydropulper unit operations.
- Validate that the shredders can process 1,000 lb/hr of pallets and, separately, 250 lb/hr of plastics.

Several commercial shredders identical in size to the units proposed for the full-scale system were used to achieve the size reduction of the solid materials of interest. In the initial report, the committee had stated the following (NRC, 1999):

**Finding GA-4.** Shredding of dunnage and injection of the slurry directly into a SCWO system is a new and unproven process. While General Atomics claims to have developed a proprietary pump capable of pumping the slurry at high pressures, it has not been tested under the

intense solids loading anticipated. Furthermore, the injection of large amounts of solid material, including wood shreds, cut-up nails, and complex organic materials, such as pentachlorophenol and other wood preservatives, into the SCWO system has not been demonstrated. Considering the difficulty SCWO reactors have encountered with deposition of solids when liquids are treated, the committee believes that this application of SCWO may encounter significant difficulties. (At the time of this writing, processing of solids with SCWO was being performed as part of the ACWA demonstrations.)

The individual components of the DSHS had been tested previously in their respective applications but had not been used collectively in the configuration used for the demonstration test program. Consequently, numerous, albeit surmountable, problems were encountered (e.g., wood "nesting" in the hammer mill and micronizer feed chutes and inadequate magnetic separation of metal from the shredded DPE suits prior to processing in the granulator). The technology provider was able to control both system and feed variables well enough to achieve the targeted feed processing rates and obtain the proposed objective for size reduction (< 1 mm for wood and < 3 mm for plastics). The 3-mm plastic material product was processed through a sieve to separate material that was less than 1 mm that could be fed to the SCWO reactor. The full-scale SCWO system will have larger feed nozzle diameters that should be capable of accepting the plastic dunnage material as shredded (i.e., without the need for sizing to less than 1 mm) (General Atomics, 1999b).

The demonstration tests did not validate that the hydropulper could consistently produce material that was smaller in diameter than the goal objective of 1-mm; however, the tests did determine that the hydropulper could blend energetics hydrolysates with size-reduced wood to yield a uniform, pumpable slurry for processing in the SCWO reactor.

The mass balance reported for the two validation test runs of the micronizer while processing wood pallets showed a 5.4 and 6.3 percent deficit (General Atomics, 1999a). The deficit was attributed to "Presumably . . . the loss of water due to heatup in the micronizer." This loss is not a problem for pallets that are not contaminated with agent. When contaminated wood is processed, however, the water vapor released could contain vaporized agent, and the gas stream will have to be managed accordingly.

The duration of the shredding tests was too short to allow for an evaluation of the long-term efficacy of this process. The demonstration was highly labor intensive and, because it was performed on uncontaminated material, did not require that the operators work in full protective clothing. Therefore, it cannot be concluded that a full-scale system would provide similar levels of materials segregation without further development of the process. For example, one of the technology provider's conclusions is that the metal parts in DPE suits would have to be manually cut out in glove boxes prior to processing and then decontaminated to a 5X

condition in the metal parts furnace (General Atomics, 1999a). Because this step (which is necessary for successful processing) was not performed during the demonstration tests, the committee could not assess its efficacy.

## SUPERCRITICAL WATER OXIDATION SYSTEM

The hydrolysates of energetic materials provided by the PMACWA were prepared using 12 percent sodium hydroxide (as specified in the technology provider's proposal). The DREs from hydrolysis of energetic constituents of Comp B, tetrytol, and M28 propellant all exceeded 99.999 percent, except for the nitrocellulose component of the M28 propellant. The latter was set to measure a DRE of no greater than 99.988 because the analytical method has a high detection limit.

The SCWO system was demonstrated to validate its capability to destroy Schedule 2 and other organic compounds produced from agent hydrolysis. The objectives of the demonstration testing of the SCWO reactor concerning agent hydrolysate products are listed below (DOD, 1999b):

- Validate that the SCWO reactor can eliminate the Schedule 2 compounds present in the agent hydrolysate feed.
- Validate that the agent hydrolysis process and the SCWO reactor can achieve a DRE of 99.9999 percent for HD, GB, and VX.
- Demonstrate the long-term operability of the SCWO reactor with respect to salt plugging and corrosion.
- Characterize the gas, liquid, and solid process streams from the SCWO reactor.

The SCWO system was also demonstrated to validate its capability to destroy organic compounds from energetic hydrolysis products and to demonstrate the feasibility of destroying shredded dunnage. The demonstration tests included the following objectives (DOD, 1999b):

- Validate that the ERH, continuously stirred tank reactor (CSTR), and SCWO can achieve a DRE of 99.999 percent for tetrytol, Comp B, and M28 propellant.
- Determine the impact of the aluminum from the ERH process on SCWO operation.
- Determine how well organics in the shredded dunnage are oxidized in the SCWO reactor.
- Characterize the gas, liquid, and solid process streams from the SCWO system.

The committee's initial report contained the following finding concerning General Atomic's use of SCWO (NRC, 1999):

Finding GA-5. All of the findings in the [1998] NRC report, *Using Supercritical Water Oxidation to Treat*

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*Hydrolysate from VX Neutralization*, apply to the General Atomics system.

The demonstration confirmed this finding (see Appendix A). Although the SCWO system successfully destroyed organic compounds in the liquids, the results did not demonstrate that the system is capable of operating without frequent shutdowns for repair or cleaning. This uncertainty could affect the system's ability to treat the numbers of munitions located at a storage site within a reasonable length of time. For the destruction of agent and energetics hydrolysates and dunnage, the SCWO system performed reasonably well. However, corrosion and salt plugging both raised concerns about reliable long-term operation.

Operationally, the validation test runs for agent hydrolysate (all liquid feeds) proceeded smoothly, except for inconsequential leaks at some joints. Validation test runs for the energetic hydrolysates and dunnage feeds showed that these can be processed successfully, provided that aluminum hydroxide is removed from the feed (it caused severe plugging). Safety issues pertaining to the removal of aluminum hydroxide are noted later in the chapter.

Thus, the demonstration confirmed the concerns of the committee (and of another NRC committee that had previously evaluated the use of SCWO to treat VX hydrolysate) about the durability of components and the materials of construction in the highly corrosive SCWO system environment (NRC, 1998, 1999). Although the demonstration plan had called for the use of a platinum-lined reactor, because of problems encountered in fabricating the platinum liner, an unlined Inconel™ 718 SCWO reactor was used. This contributed to the corrosion and plugging of the downstream components with corrosion products (DOD, 1999b).

SCWO processing of the dunnage slurry was not demonstrated beyond a simple proof of concept. As described in the technology provider's report, a mixture of tetryl hydrolysate, aluminum hydrolysate, deionized water, phosphoric acid, micronized wood, granulated plastic (< 1 mm), ground activated carbon, and a stabilizing additive proprietary to the technology provider was fed to the SCWO reactor at an approximate rate of 6 kg/hr (General Atomics, 1999a). The committee concluded that this brief test constituted a proof of concept only and could not be considered a validation of the method.

The demonstrated treatment of shredded and slurried dunnage using SCWO resolved one of the committee's concerns but raised new ones. The demonstration tests showed that the SCWO system's pump can pressurize the slurry to the high pressure required for the SCWO reactor and that the SCWO reactor is capable of oxidizing the slurried dunnage. However, the testing did not demonstrate that tramp metal<sup>3</sup> would not prove to be a problem in extended operation.

<sup>3</sup>In this instance, tramp metal consists of metal pieces and fragments originating from dunnage components entrained in the dunnage slurry.

Furthermore, the demonstration tests of the SCWO system with dunnage feed was too short to demonstrate the long-term reliability of the system.

Finally, the demonstration tests used slurried solids of dunnage shredded to less than 1 mm (rather than less than 3 mm as proposed in the full-scale process), and the feed nozzles were smaller than those proposed for full-scale operation. Thus, the efficacy of the process with particles sized to full-scale specifications and larger nozzles was not demonstrated.

## SAFETY CONCERNS

The demonstration tests revealed that additional processing steps to remove aluminum from energetics hydrolysate would be necessary to prevent plugging of the SCWO reactor. The technology provider has proposed using a neutralization and filtration process to remove aluminum hydroxide from the hydrolysate, with subsequent 5X treatment of the precipitated aluminum filter cake in an inductively heated metal parts furnace (General Atomics, 1999b). Aluminum hydroxide forms a very flocculent precipitate, however. Because this compound is also amphoteric, the pH will have to be carefully controlled and the precipitate carefully filtered. If other hazardous metal salts precipitate with the aluminum hydroxide, they may have to be treated under RCRA specifications.

The removal of aluminum hydroxide would require additional processing equipment, which would add to the maintenance and reliability burden of the plant and would increase worker maintenance time in DPE suits and opportunities for worker exposure to agent. This concern was raised in the committee's initial report (NRC, 1999). It is repeated here to emphasize that modifications used in the demonstration tests would increase the potential of exposure.

The demonstration tests showed that condensable organics, such as nitroglycerine, will be evolved from the ERH and will be subsequently condensed and returned to the CSTR for hydrolysis. The committee notes that considerable care will be required to ensure that these condensable explosive materials are not initiated, thereby increasing the possibility of worker exposure to agent and damage to process equipment. The ERH demonstration tests using propellant feed also resulted in the release of volatile organic compounds (VOCs) into the explosive containment cubicle for the ERH. The walls of the cubicle were coated with this material as it condensed. As the technology provider noted, this experience reveals that the ERH design will have to control fugitive emissions (General Atomics, 1999b). The committee believes that the potential for worker exposure to agent would be increased during the maintenance of currently undefined control systems for fugitive emissions.

The technology provider also indicated that, to preclude dust explosions (which are extremely unlikely) in the micronizer component of the DSHS, additional safety

features will be required for the full-scale design of the system (General Atomics, 1999b). These features, too, would increase the opportunities for worker exposure to agent during maintenance.

In general, the demonstration tests revealed that more maintenance in DPE suits would be required, and, thus, the opportunities of exposure to agent by workers would be increased. At the baseline incineration disposal facilities operating on Johnston Island (in the Pacific Ocean) and at Tooele, Utah, workers in DPE suits are only allowed to remain in contaminated areas for two hours at a time and can only enter if another worker is present. In case of emergency, two more workers wearing protective clothing must be prepared to provide assistance (PMCD, 1998). Thus, an increase in maintenance in DPE suits can have a significant impact on productivity. Process design and the selection of reliable process equipment and materials, in conjunction with suitable training and procedures, should be used to minimize requirements for activities in DPE suits.

### EFFLUENT CHARACTERIZATION

In the initial report, the committee concluded that the liquid effluent from the General Atomics process consists of pure water from the evaporator/crystallizer used to produce the solid filter cake (NRC, 1999). This effluent is essentially distilled water and should not pose a significant hazard to human health or the environment. The solid waste from the process, consisting of dried filter cake, was reasonably well characterized. The gaseous effluent from the SCWO process was not well characterized, however, and as a result, its hazardous characteristics could not be determined.

Tables 3.4-10 through 3.4-19 in the demonstration test report by General Atomics present some analytical results on the liquid and gaseous effluents from the SCWO reactors (General Atomics, 1999a). However, the reported characterizations are inadequate to determine if the solid filter cake could be stabilized adequately or to estimate the degree of risk to human health or the environment posed by the gaseous effluent from the SCWO process.

A further concern relates to the presence of sodium and other solid materials in the gaseous emissions from the SCWO reactor. The mechanism whereby solids are released into the gaseous effluents is not clear. One would expect that these inorganic materials would be found in the solid and liquid phases, but not in the gaseous phase. Small quantities of chromium in the gaseous emissions from the SCWO reactor are of potential concern for two reasons. First, it reinforces the importance of demonstrating the reliable operation of the platinum-lined reactor; second, it illustrates the need to test gaseous emissions from the SCWO system for particulates, as well as for gaseous contaminants. Chromium emissions reported in Table 3.5-11 of the technology provider's demonstration test report were at 3.1, 12.3, and 10.5 micrograms, respectively, during a five-hour test

period for each of three test runs (General Atomics, 1999a). If the reported emissions pertain to chromium in the hexavalent form, the committee has serious concerns.

Table 3.4-8 of the demonstration test report by General Atomics shows that chemical analyses on VOCs and semi-VOCs were conducted on samples from the off-gas duct of the SCWO system during tests with HD hydrolysate tests (General Atomics, 1999a). The results of these measurements, however, do not appear to be adequate for evaluating the environmental impact of the process. Standard EPA methods for analysis of gaseous effluent samples generally produce full scans that can indicate the quantities of a large number of compounds of environmental concern.<sup>4</sup> These results, along with the results for emissions of metals (including chromium valency), can then be used to assess the environmental impact of a facility through accepted risk assessment methods (EPA, 1998a).

### REEVALUATION OF STEPS REQUIRED FOR IMPLEMENTATION

The committee's earlier report included six required steps for implementation of the General Atomics overall technology package (NRC, 1999). These steps are reprinted below, followed by a description of the effects of the demonstration tests on them.

1. Conduct tests of the cryofracture process to ascertain if it provides better access to the agent cavity in projectiles and mortars than the baseline disassembly process.

Cryofracture was not part of the demonstration.

2. Sample and analyze air emissions from the demonstration system. The air emissions will have to be measured to a level of detail and accuracy that can be used for HRAs and environmental risk assessments required by EPA (1998a).

Some sampling and analyses of air emissions were conducted during the demonstration. However, additional data will be required to evaluate HRA and EPA emissions requirements.

3. Verify that energetic materials encased in metal (e.g., rocket or other munitions fragments) will be hydrolyzed.

The demonstration tests did verify that energetic materials encased in metal can be hydrolyzed. They also confirmed that the chemical reaction of the aluminum casings with the caustic solution is sufficient to gain access to and hydrolyze the contained energetic materials in the design residence time of the ERH.

<sup>4</sup>8000 Series Methods, especially those using gas chromatography/mass spectrometry scans (e.g., Methods 8260B, "VOCs by GC/MS," and 8270C, "Semi-VOCs by GC/MS").

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4. Ascertain how well the SCWO process can handle high-solids materials (shredded dunnage).

The demonstration indicated that the SCWO process can handle materials with a high solids content (e.g., shredded dunnage). However, the SCWO system was not operated long enough to demonstrate reliable continuous operation.

5. Ascertain how well the SCWO system can treat hydrolysate containing large amounts of chlorides, sulfur, and phosphates on a continuing basis.

The ability of the SCWO system to treat hydrolysate containing large amounts of chlorides, sulfur, and phosphates on a continuous basis was not demonstrated.

6. Determine erosion and corrosion behavior of the components of the SCWO system.

General Atomics provided data on the types and quantities of metals found in the precipitates. Both the types and relative quantities matched those of Inconel™ 718. These data provide a strong indication that Inconel™ 718 was the source of the precipitates during the demonstration tests; they do not prove that other materials would not also form precipitates. In addition, the results do not confirm that a platinum-lined reactor could withstand the SCWO conditions and protect the underlying reactor wall during sustained operation.

## SUPPLEMENTAL FINDINGS AND RECOMMENDATIONS

**Finding GA-1.** Testing on the hydrolysis of energetic materials contaminated with agent will be necessary before a full-scale system is built and operated.

**Finding GA-2.** Testing will be required to verify that the larger diameter supercritical water oxidation (SCWO) reactor feed nozzles will be capable of accepting the dunnage material as shredded (i.e., without additional classification and segregation) and that the reactor will perform reliably under these conditions.

**Recommendation GA-1.** Operation of the size reduction and slurring system, and long-term operation of the supercritical water oxidation (SCWO) reactor with slurry, should be conducted before proceeding with a full-scale system.

**Recommendation GA-2.** Before construction of a full-scale supercritical water oxidation (SCWO) system, additional evaluations of construction materials and fabrication techniques will be necessary because corrosion and plugging prevent continuous operation with the present design. If the new construction materials do not solve these problems, then alternative SCWO reactor designs should be investigated.

**Recommendation GA-3.** To determine the operability of the supercritical water oxidation (SCWO) reactor and the reliability of the materials of construction, long duration runs of a SCWO reactor should be conducted with slurry, with energetics hydrolysate, and with agent hydrolysate before full-scale implementation proceeds.

**Recommendation GA-4.** The efficacy and safety of the additional step to remove aluminum hydroxide from the hydrolysate produced from rocket propellants should be evaluated prior to construction of a full-scale supercritical water oxidation (SCWO) system.

**Recommendation GA-5.** Decontamination of solid munitions materials by flushing and immersion should be demonstrated prior to full-scale implementation.

**Recommendation GA-6.** The air emissions data from the demonstration tests should be used in a screening risk assessment. The results of the air effluent samples should be subject to (1) a human health risk assessment following the Human Health Risk Assessment Protocol (HHRAP) for Hazardous Waste Combustion Facilities from the Environmental Protection Agency (EPA) [EPA530-D-98-001(A,B,C)], and (2) an ecological risk assessment following a protocol that will be released by EPA in the very near future.

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## Parsons-AlliedSignal WHEAT<sup>1</sup> Process

The Parsons-AlliedSignal process uses a modified baseline disassembly system to access agent and energetics. These are then hydrolyzed and subsequently biotreated. Hardware and dunnage are thermally decontaminated. The overall process consists of several technologies.

Demonstration testing was conducted for the following components:

- munitions cutting and fluid mining
- biotreatment of agent and energetics hydrolysates
- catalytic oxidation of all gases from the process
- metal parts treater for 5X treatment and dunnage treatment

### MUNITIONS CUTTING AND FLUID MINING

A major modification from the standard baseline disassembly system is the use of water-jet cutting for accessing munitions, followed by fluid mining (wash out) of the energetics with high-pressure water jets. The objectives of the tests are listed below (DOD, 1999b):

- Demonstrate that circumferential cuts at required locations along the rocket length can be made.
- Demonstrate effective fluid mining and separate collection of rocket bursters, motor propellants, and residual agent simulant.
- Demonstrate that control can be maintained of rocket metal and plastic parts from cutting and fluid mining operations.
- Determine the energetic particle size of mined rocket bursters and propellant.

- Determine the requirements for separating used grit from the residual cutting solution.

Most of the objectives listed above were met:

- Rockets were cut at appropriate locations.
- Explosives were successfully washed out, yielding particles that were small enough for subsequent hydrolysis. M28 rocket propellant could not be washed out, however, because of its tough, rubbery consistency. The propellant grain was separated as a single piece several times during the demonstration tests. In the full-scale operation, the technology provider proposes that the propellant grain would be separated, sheared, and the pieces shredded.
- Operational control during the cutting operations was demonstrated, although some refinements from original plans were necessary.
- Used grit was readily separated from the water used for cutting.

During demonstration tests, the propellant grain ignited and burned while it was being forcibly fed into the low-speed shredder. The committee had noted this possibility earlier (NRC, 1999):

Friction, shear, or heat may result from the inadvertent introduction of metal, an excessive feed rate, or some other cause and could initiate the energetic material.

The problem was resolved during the demonstration by inundating the shredding face with cooling water. In the full-scale operation, the technology provider proposes performing the entire shredding operation under water.

The separation and initial processing of the rocket components (and other major hazardous operations) are performed remotely to reduce worker exposure to safe levels. Thus, although further development is necessary in certain

<sup>1</sup>WHEAT is an acronym for water hydrolysis of explosives and agent technology.



areas, the committee continues to believe that design and administrative controls will be feasible when the technology reaches the level of development at which quantitative risk assessments and hazard evaluations can be performed (NRC, 1999).

**BIOTREATMENT SYSTEMS**

Different biotreatment systems are used to treat HD hydrolysate and nerve agent (GB and VX) hydrolysates. Therefore, they are discussed separately below. The main objectives of the demonstration tests are listed below:

- to show a high level of destruction of Schedule 2 compounds and energetics hydrolysate compounds, yielding products acceptable for discharge
- to demonstrate a high level of destruction over an extended period of time with good operational control

The specific test objectives are listed below (DOD, 1999b):

- Validate that the immobilized cell biotreatment (ICB) process can eliminate Schedule 2 compounds present in all hydrolysate feeds.

- Confirm the absence of agent in the effluents of the ICB systems.
- Validate that the ICB systems (and the separately tested agent hydrolysis systems) can achieve a DRE of 99.9999 percent for VX, GB, and HD.
- Validate that the ICB systems (and the separately tested energetic hydrolysis systems) can achieve a DRE of 99.999 percent for energetics.
- Develop mass loading and kinetic data required for scale-up of ICB unit operations.
- Validate that the catalytic oxidation (CATOX) unit can eliminate specified VOCs, semi-VOCs, and Schedule 2 compounds from the process gas stream.
- Determine the potential impact of operating conditions on fouling and plugging of the CATOX unit.
- Characterize gas, liquid, and solid process streams from the ICB process for selected chemical constituents and physical parameters, as well as the presence or absence of agent, Schedule 2 compounds, and other toxic or hazardous compounds.

**Biotreatment System for Mustard Hydrolysate**

A flow diagram for the demonstration test unit used for HD hydrolysate is shown in Figure 4-1. The feed consisted

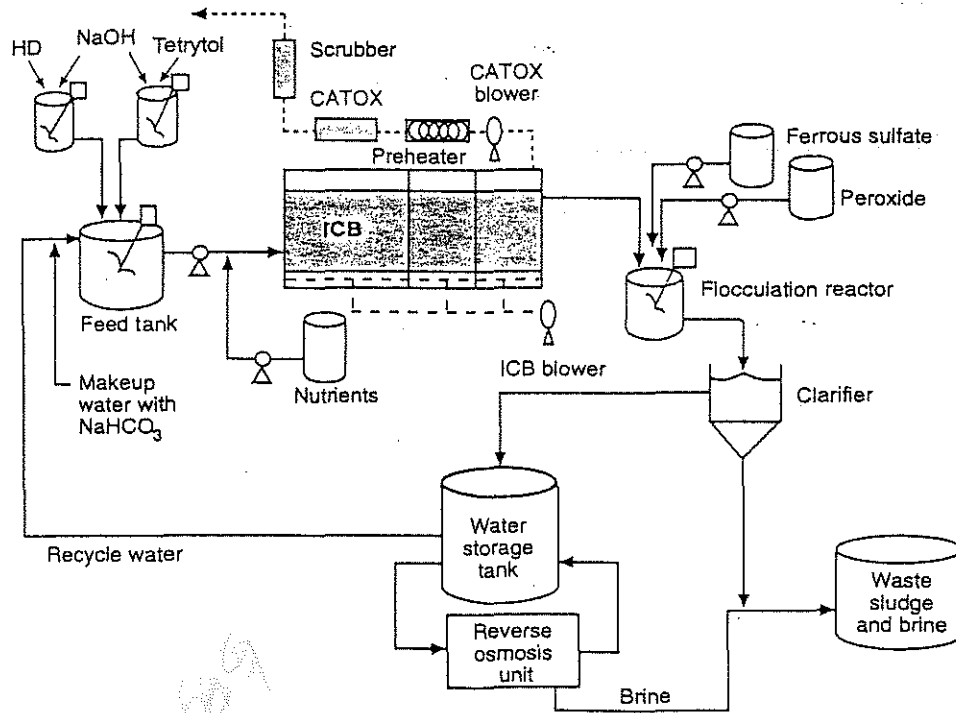


FIGURE 4-1 Demonstration test unit for treatment of HD/tetrytol hydrolysate. Source: Adapted from Parsons-AlliedSignal, 1999a.

of two streams, hydrolyzed HD and hydrolyzed tetrytol, that corresponded to the agent/energetics combination from an M60 105-mm artillery shell. Nutrients (ammonium sulfate or ammonium bicarbonate) were added to supply additional nitrogen. Fenton's reagent (30 percent  $H_2O_2$  plus  $FeSO_4$ ) was added to the flocculation product after biotreatment. (The amount added was small and did not contribute significantly to the overall oxidation process.)

The products of the HD biotreatment process are listed below:

- a wet sludge (biosolids plus a high percentage of brine)
- brine from the biotreatment system, concentrated by a reverse osmosis unit (which will not be included in the final plant design)
- depleted air from the bioreactors that has been treated in a CATOX unit (to oxidize organics carried over as spray or vapor) and then passed through a dry caustic scrubber and a carbon filter

The major criterion used to judge the efficacy of the bioreactor was the destruction of Schedule 2 compounds in HD hydrolysate and of tetrytol hydrolysate products in the feed. Schedule 2 compounds were not detected in the brine or sludge, and the DRE of Schedule 2 compounds from the combined agent/energetic hydrolysate feed was greater than 99.9 percent. Small amounts of 1,4-dithiane and 1,4-thioxane survived but were removed in the flocculation step, in which Fenton's reagent was added.

No energetics or their breakdown products, such as nitrotoluenes and nitrobenzenes, were detected in the brine and sludge, and samples of brine and sludge passed the EPA's toxic characteristic leaching procedure (TCLP). Low levels of several semi-VOCs were found in both sludge and brine samples. Also, some VOCs (e.g., 2-butanone and acetone) were found. Dioxins and furans were detected in some samples, but were below the levels of concern. Metals were also below the levels of concern. Analysis of the brine showed a greater than 90 percent removal of chemical oxygen demand (COD) relative to the bioreactor feed. Biological oxygen demand (BOD) in the brine was measured, but the technology provider considered the results meaningless because the microorganisms used in the BOD test were not well acclimated to the components in the agent and energetic hydrolysates.

### Biotreatment System for Nerve Agent Hydrolysates

A flow diagram of the demonstration test unit used for nerve agent hydrolysate is shown in Figure 4-2. The main difference between this system and the system used for HD hydrolysate is the presence of the phosphonate form of phosphorus, which cannot be readily biodegraded. Other differences are listed below:

- A large amount of dextrose was added (about 44 lbs per pound of nerve agent products). The dextrose plus other nutrients (e.g., urea) represent about 95 percent of the total COD of the system.
- The feed rate of agent/energetics hydrolysate to the biotreatment system was scaled back to accommodate the added dextrose. The hydrolysate feed contained a concentration of about 0.1 percent Schedule 2 compounds, compared with 1.0 percent for the HD/energetics hydrolysate feed.
- The bio-oxidation process was augmented by a ultraviolet (UV)/hydrogen peroxide reactor.

The operating conditions were based on tests performed at the technology provider's laboratory that had demonstrated a DRE of more than 95 percent for Schedule 2 compounds. Energetics hydrolysate and agent hydrolysates were fed to the reactor in the following combinations:

- VX hydrolysate, Comp B hydrolysate, and M28 propellant (the products of a processed M55 rocket)
- GB hydrolysate and Comp B hydrolysate (the products of a processed M426 8-inch artillery shell)

The major criterion for judging the nerve agent process was the same as for the mustard process—destruction of the Schedule 2 compounds and energetic products in the hydrolysate feed. In general, the biotreatment of nerve agent hydrolysates was not successful. Although some of the problems were identified (described below), the reasons for the inadequate performance remain unclear.

The overall process (biotreatment plus UV/hydrogen peroxide) reduced the Schedule 2 compounds by 40 to 60 percent for GB hydrolysate, somewhat more for the VX hydrolysate (the higher DRE quoted in the demonstration report is an error [Parsons-AlliedSignal, 1999a].) As the test proceeded, there was a gradual buildup of the most biologically refractory Schedule 2 compounds: isopropyl methylphosphonic acid (IMPA) in GB hydrolysate; ethyl methylphosphonic acid (EMPA) in VX hydrolysate. The proportion of the DRE attributable to the biotreatment system and the proportion attributable to the UV/hydrogen peroxide could not be established from the available data. However, based on material balance estimates from the reported information on GB (for tests on April 13 and May 5), about 60 percent of the total IMPA conversion occurred in the bioreactor and flocculator, and about 40 percent occurred in the UV/hydrogen peroxide unit (Parsons-AlliedSignal, 1999a). The Fenton's reagent was not a major factor because the amount added corresponded to only about 3 percent of the initial feed COD.

The flow through the biotreatment process was continuous, 24 hours per day. However, the UV/hydrogen peroxide treatment was operated intermittently. A reverse osmosis

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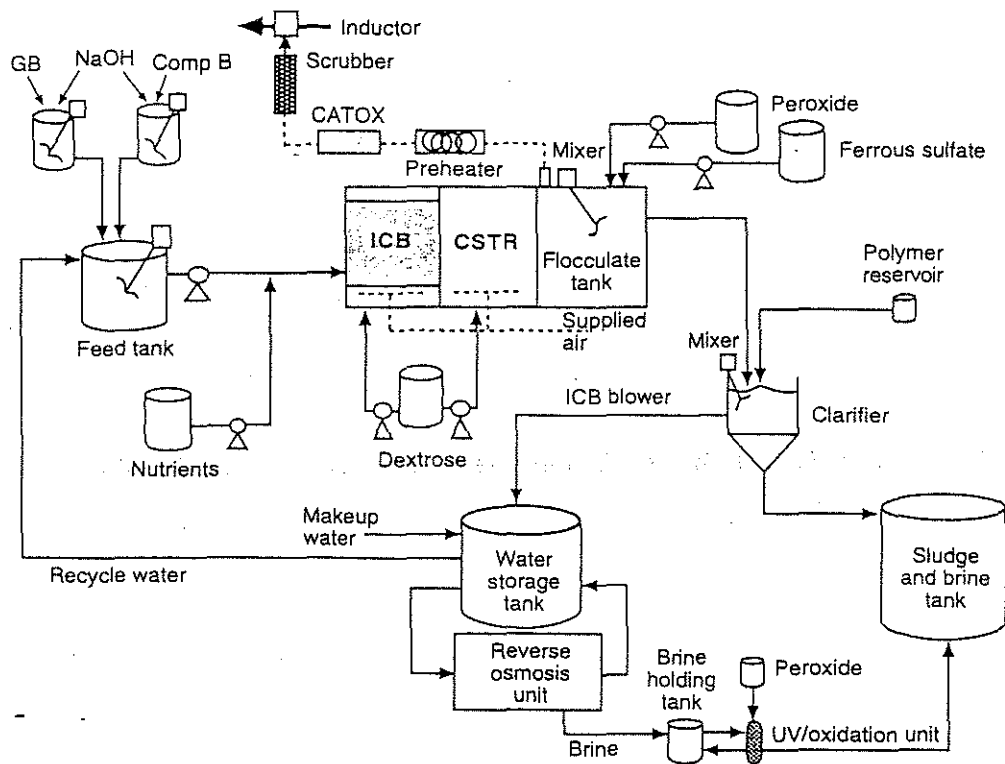


FIGURE 4-2 Demonstration test unit for treatment of GB/Comp B hydrolysate. Source: Adapted from Parsons-AlliedSignal, 1999a.

unit drawing on the recycle stream produced a small flow of concentrated brine, which accumulated in the brine holding tank. After 800 gallons had accumulated (over a period of about five days), the brine was recycled through the UV/hydrogen peroxide unit for six hours to produce one of the products leaving the plant. Although the UV/hydrogen peroxide unit was responsible for a substantial fraction of the total oxidation, a very large excess of hydrogen peroxide was used (at least 10-times the theoretical requirement). The intensity of the UV light was not reported. Therefore, the committee was unable to evaluate the efficiency of the UV/hydrogen peroxide unit.

The circulating brine was black, which suggests that the process was anaerobic in some areas. The black color-bodies were not identified, but, because of the black color, the brine was not suited for oxidation by the UV/hydrogen peroxide unit.

The air supply (116 cubic feet per minute [CFM]) was substantially less than planned (200 CFM) because of a much higher than expected pressure drop across the CATOX unit. The technology provider attributes this to an accumulation of corrosion products from the inlet line, but the CATOX unit was not examined (Lupton, 1999). The technology provider had obtained acceptable results with another unit when the air supply was equivalent to 200 CFM. Although a larger air supply might have resulted in acceptable levels of

destruction during the demonstration tests, this is merely conjecture. Even at the reduced level of 116 CFM, the oxygen supply was more than 10 times the stoichiometric requirement (i.e., with air in at 21 percent oxygen, air out contained 19.5 percent oxygen). The reduced air flow might have caused poor dispersion of air in the reactor or uneven mixing and stirring. Nevertheless, the technology provider should examine the CATOX unit thoroughly and reassess its design.

During demonstration, the BOD of the hydrolysate feed was unusually large (15,800 mg/L)—in fact, 85-fold larger than the BOD during prior tests (200 mg/L). No explanation was given for the very large BOD requirement, which was much larger than the calculated oxygen requirement for complete oxidation of the feed. The very small BOD in the earlier tests was much lower than the theoretical oxygen requirement and undoubtedly much lower than the oxygen actually consumed in the tests. Too low a BOD measurement may be explained as a poor BOD test with a biological culture poorly acclimated to the feed, for example. However, there is no apparent explanation for a BOD measurement higher than the BOD for total oxidation. Therefore, the committee believes the BOD measurements are questionable.

"Thiol," the major Schedule 2 compound produced from VX hydrolysis, is expected to be more than 50 percent of the

mass of Schedule 2 materials. Surprisingly, however, it is reported to be present in much smaller amounts, less than 5 percent in some cases. (To reduce the unpleasant odor, the hydrolysate may have been treated with sodium hypochlorite and the thiol oxidized, but no information on this is given. The treatment would have reduced the oxidation required of the bioreactor.)

According to the technology provider, the sludge produced in the biotreatment of nerve agents passed the TCLP tests satisfactorily. Because the treatment of these organophosphorus compounds was unsatisfactory, this sludge is not representative of the sludge that would be produced if the technology provider had developed an effective process. Thus, these TCLP tests are invalid.

The Army and its contractors have experienced problems with the analyses of the trace components in the effluents. For example, low concentrations of semi-VOCs and Schedule 2 compounds had to be measured in highly contaminated samples containing high concentrations of caustic. Many of the compounds in the effluents were never identified. Such solutions, as well as sludges, present difficult matrices in which to perform trace analyses. To lower the alkalinity, the samples were diluted extensively, thereby lowering further the concentrations of the trace components. Also, the caustic reacted with the absorbents, such as alumina, used in the chromatography columns (Arthur D. Little, Inc., 1999). In addition, the demonstration tests with the VX hydrolysate were delayed because the Army had difficulty analyzing the residual VX and certifying that the hydrolysate was safe prior to shipment.

The poor performance in the demonstration tests was attributed to the low air supply and the large BOD described above (Parsons-AlliedSignal, 1999b). However, the committee believes other factors may have been crucial:

- poor dispersion of air in the reactor leading to inadequate saturation of the liquid with oxygen
- inadequate acclimation of the biomass, particularly for handling phosphonate material

## CATALYTIC OXIDATION

### Catalytic Oxidation Unit for Mustard

The CATOX unit on the effluent gas from the biotreatment of HD hydrolysate appeared to work well, but because there were some difficulties in analyzing the gas for some EPA-regulated nonvolatile organic compounds, the gas composition was uncertain. The gas leaving the CATOX unit had traces of low molecular weight materials, which are considered acceptable. Chlorinated dioxins and furans were observed at very low levels in some of the analyses, but these compounds should be adsorbed from the gas by the carbon filter. No analysis of the gas discharged from the carbon filter was performed.

### Catalytic Oxidation Unit for Nerve Agent

The technology provider claimed that the CATOX unit for the effluent gas from the biotreatment of GB and VX hydrolysates performed well. However, there was an unexpectedly large pressure drop across the unit (Lupton, 1999). Although both input and output streams were sampled, no data on the composition of the effluents were available.

## METAL PARTS TREATER

The MPT system consisted of the following units:

- a cylindrical furnace heated electrically by induction heaters surrounding the cavity and by a flow of low-pressure superheated steam
- a furnace to generate and superheat the steam
- a heat exchanger to condense most of the outlet steam and the semi-VOCs
- a CATOX unit with a preheater and added air to treat gases leaving the condenser
- a solid caustic scrubber for the gas leaving the CATOX unit

The system was run in a batch mode. The chamber was loaded with the material to be treated, and the temperature and steam flow were ramped up to achieve a 5X decontamination condition. The chamber was cooled, opened, and the products examined. The proposed full-scale MPT system will have several batch reactors of the general type demonstrated, as well as a continuous reactor for some components (e.g., fuses and projectile burster casings). The continuous reactor will resemble the metal parts furnace of the baseline system but will be electrically and steam heated. The continuous processing unit was not included in the demonstration testing.

The MPT was tested with the following feeds:

- M60 105-mm projectile spiked with GB, VX, or HD
- dunnage of various kinds (wood, DPE suits, carbon)

To test a potential failure mode of the MPT, the CATOX unit associated with it was challenged by separately injecting 0.6 lb of each of the three neat agents over a four-hour period.

Qualitatively, the MPT system appeared to work well. Solid material remaining in the furnace was decontaminated to a 5X condition (free of agent). The condition of the material driven off in the furnace (the liquid and off-gas from the condenser) is more difficult to characterize. HD was reported to be less than 5 µg/L in the condensate; its breakdown (hydrolysis) products (thiodiglycol, 1,4-oxathiane, and dithiane) were at several hundred µg/L. In direct agent injection tests, GB was reported at 11 and 27 µg/L; VX at 60 and 220 µg/L. Their breakdown products were not reported. The volume flow of steam (and the volume of condensate) was not

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reported. Consequently, the breakdown level of the agents not be calculated.

A variety of VOCs were present in the condensate. The data on semi-VOCs were not available to the committee during the preparation of this report. There was some evidence of the reaction of organic materials with steam, but it was not possible to determine the extent or the weight fraction of feed material driven off in the furnace. The nature of the materials identified in the condensate suggests that they could be handled satisfactorily by recycling to the ICB reactor feed.

Neither analytical data on the gas from the condenser nor flow rates were included in the reports (DOD, 1999b; Parsons-AlliedSignal, 1999a). Some agent concentrations were reported based on analysis of depot area air monitoring system (DAAMS) tubes, which showed agent concentrations for VX from zero (i.e., not detected at the detection limit) to 25 times the time-weighted average (TWA) permissible exposure limit. (The committee assumed the TWA referred to was the stack-emission limit of 0.0003 mg/m<sup>3</sup>).

During the direct injection tests, the CATOX unit destroyed the agent to a DRE of greater than 99.9999 percent. The very low levels of agent leaving the MPT unit should be destroyed in the CATOX (Parsons-AlliedSignal, 1999a).

The operational problems listed below must be addressed prior to the development of a final plant design:

- Some dunnage (e.g., DPE suits) generated gas too rapidly, resulting in an excessive temperature rise in the CATOX unit.
- Paint chips clogged the condenser liquid outlet.
- Some significant operational data were not reported: steam flow rate, liquid condensate rate, and vapor and air flow rates to the CATOX unit.
- The catalytic activity of the CATOX unit is expected to decline slowly with time, but this was not investigated during the demonstration tests.

It seems likely to the committee that the system performed its desired function. However, going from the batch, "unsteady-state" operation of the demonstration test unit to the proposed, "steady-state" flow operation will require further investigation by the technology provider.

## SAFETY CONCERNS

The safety issues were discussed in the section on munitions-cutting and fluid-mining.

## REEVALUATION OF STEPS REQUIRED FOR IMPLEMENTATION

The committee's earlier report identified seven steps required for implementation of the WHEAT technology (NRC, 1999).

The following steps would have to be taken to implement this technology package:

1. demonstration of the effectiveness of the biotreatment of various combinations of agent and energetics hydrolysates of sufficient length to give reasonable assurance of long-term performance

Mustard and energetics hydrolysates were effectively treated by the biotreatment process. However, nerve agent hydrolysates, which were mixed with energetic hydrolysates, were not digested by the microorganisms.

2. operation of the bioreactor at the planned salt-content

The demonstration tests were all done at very low salt contents (e.g., 0.5 weight percent). Other experience suggests that much higher salt contents could be tolerated (e.g., 2 weight percent [Lupton, 1999]).

3. characterization of the off-gas from the bioreactor to evaluate the extent of air-stripping from the reactor and the possible poisoning of the catalyst in the catalytic oxidation unit

This was not done during the demonstration tests (at least partly because of analytical difficulties). Therefore, the extent and rate of catalyst poisoning have yet to be determined. The extent of air stripping was not evaluated.

4. demonstration of the effectiveness and long-term performance of the catalytic oxidation system in destroying organic constituents in the bioreactor off-gas

Although the CATOX units appeared to perform well during the demonstration tests, their long-term performance remains to be demonstrated (see commentary on Step 3 above).

5. quantification and characterization of the sludge from the biological process to ascertain if Schedule 2 compounds or other hazardous constituents are present

The sludge from HD hydrolysates was tested and appeared to be nonhazardous. The sludge from the nerve agent hydrolysates also appeared to be acceptable, but they were the products of an operation that will require further development to perform satisfactorily and should, therefore, be retested as the system advances.

6. demonstration of unproven steps in the proposed process, including ultraviolet/peroxide oxidation and evaporation operations

Some "unproven steps" were demonstrated (e.g., high-pressure water-jet mining of explosives). Because the UV/hydrogen peroxide process was tested under very adverse conditions, its ultimate operation could not be evaluated. No brines were evaporated.

7. quantification and characterization of the salts from the evaporation operations to ascertain what organic compounds are present

Many partially oxygenated compounds were identified in the brine—some appeared in the dried salts and some evaporated in the drying operation. The compounds observed in the mustard/energetics process were materials typically observed in biotreatment plants. The nerve agent/energetics products, however, were the products of an unsatisfactory operation. Therefore, no conclusions can be drawn.

Because the demonstration test program was short, and because difficulties were encountered, few of the steps noted above were of sufficient duration to demonstrate long-term performance. However, it is reasonable to conclude that the biotreatment process will operate satisfactorily for HD hydrolysate. Because the nerve agent demonstration tests encountered many problems, further scale-up should be delayed until these problems have been resolved.

## REVIEW OF PREVIOUS COMMITTEE FINDINGS

The demonstration program was responsive to some, but not all, of the committee's earlier findings.

**Finding PA-1.** The biological treatment operation will require further demonstration to prove its ability (1) to handle a variety of feed stocks with reasonable acclimation times between changes, and (2) to achieve high levels of conversion of the Schedule 2 compounds in the hydrolysate. The demonstration will have to last long enough to give confidence in the long-term operational ability of the process.

The conversion rate of Schedule 2 compounds in the biotreatment process on mustard hydrolysate was high. Although acclimation time was longer than anticipated, this does not represent a serious problem. The results of the biotreatment of nerve agent hydrolysates, however, were discouraging. In both cases, the demonstration tests were too short in duration to demonstrate conclusively long-term operational reliability.

**Finding PA-2.** The relative effects of biological treatment and air-stripping on the destruction of organic materials in the bioreactor have not been established. This will affect the composition of the off-gas from the bioreactor.

Air stripping was not seriously examined in the demonstration tests. However, the concentration of organics in the off-gas from the reactor was low.

**Finding PA-3.** The effectiveness of ultraviolet/hydrogen peroxide oxidation in reducing Schedule 2 compounds to an acceptably low level has not been demonstrated. [Note: Applicable only to biotreatment of nerve agent hydrolysate.]

The UV/hydrogen peroxide process was operated under adverse conditions in the demonstration tests (i.e., the fluid was black and nontransparent).

**Finding PA-4.** The bioreactor has been operated only at very low salt concentrations. Operation at design concentrations has not been demonstrated.

The demonstration reactions were also carried out only at low salt concentrations.

**Finding PA-5.** Additional data should be gathered on the effectiveness of the catalytic oxidation system in destroying organic materials in the biotreatment of off-gas.

The CATOX system demonstrated high conversion of nerve agents and very low levels of materials in the off-gas. Input concentrations were very low, however, so the DRE could not be computed.

**Finding PA-6.** The sludge from the biological process has not been completely characterized.

The sludges in the demonstration tests were extensively characterized. However, in contrast to the sludges produced from treatment of mustard hydrolysate, the sludges produced from biotreatment of nerve agent hydrolysates were not considered representative of a final acceptable process because of difficulties in processing the phosphonate form of phosphorus.

**Finding PA-7.** Even though the evaporation operations involve conventional technologies, they have not been tested for this application.

No evaporation process was demonstrated.

**Finding PA-8.** The dried salts from the evaporation operations have not been characterized for leachability and toxicity.

No dried salts were produced. Therefore, whether or not the dried salts will meet leachability and toxicity requirements for disposal, either with or without stabilization, was not determined.

## SUPPLEMENTAL FINDINGS AND RECOMMENDATION

As a result of the demonstration tests, the committee's earlier findings (discussed above) have been supplemented by two new findings and a new recommendation:

**Finding PA-1.** The mustard demonstration tests were very encouraging and showed that the process is ready for the next scale-up.

**Finding PA-2.** The nerve agent demonstration tests had serious problems. However, if the previous tests at the technology provider's laboratory and the results of the demonstration tests are combined, the aggregate results are inconclusive. The reason for the poor demonstration results might be as simple as poor aeration in the bioreactor (see Recommendation PA-1).

Recommendation PA-1. Before proceeding to a further set-up of GB and VX biotreatment processing, the committee recommends that the following steps be taken:

- The biotreatment process should be examined care-

fully at bench scale to determine the factors that are critical to success.

- An investigation of analytical techniques should be undertaken to provide more reliable process information.

# Update of General Findings and Recommendations

Chapter 11 of the committee's initial report, *Review and Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons*, included 16 general findings and seven general recommendations (NRC, 1999). For the most part, these findings and recommendations remain unaffected by the results of the demonstration tests of the three technology packages. Each of these findings and recommendations is quoted below followed by a discussion of the effect of the demonstration tests results. New findings are then presented.

## REVIEW OF EARLIER FINDINGS AND RECOMMENDATIONS

**General Finding 1.** The chemistries of all four of the primary technologies, (hydrolysis, SILVER II, plasma arc, and SET) as proposed, can decompose the chemical agents with destruction efficiencies of 99.9999 percent. However, each technology package raises other technical issues that must be resolved. One of the crucial issues is the identity and disposition of by-products.

Two of the three technology packages chosen for ACWA demonstration rely on hydrolysis as the primary treatment process. The third is based on plasma arc technology. Hydrolysis of agents was not a direct part of the demonstrations. However, the PMACWA produced approximately 1,100 gallons of GB hydrolysate, 400 gallons of VX hydrolysate, and 4,200 gallons of HD hydrolysate as starting materials for the demonstrations. The Army's ability to produce agent hydrolysates that show no agent above detection limits confirms the effectiveness of hydrolysis in destroying both mustard and nerve agents to a DRE of 99.9999 percent.

Although the Burns and Roe team did not conduct demonstration tests for the destruction of neat chemical agents, the committee continues to believe that a properly engineered plasma arc device could destroy both mustard and nerve agents to a DRE of 99.9999 percent.

**General Finding 2.** The technology base for the hydrolysis of energetic materials is not as mature as it is for chemical agents. Chemical methods of destroying energetics have only been considered recently. Therefore, there has been relatively little experience with the alkaline decomposition of ACWA-specific energetic materials (compared to experience with chemical agents). The following significant issues should be resolved to reduce uncertainties about the effectiveness and safety of using hydrolysis operations for destroying energetic materials:

- the particle size reduction of energetics that must be achieved for proper operation
- the solubility of energetics in specific alkaline solutions
- process design of the unit operation and the identification of processing parameters (such as the degree of agitation and reactor residence time) necessary for complete hydrolysis
- the characterization of actual products and by-products of hydrolysis as a function of the extent of reaction
- the selection of chemical sensors and process control strategies to ensure that the unit operation following hydrolysis can accept the products of hydrolysis
- development of a preventative maintenance program that minimizes the possibility of incidents during the cleanup of accumulated precipitates

**General Finding 3.** The conditions under which aromatic nitro compounds, such as trinitrotoluene (TNT) or picric acid, will emulsify in the aqueous phase and not be completely hydrolyzed are not well understood. Therefore, this type of material could be present in the output stream from an energetic hydrolysis step.

**General Finding 4.** The products of hydrolysis of some energetic materials have not been characterized well enough to support simultaneous hydrolysis of different kinds of energetic materials in the same batch reactor.

**General Recommendation 5.** Whatever unit operation immediately follows the hydrolysis of energetic materials should be designed to accept emulsified aromatic

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nitro compounds, such as TNT or picric acid, as contaminants in the aqueous feed stream. (See General Finding 3.)

**General Recommendation 6.** Simultaneous processing of different types of energetic materials should not be performed until there is substantial evidence that the intermediates formed from the hydrolysis of aromatic nitro compounds will not combine with M28 propellant additives or ordnance fuze components to form extremely sensitive explosives, such as lead picrate. (See General Finding 4.)

The hydrolysis of energetics performed during the ACWA demonstrations substantiates the findings and recommendations cited above. The committee is concerned that the technology for the hydrolysis of energetic materials may be even more immature than was originally anticipated. Problems were experienced in scale-up test runs for Comp B and tetrytol that were not apparent during laboratory-scale tests. Because the hydrolysis of lead stearate produces lead hydroxide, toxicity is a potential problem, justifying the committee's concern about the possible formation of lead picrate if M28 propellant is simultaneously hydrolyzed with Comp B or tetrytol bursters.

The Army and General Atomics have acknowledged that more work needs to be done before the hydrolysis of energetics can be considered safe and effective at production-scale levels (DOD, 1999c, 1999d; General Atomics, 1999a). The demonstration tests provided a large body of data. The Army has assembled a team of agencies to analyze the preliminary results, assess the efficacy of the processes, and identify problems and their causes and effects. Further experimentation is also being planned.

**General Finding 5.** The primary chemical decomposition process in all of the technology packages produces environmentally unacceptable reaction products. Therefore, all of the packages are complicated processes that include subsequent treatment step(s) to modify these products.

The General Atomics and the Parsons-AlliedSignal technology packages use hydrolysis for primary chemical decomposition, whereas the primary treatment process in the Burns and Roe package is the PWC. Analyses of the agent hydrolysates produced by the PMACWA for the demonstration tests confirmed General Finding 5. In other words, the hydrolysates contained Schedule 2 compounds and other products that are not suitable for direct discharge to the environment. The PWC used for the demonstration was not tested on agents or under conditions that produced acceptable synfuel. Consequently, PWC by-products produced from agents must still be characterized.

**General Finding 6.** The waste streams of all of the ACWA technology packages could contain very small amounts of hazardous substances (besides any residual chemical agent). These substances were not fully characterized at the time of this report; therefore, all waste streams must be characterized to ensure that human

health and the environment are protected. If more than one phase (gas, liquid, or solid) is present in a waste stream, each phase should be characterized separately.

Although a large body of data was gathered, the tests of unit operations from the three technology packages during the demonstrations were of short duration and were conducted with undersized reactors. In addition, the operating conditions were not optimized. Thus, the effluents that were produced may not be completely representative of the effluents that would be produced in units operating at different conditions (e.g., temperature, pressure, etc.).

**General Finding 7.** None of the proposed technology packages complies completely with the hold-test-release concept for all gaseous effluents (both process and ventilation effluents).

**General Finding 8.** Hold-test-release of gaseous effluents may not ensure against a release of agent or other hazardous material to the atmosphere. No evidence shows that hold-test-release provides a higher level of safety than current continuous monitoring methods for gaseous streams with low levels of contamination. Furthermore, none of the technologies provides for hold-test-release of effluents from ventilation systems that handle large volumes of gases from contaminated process areas.

Because the basic configurations of the three demonstrated technology packages have not changed, General Findings 7 and 8 remain unchanged. Hold-test-release was not included in the demonstration tests.

**General Finding 9.** Solid salts will be hazardous waste, either because they are derived from hazardous waste... or because they leach heavy metals above the levels allowed by the Resource Conservation and Recovery Act Toxicity Characteristic Leaching Procedure. Stabilization—mixing waste with a reagent or reagents to reduce the leachability of heavy metals—will probably be required before the salts can be sent to a landfill. The potentially high chloride and nitrate content of these salts will make the waste difficult to stabilize, and treatability studies will be necessary to determine a proper stabilization formula.

General Finding 9 remains unchanged because the demonstrations did not test the ability of unit operations to produce dried salts.

**General Finding 10.** Testing, verification, and integration beyond the 1999 demonstration phase will be necessary because the scale-up of a process can present many unexpected challenges, and the ACWA demonstrations were limited in nature.

The committee considers the demonstration tests as "proof-of-concept" tests of the demonstrated unit operations. In nearly all cases, the conditions during the tests had to be modified in some respects, and, in many cases, significant alterations had to be made to the procedures. Finally, the critical step of integrating the unit operations has not yet been addressed by the technology providers for any of the demonstrated technology packages.

The committee believes that the following general findings and recommendations from the committee's original report were not affected in any way by the demonstration tests of the three technology packages.

**General Finding 11.** Although a comprehensive quantitative risk assessment (QRA), health risk assessment (HRA), and ecological risk assessment (similar to assessments performed for the baseline process) cannot be completed at this stage of process development, these assessments will have to be performed and refined as process development continues.

**General Finding 12.** The "optimum" system for a particular chemical weapons storage depot might include a combination of unit operations from the technology packages considered in this report.

**General Finding 13.** Some of the ACWA technology providers propose that some effluent streams be used commercially. New or modified regulations may have to be developed to determine if these effluent streams can be recovered or reused.

**General Finding 14.** An extraordinary commitment of resources will be necessary to complete the destruction of the assembled chemical weapons stockpile in time to meet the current deadline using any of the ACWA technology packages. This would demand a concerted national effort. It is unlikely that any of the technology packages could meet this deadline.

**General Finding 15.** The Dialogue process for identifying an alternative technology is likely to reduce the level of public opposition to that technology. The committee believes that the Dialogue has been and continues to be a positive force for public acceptance of alternatives to incineration. Although the Dialogue process requires a significant commitment of time and resources, it has been a critical component of the ACWA program to date.

**General Finding 16.** Although the committee did not have access to scientific data on the attributes of a technology that would be most acceptable to the public, input from members of the active publics and previous research indicates that technologies with the following characteristics are likely to stimulate less public opposition:

- minimal emissions, particularly gaseous
- continuous monitoring of effluents to verify that the process is operating as designed (process assurance measurement)
- provisions for representatives of the local community to observe and participate in the process assurance measurement

**General Recommendation 1.** If a decision is made to move forward with any of the ACWA technology packages, substantial additional testing, verification, and integration should be performed prior to full-scale implementation (see General Finding 10).

**General Recommendation 2.** The sampling and analysis programs at each phase of development should be carefully reviewed to ensure that the characterization of trace components is as comprehensive as possible to avoid surprises in the implementation of the selected technology (see General Finding 6).

**General Recommendation 3.** If a decision is made to move forward with any of these technology packages, health and safety evaluations should progress from qualitative assessments to more quantitative assessments as the process design matures. Quantitative (QRA), health (HRA), and ecological risk assessments should be conducted as soon as is practical. Early initiation of these assessments will allow findings to be implemented with minimal cost and schedule impact (see General Finding 11).

**General Recommendation 4.** Any of these technology packages, or any component of these technology packages, should be selected on a site-specific basis (see General Finding 12).

**General Recommendation 7.** The Department of Defense should continue to support the Dialogue throughout the current ACWA program and should seriously consider the participation of the Dialogue in follow-on programs.

## SUPPLEMENTAL GENERAL FINDINGS

In the Statement of Task for this report, the committee was asked to determine if any of the technology packages chosen for demonstrations was "viable to proceed with implementation of a pilot-scale program that would employ any of these technologies." The committee has evaluated the maturity of each unit operation in the proceeding chapters of this report. Table 5-1 provides a summary of the committee's assessments.

**General Finding 1.** Based on the committee's assessment of the maturity of the various unit operations (as summarized in Table 5-1), none of the three technology packages is ready for *integrated* pilot programming, although certain unit operations are sufficiently mature to bypass pilot testing (e.g., hydrolysis of agent).

The demonstrated PWC system of the Burns and Roe technology package does not appear to be ready for pilot testing for any assembled chemical weapons materials. The demonstrated components of the General Atomics technology package are close to achieving an overall acceptable level of maturity. However, certain key demonstration tests were not performed or the results were inconclusive. The demonstrated components of the Parsons-AlliedSignal technology package are also close

TABLE 5-1 Summary Evaluation of the Maturity of Demonstrated Unit Operations and Processes<sup>a</sup>

Unit Operation/Process	Hydrolysates			Agent Munitions			Other
	VX/GB	HD	Energetics	VX/GB	HD	Energetics	
Burns and Roe Plasma waste converter <sup>b</sup>	C	C	D	D	D	E	C <sup>c</sup> , d <sup>e</sup>
General Atomics Hydrolysis				A	A		
Rotary hydrolyzer						C	
Shredding/hydropulping SCWO	B	B	C				A <sup>c</sup> C <sup>c</sup>
Parsons-AlliedSignal Munitions accessing				B	B	B	
Hydrolysis				A	A	C	
Biotreatment	D	A	A				
Catalytic oxidation							B <sup>c</sup>
Metal parts treater				B	B	D	B <sup>d</sup>

Note: Environmental and safety issues were considered in assigning maturity categorizations. Schedule and cost issues were not considered.

<sup>a</sup> The letter designations are defined as follows (a blank space indicates categorization was not applicable for that material).

- A Demonstration provides sufficient information to allow moving forward to full-scale design with reasonable probability of success.
- B Demonstration provides sufficient information to allow moving forward to the pilot stage with reasonable probability of success.
- C Demonstration indicates that unit operation or process requires additional refinement and additional demonstration before moving forward to pilot stage.
- D Not demonstrated; more R&D required.
- E Demonstrated unit operation or process is inappropriate for treatment.

<sup>b</sup> Includes integrated gas polishing system to support demonstration

<sup>c</sup> Munage

<sup>d</sup> Metal parts

<sup>e</sup> Effluents

to being ready for pilot testing, but only for mustard-bearing munitions. Hydrolysis of agent (used in the General Atomics and Parsons-AlliedSignal technology packages) appears sufficiently mature to consider full scale application to any assembled chemical weapons. Similarly, biotreatment of hydrolysate (Parsons-AlliedSignal technology package) appears sufficiently mature for full scale application to mustard munitions.

General Finding 2. The demonstration tests were not operated long enough to demonstrate reliability and long-term operation.

The PMACWA's demonstration plan was severely

constrained by both scheduling deadlines and available budget resources. The technology providers did not have enough time for systemization (preoperational testing). Consequently, the committee maintains that these tests were simply "proof-of-concept" demonstrations that indicate whether or not a particular unit operation (with more development) might be applicable to the disposal of assembled chemical munitions.

General Finding 3. The committee reiterates that none of the unit operations has yet been integrated into a complete system. The lack of integration is a major concern and a significant obstacle to full-scale implementation.

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# Appendix A

## Findings and Recommendations from the 1998 Report on Supercritical Water Oxidation

The following paragraph and the subsequent findings and recommendations are taken directly from *Using Supercritical Water Oxidation to Treat Hydrolysate from VX Neutralization* (NRC, 1998). They are reproduced here because the committee considers them applicable to the supercritical water oxidation (SCWO) technology evaluated in this study.

### EXCERPT

Chemical neutralization of VX nerve agent results in the production of a liquid hydrolysate stream that has greatly reduced toxicity compared to the original nerve agent but requires further treatment to meet the requirements of the Chemical Weapons Convention and to be suitable for disposal. After considering several approaches, the U.S. Army has selected SCWO (supercritical water oxidation) as the primary process for treating the hydrolysate from VX neutralization prior to ultimate disposition. The integration of SCWO into the complete process for the destruction of VX stored at Newport, Indiana, also requires an evaporator system after SCWO treatment to allow water to be recycled back into the neutralization process. The evaporation system also produces a dry solid waste stream consisting of salts produced during the neutralization and SCWO treatment steps. Excess condensed water from the evaporator is expected to be of relatively high purity and suitable for discharge. The technology selected for the evaporation process step is mature with considerable full-scale design and operations experience. In contrast, treatment of the hydrolysate will be a new application for SCWO. Thus, the findings and recommendations presented here focus on the use of SCWO for the treatment of VX hydrolysate.

### FINDINGS

**Finding 1.** Limited pilot-scale testing has demonstrated the ability of SCWO to achieve high destruction efficiencies for the organic constituents of VX hydrolysate. Effluent from SCWO treatment of VX hydrolysate has been

shown to have negligible acute toxicity in intravenous testing in mice, gavage testing in rats, and dermal testing in rabbits. The separation of salts in the effluents from SCWO through an evaporator system should produce relatively pure water suitable for discharge and solid salts suitable for disposal. Treatment requirements for VX hydrolysate are less stringent than they are for VX because the hydrolysate has low toxicity relative to the agent. However, criteria for process destruction efficiency and final disposal standards have not been established.

**Finding 2.** Using SCWO to treat VX hydrolysate is significantly different and more complex than previous applications. SCWO systems on a pilot scale have been used to treat several other types of wastes, but SCWO is in commercial operation at only one site. There has been only limited pilot-scale or operational-scale experience with wastes that are similar to VX hydrolysate in being highly corrosive and salt-laden. Operation with VX hydrolysate or appropriate surrogates at design conditions, equipment configuration, or approximate scale for full-scale operations has not been demonstrated. A vertical cylindrical reactor is the only reactor configuration that has been successfully demonstrated to date at pilot scale for the treatment of VX hydrolysate and similar waste streams. Additional development and pilot-scale testing of SCWO technology will be necessary to ensure sustained, reliable operation of a full-scale integrated treatment system. Sufficient time appears to be available in the Army's implementation schedule for the Army to carry out development and testing for using SCWO at the Newport site, provided they are carried out expeditiously.

**Finding 3.** Pilot-scale operation of SCWO in a vertical cylindrical reactor at the temperature and pressure necessary for the effective destruction of hydrolysate constituents has been limited to one eight-hour and two less than two-hour tests. During pilot-scale testing with hydrolysate, the following factors were identified that could create difficulties in sustaining system performance:

- Large quantities of insoluble salts were produced, which must be effectively managed within, and downstream of, the SCWO reactor.

- Unexpected fluctuations were observed in temperature, pressure, and salt expulsion from the SCWO reactor.
- High levels of corrosion and erosion of materials of construction were observed in the reactor liner and pressure let-down valves.
- The sustained performance and reliability of the pressure let-down system was not demonstrated.

Although at this point in development the Stockpile Committee cannot be certain, it believes that a SCWO system for the treatment of VX hydrolysate with sufficient sustained performance can be achieved with additional development and testing.

**Finding 4.** Limited bench-scale and pilot-scale tests have demonstrated operating regimes under which SCWO can effectively destroy carbon-phosphorus bonds and oxidize the organic constituents present in VX hydrolysate. The demonstrated conditions for high levels of destruction (> 99 percent) include temperatures between 640°C (1184°F) and 730°C (1346°F) and pressures between 231 and 258 atm (3395 to 3792 psi). At temperatures and pressures below this regime, effluent from SCWO processing may contain significant concentrations of residual organic species that are difficult to destroy, including constituents with carbon-phosphorus bonds.

A basis for the reliable scale-up and operation of SCWO technology for the treatment of VX hydrolysate has not yet been demonstrated. Fundamental knowledge about the following processes within the SCWO reactor is still not available:

- the number and characteristics of the physical phases, including large quantities of entrained and adhered solids and potentially liquid, gas, and supercritical fluid phases
- fluid dynamics and mixing processes complicated by relatively high loadings of insoluble salts
- heterogeneous and homogeneous reaction mechanisms and kinetics
- salt nucleation, particle growth, agglomeration and adhesion mechanisms, and kinetics

Because the understanding of fundamental processes is limited and the process operational data and experience are sparse, empirical design and engineering judgment will be required for the selection of a prudent scale for development prior to full-scale demonstration. This is common engineering practice.

**Finding 5.** Alkaline VX hydrolysate and its destruction products under SCWO reaction conditions create an extremely corrosive and erosive environment that requires the careful selection of materials of construction. Although preliminary data indicate that certain noble metals, such as platinum and gold, may have acceptable properties, the data currently available are insufficient for the selection of materials of construction. The Army has initiated further testing of materials of construction.

**Finding 6.** Process monitoring and control strategies for the management of salts within the SCWO reactor and

the destruction of the organic constituents of the hydrolysate have not been demonstrated.

## RECOMMENDATIONS

**Recommendation 1.** A pilot-scale SCWO process facility with the critical characteristics of the full-scale design should be constructed and operated to further define operating characteristics and demonstrate sustained continuous operation of the process. Objectives for process development and demonstration should include:

- operation with either hydrolysate or a suitable surrogate to demonstrate reliable operation for periods similar to full-scale design operating cycles
- the development and validation of process monitoring and control strategies for salt management and the destruction of organic constituents
- the definition of stable operating regimes, including the temperature, pressure, and the use of the oxidant (liquid oxygen or compressed air) selected for full-scale operation
- the definition of a basis for process scale-up, operation, and maintenance of a full-scale system
- the development and demonstration of a reliable pressure let-down system

Because the understanding of the fundamental process mechanisms and operating characteristics is limited, the committee recommends that the pilot-scale system be within an order of magnitude of the total mass and heating throughput of a full-scale design unit. Based on testing and reactor scale-ups to date, a vertical cylindrical reactor configuration is recommended as the system that will probably require the least amount of additional development. Other reactor configurations may perform at required levels but would require significant additional development.

**Recommendation 2.** Testing of materials of construction should be carried out as necessary to finalize the selection of materials for critical components, including the SCWO reactor and the pressure let-down system. Additional pilot-scale testing indicated in Recommendation 1 should include fabrication with the materials of construction selected from testing smaller samples and evaluation of corrosion and erosion rates for critical components.

**Recommendation 3.** Flexibility and redundancy of critical components should be incorporated into the design of the full-scale system to allow for uncertainties about the basis for scale-up and operation. Trade-offs should be evaluated to establish an appropriate balance between two 100-percent capacity SCWO reactors or a greater number of smaller reactors. The analysis should consider performance uncertainties associated with process scale-up and complexity, as well as the reliability of operating several reactors in parallel.

**Recommendation 4.** The Army should make provisions for targeted research and development to resolve

problems identified during pilot-scale testing and the full-scale implementation of SCWO technology.

**Recommendation 5.** Requirements for process destruction efficiencies and final disposal standards for all effluent streams from SCWO treatment should be clearly defined to ensure that the final design meets regulatory standards.

## REFERENCE

NRC (National Research Council). 1998. Using Supercritical Water Oxidation to Treat Hydrolysate from VX Neutralization. Committee on Review and Evaluation of the Army Chemical Stockpile Disposal Program, Board on Army Science and Technology. Washington, D.C.: National Academy Press.

# Appendix B

## Biographical Sketches of the Committee Members

**Robert A. Beaudet**, *chair*, received his Ph.D. in physical chemistry from Harvard University. He joined the faculty of the University of Southern California in 1962 as an assistant professor and is now a full professor in the Chemistry Department. He has extensive knowledge of chemical-agent monitoring and detection technologies and has served on several Department of Defense committees on chemical-warfare agents.

**Richard J. Ayen** received his Ph.D. in chemical engineering from the University of Illinois. Dr. Ayen is currently an independent consultant and was formerly the director of technology for Waste Management, Inc. He has extensive experience in the evaluation and development of new technologies for the treatment of hazardous, radioactive, industrial, and municipal waste.

**Joan B. Berkowitz** graduated from the University of Illinois with a Ph.D. in physical chemistry. Dr. Berkowitz is currently managing director of Farkas Berkowitz and Company. She has extensive experience in the area of environmental and hazardous-waste management, a comprehensive knowledge of available technologies for the cleanup of contaminated soils and groundwater, and a strong background in physical and electrochemistry.

**Nosa O. Egiebor** graduated from Queens University in Kingston, Ontario, with a Ph.D. in mineral process and reaction engineering. Dr. Egiebor currently holds the Department of Energy Samuel P. Massie Chair of Excellence in Environmental Engineering at Tuskegee University. His areas of expertise span a broad range of topics in environmental engineering; his specific focus is on the biotreatment of hazardous wastes and supercritical-fluid technology.

**Willard C. Gekler** graduated from the Colorado School of Mines with a degree in petroleum-refining engineering. Mr.

Gekler, formerly vice president, chief engineer at PLG, Inc., is currently an independent consultant. His extensive experience includes design and safety analysis of hazardous-materials handling, storage, and waste-treatment systems. He specializes in hazard evaluation, quantitative risk analysis, reliability assessment, and database development for risk and reliability.

**Hank C. Jenkins-Smith** received his Ph.D. in political science from the University of Rochester. Dr. Jenkins-Smith is currently a professor in the Department of Political Science at the University of New Mexico, where he is also the director of the Institute for Public Policy. His areas of expertise include statistical analysis, measurement of public opinion, politics of risk perception, environmental policy, and public policy.

**John L. Margrave**, a member of the National Academy of Sciences, graduated from the University of Kansas with a B.S. in engineering physics and a Ph.D. in physical chemistry. Dr. Margrave is currently the chief scientific officer at the Houston Advanced Research Center and the E.D. Butcher Professor of Chemistry at Rice University. His expertise is in high-temperature chemistry, materials science, and environmental chemistry.

**Walter G. May**, a member of the National Academy of Engineering (NAE), graduated with a Sc.D. in chemical engineering from the Massachusetts Institute of Technology. He was the senior science advisor for Exxon Research and Engineering Company from 1976 to 1983 and professor of chemical engineering at the University of Illinois from 1983 until his retirement in 1991. His expertise is in process design, thermodynamics, chemical-reactor design, separation processes, industrial chemistry and stoichiometry, and chemical-weapons disposal.

**Kirk E. Newman** received a B.S. in chemistry from the



College of William and Mary and an M.S. in chemical engineering from the University of Virginia. Mr. Newman is currently technology group leader for the Yorktown Detachment of the Naval Surface Warfare Center, Indian Head Division. He has extensive experience in the development, processing, and characterization of energetic materials used in military applications.

Jimmie C. Oxley received her Ph.D. in chemistry from the University of British Columbia in Vancouver and is currently an associate professor of chemistry at the University of Rhode Island. Her expertise is in thermal decomposition of energetic materials, explosives chemistry, and explosives safety.

William R. Rhyne received a B.S. in nuclear engineering from the University of Tennessee and an M.S. and D.Sc. in nuclear engineering from the University of Virginia. Dr. Rhyne is cofounder and director of H&R Technical Associates, Inc. He has extensive experience in risk and safety analysis associated with the processing and transport of hazardous nuclear materials and chemicals.

Stanley I. Sandler, a member of the NAE, graduated from the University of Minnesota with a Ph.D. in chemical

engineering. Currently, he is the Henry Belin du Pont Professor and director of the Center for Molecular and Engineering Thermodynamics at the University of Delaware. His extensive research interests include applied thermodynamics and phase equilibrium, environmental engineering, and separations and purification.

William Randall Seeker, who received his Ph.D. in nuclear and chemical engineering from Kansas State University, is senior vice president of GE Energy and Environmental Research Corporation. Dr. Seeker has extensive experience in the use of treatment technologies and environmental-control systems for managing solid waste and controlling air pollution emissions. He is a member of the Executive Committee of the Environmental Protection Agency's Science Advisory Board.

Leo Weitzman received his Ph.D. in chemical engineering from Purdue University. He is a consultant with 28 years of experience in the development, design, permitting, and operation of equipment and facilities for treating hazardous wastes and remediation debris. Dr. Weitzman has extensive experience in the disposal of hazardous waste and contaminated materials by thermal treatment, chemical reaction, solvent extraction, biological treatment, and stabilization.

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EQC Meeting May 18, 2000  
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# ATTACHMENT U

*Additional Transcript Excerpts and Expert Witness Declaration from  
various Utah-related proceedings  
(State and Federal Courts and USHW Board)*

TITLE OF DOCUMENT	RELATED EXHIBIT NUMBER	PAGE
Testimony of Dr. Brent L. Finley; March 20, 1997 in the matter of "The Tooele Chemical Agent Disposal Facility's Permit and Permit Modifications" in a hearing before the Utah Solid and Hazardous Waste Control Board, Volume III of Transcript, pp. 836-887.	47	U-1
Deposition of Timothy W. Thomas, February 5, 1998, for the U.S. District Court for the District of Utah, CWWG, et al., Plaintiffs, vs. U.S. Department of Army, et al.; Defendants, Case No. 2:96CV-0425C, pp. 19-34.	25	U-15
Deposition of Timothy W. Thomas, February 5, 1998, for the U.S. District Court for the District of Utah, CWWG, et al., Plaintiffs, vs. U.S. Department of Army, et al.; Defendants, Case No. 2:96CV-0425C, pp. 134-161.	25	U-24
Deposition of Timothy W. Thomas, February 5, 1998, for the U.S. District Court for the District of Utah, CWWG, et al., Plaintiffs, vs. U.S. Department of Army, et al.; Defendants, Case No. 2:96CV-0425C, pp. 203-215.	25	U-39
Declaration of James J. Cudahy, July 15 1996	30	U-47
Declarations of James J. Cudahy, October, 1996	30	U-70
Declaration of James J. Cudahy, February 4, 1997	30	U-76
Declaration of James J. Cudahy, December 1, 1997	30	U-83
Professional Qualifications of James J. Cudahy	30	U-91
Deposition of Richard Holmes, April 14, 1998, for the U.S. District Court for the District of Utah, CWWG, et al., Plaintiffs, vs. U.S. Department of Army, et al.; Defendants, Case No. 2:96CV-0425C, pp. 170-175.	33 & 34	U-101

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STATE OF UTAH

DEPARTMENT OF ENVIRONMENTAL QUALITY

SOLID AND HAZARDOUS WASTE CONTROL BOARD

IN THE MATTER OF: ) TRANSCRIPT OF HEARING  
The Tooele Chemical Agent ) Volume III  
Disposal Facility's Permit )  
and Permit Modifications ) EPA ID #UT5210090002

DATE: March 20, 1997

TIME: 7:00 a.m.

PLACE: Department of Environmental Quality  
Office of the Executive Director  
168 North 1950 West  
Conference Room 101  
Salt Lake City, Utah

CERTIFIED COPY

EQC Meeting May 18, 2000  
Attachment U, Page U-1

ANGIE L. KIRK  
CSR No. 27T

INDEPENDENT REPORTING  
SERVICE  
Certified Shorthand Reporters

1710 Beneficial Life Tower  
36 South State Street  
Salt Lake City, Utah 84111  
(801) 538-2333

(1) MR. KOHNS: We'll call Dr. Brent Finley.  
 (2)  
 (3) BRENT FINLEY, M.D.  
 (4) was called as a witness, having been first duly  
 (5) sworn, was examined and testified on his oath as follows:  
 (6) DIRECT EXAMINATION  
 (7) BY MR. KOHNS:  
 (8) Q: For the record, would you please state your full  
 (9) name current employment.  
 (10) A: Full name is Brent Leonard Finley. My current  
 (11) employment is McClaran Heart Environmental Engineering.  
 (12) Q: Dr. Finley, could you give the board an idea of  
 (13) your educational background.  
 (14) A: I have a Bachelor's Degree in Biochemistry from  
 (15) Cornell University which I obtained in 1982; a Ph.D. in  
 (16) toxicology, pharmacology which I obtained in 1986 from  
 (17) Washington State University. I did a year of post-op  
 (18) research after receiving my Ph.D. and then have been a  
 (19) consultant since 1988 in risk assessment. I'm also board  
 (20) certified in toxicology.  
 (21) Q: What does that mean to be board certified in  
 (22) toxicology?  
 (23) A: Well, it basically means that you have passed a  
 (24) written exam, a three-part written exam which requires you  
 (25) to pass each part. There is a recertification that is

(1) approximated every five years, also, a written exam. I  
 (2) also have to pass all three parts. I think there's  
 (3) probably between 250 and 300 what are called DABT's.  
 (4) Three hundred DABT's or so in the United States.  
 (5) Q: What other boards do require recertification  
 (6) like that?  
 (7) A: I'm thinking of medical boards. I think this is  
 (8) getting beyond my area of expertise. I'm not aware of  
 (9) other boards that require passing a written exam every  
 (10) five years.  
 (11) Q: Have you passed that written exam every five  
 (12) years?  
 (13) A: Yes.  
 (14) Q: Let me focus in a little bit on your risk  
 (15) assessment experience. Have you ever authored, designed  
 (16) or overseen performance of risk assessment?  
 (17) A: Sure. Probably somewhere between maybe 200 and  
 (18) 300 risk assessments in the last ten years.  
 (19) Q: And how many of those have involved incineration  
 (20) facilities?  
 (21) A: Probably between five and ten.  
 (22) Q: Does EPA provide guidance on performing these  
 (23) risk assessments for incinerators?  
 (24) A: Sure.  
 (25) Q: And what's the date of the applicable version of

(1) the guidance?  
 (2) A: My recollection is it's April 1994 Exposure  
 (3) Assessment Guidance for RCRA.  
 (4) Q: What is the purpose of a screening of a risk  
 (5) assessment?  
 (6) A: I don't know how much detail you've gone into  
 (7) that already.  
 (8) Q: None so far. Feel free to answer.  
 (9) A: The purpose of a screening level risk assessment  
 (10) is to try to ascertain using limited amounts of resources,  
 (11) which means using very conservative uncertain assumptions  
 (12) about whether or not a risk truly exists, using, again, a  
 (13) short time frame, limited information on site specifics.  
 (14) Basically, what you do in a screening level risk  
 (15) assessment is pile on the conservatisms and at the end  
 (16) look at your results and make a conclusion of yes, no, or  
 (17) do these results indicate a potentially significant risk  
 (18) or not.  
 (19) Q: You use the word "conservative." What does that  
 (20) term mean in risk assessment?  
 (21) A: In the screening mobile risk assessment world,  
 (22) in the risk assessment universe, conservative means an  
 (23) assumption that is intentionally overstating what is known  
 (24) to be true. Maybe using a maximum value when we know most  
 (25) of the values are going to be less than that or

(1) overstating an expose or something like that, using  
 (2) something that's known to be close to implausible.  
 (3) Q: And what does the use of these conservative  
 (4) assumption mean for a risk assessment's ultimate results?  
 (5) A: Well, it will depend on the assessment. As you  
 (6) have more pathways and more exposure factors, what happens  
 (7) is you accumulate conservatism throughout the assessment,  
 (8) and basically the final result of such an assessment will  
 (9) manifest that conservatism and the final result is a  
 (10) number that is understood contains a healthy degree of  
 (11) conservatism. It shouldn't be taken as being a real  
 (12) number, not a real accurate estimate, but something that  
 (13) contains some measure of built-in conservatism.  
 (14) Q: Does this implement in '94 Risk Assessment  
 (15) require risk assessors to stop after the first  
 (16) incineration a Screening Risk Assessment is done?  
 (17) A: Required to stop?  
 (18) Q: Right. In other words, how does it deal with  
 (19) use of drafts and iterations and that sort of thing?  
 (20) A: You're not required to stop. Basically you do  
 (21) your screening level assessment. If at that point it's  
 (22) clear that there's no risk, even under these implausible  
 (23) worse case assumptions, you're done. There's no point in  
 (24) continuing. You've proven beyond a shadow of a doubt  
 (25) there can't be a risk there.

[1] If the results indicate that under these conservative  
[2] assumptions there is potentially - if the results are  
[3] such that they exceed some criteria of what's considered  
[4] an assumable risk, then the risk assessor is required to  
[5] go back and conduct a more refined analysis. Sometimes a  
[6] sensitivity analysis is conducted where you go back and  
[7] look at the individual factors and try to decide which one  
[8] is influencing the risk and, if possible, incorporate some  
[9] refinements into those factors if you can.

[10] Q: Let's focus in now on the 1996 version of the  
[11] Risk Assessment that was done by AT Kearney. Have you  
[12] reviewed that document?

[13] A: Yes.

[14] Q: Can you please describe for the board again,  
[15] briefly, how AT Kearney went about its process, how that  
[16] document reaches its conclusions.

[17] MR. HARRISON: Excuse me, Mr. Chairman. There's  
[18] no foundation for this witness who did not offer this Risk  
[19] Assessment knowing how it was prepared or how they reached  
[20] their conclusions other than from the face of the  
[21] document.

[22] MR. KOHNS: That's exactly what I would like  
[23] this witness to describe to the board, from the  
[24] perspective of a public risk assessor to give how this  
[25] complex document logically goes through its process and

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[1] uptake of the chemicals via inhalation, ingestion, what  
[2] have you.

[3] Then based on that dose, how much chemical gets in  
[4] the body, they then characterize the risk by using EPA  
[5] toxicity criteria. I think those were discussed a little  
[6] bit already. Those are basically the numbers the EPA  
[7] publishes that said this is the value you would use for  
[8] this chemical for this pathway. Then they characterize  
[9] non-cancer and cancer risk for the various scenarios and  
[10] discuss some of the uncertainty.

[11] MR. KOHNS: Mr. Utley, I'm afraid I overlooked a  
[12] bit of administrative paperwork.

[13] Q: (BY MR. KOHNS) Dr. Finley, did you submit a  
[14] declaration in with this proceeding?

[15] A: Yes.

[16] MR. KOHNS: And, again, for the record, that's  
[17] already been attached and admitted. I guess we will be  
[18] referring to this document. I'll hand Mr. Finley a copy  
[19] of this document now.

[20] THE CHAIRMAN: For the record, this has been  
[21] admitted into evidence.

[22] Q: (BY MR. KOHNS) Dr. Finley, did the February '96  
[23] version of the Kearney Risk Assessment use conservative  
[24] assumptions?

[25] A: Certainly.

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[1] reaches its conclusions.

[2] MR. HARRISON: Mr. Chairman, just to clarify.  
[3] If the witness is going to answer how this document came  
[4] to be, we have another witness later today, Mrs. Sellers,  
[5] who authored it. We also have a series of documents  
[6] showing its history. If the witness is simply describing  
[7] a risk assessment process in general, that's fine. But it  
[8] is not for this witness to describe how this risk  
[9] assessment was done.

[10] MR. KOHNS: Mr. Chairman, I have no idea of what  
[11] the examination Mr. Harrison has planned for Mrs. Sellers.

[12] We have this witness right here right now who is  
[13] prepared, in less time than this exchange has taken, to  
[14] explain how the logic of it pulls together.

[15] MR. HARRISON: I'll retain my objection for lack  
[16] of foundation.

[17] THE CHAIRMAN: Go ahead and answer his question  
[18] to the best of your ability.

[19] THE WITNESS: I'll give you the 60-second  
[20] version. It's a pretty standard risk assessment. They  
[21] basically start with the emission rates that they took  
[22] from another facility because no emission data existed at  
[23] the time. Then they went through an emission scenario and  
[24] used the exposure scenarios that were dictated in the  
[25] guidance for farmers, residents, et cetera; calculated

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[1] Q: Can you give the board some examples of those?

[2] A: Well, again, I'll give you this brief version,  
[3] because that could take some time, in my mind, I divide it  
[4] up into the emissions and the exposure segments. In the  
[5] emissions they certainly overestimated the emissions of  
[6] chemicals. I won't go into a lot of detail. I believe  
[7] it's explained in some detail in my declaration. For  
[8] detecting chemicals they use the maximum measured value;  
[9] for non-detected chemicals they use the limited detection,  
[10] which is a very conservative assumption. In some cases I  
[11] believe they use five times the detection of chemicals.

[12] For dioxin, in particular, they assume that all of  
[13] the dioxin, whether it was even detected or not, was in  
[14] the potent form. That's something I could go into detail  
[15] if you would like. Basically, there's only a handful of  
[16] the 210 dioxin and furan congeners that actually possess  
[17] any toxicity. Basically the consultant assumed that all  
[18] the congeners possessed toxicity. And there are some  
[19] other factors in emission that contributed to the  
[20] conservatism.

[21] As far as exposure is concerned, they then used worse  
[22] case assumption regarding exposure duration, how much we  
[23] breathe and how much we eat. I somewhere in my  
[24] declaration I give an estimate of what the overestimate  
[25] might be or the level of conservatism. As I sit here, I

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(1) think I said the factor of ten or more, or at least a  
 (2) factor of ten.  
 (3) Q: Again, you may have just answered my next  
 (4) question. What effect would the use of these conservative  
 (5) assumptions that's were used by AT Kearney have on the  
 (6) overall risk assessment calculations?

(7) A: Well, again, you have to understand as you look  
 (8) at the results that there is a healthy degree of  
 (9) conservatism built into those numbers. Be aware of that  
 (10) as you're interpreting that information. There is a lot  
 (11) of conservatism in there.

(12) Q: Does the February 1996 AT Kearney Risk  
 (13) Assessment, in your opinion, comply with the applicable  
 (14) guidance and accepted risk assessment practice?

(15) A: Yes.

(16) Q: Let's talk about some specific issues that have  
 (17) arisen over the course of the past few days. What is your  
 (18) opinion about the February '96 Risk Assessment's exclusion  
 (19) of a breast feeding infant?

(20) A: Basically, that was consistent with the  
 (21) applicable guidance, the April '94 guidance, which does  
 (22) not include a breast fed infant.

(23) Q: And how about the Risk Assessments's evaluation  
 (24) of the health impact of dioxin, both cancer and  
 (25) non-cancer?

(1) A: Again, that was done in a standard method.  
 (2) Cancer risks were assessed using the USCPA cancer slope  
 (3) factor. Non-cancer risks were not quantitative because  
 (4) EPA has not come forth with a reference dose.

(5) Q: Dr. Finley, I'm going to show you a series of  
 (6) document to try to help put this Risk Assessment in  
 (7) perspective. These have been previously marked and  
 (8) provided by counsel, and I'll have you identify them.

(9) Dr. Finley, do you see the Exhibit that's marked Army  
 (10) 5A?

(11) A: Okay.

(12) Q: Have you ever seen this document before?

(13) A: Yes.

(14) Q: If you just read the subject line on the first  
 (15) page.

(16) A: Preliminary Summary Report for the DFSTSCA  
 (17) Demonstration Burn.

(18) Q: And for the record, this document is an excerpt  
 (19) from the document Army Exhibit 5 which as admitted  
 (20) yesterday.

(21) Secondly, if you would look to Army Exhibit A6. Can  
 (22) you identify that?

(23) A: Yes. This is appendix R1 from the Kearney Risk  
 (24) Assessment, February '96.

(25) Q: Is this the entire document or just excerpts.

(1) A: This is just an excerpt.  
 (2) Q: Again, Army A7, if you would look at that.  
 (3) A: This is an excerpt from the draft June 1994 EPA.  
 (4) The title of the document is Estimating Exposure to  
 (5) Dioxin-Like Compounds.

(6) Q: Then finally Army A8.

(7) A: This is Part 2 of EPA's 40 CFR Part 60 of the  
 (8) Hazardous Waste Combustors Rule?

(9) Q: And how much pages does this exhibit comprise?

(10) A: This is two pages, plus the cover sheet is  
 (11) three.

(12) MR. KOHNS: Okay. Mr. Utley, at this time I  
 (13) would like to move the admission of these four documents.  
 (14) These documents were on our exhibit list. I forget how  
 (15) long ago. We have not received objection to these.

(16) THE CHAIRMAN: Counsel?

(17) MS. LOCKHART: No objection.

(18) THE CHAIRMAN: Mr. Harrison?

(19) MR. HARRISON: No objection.

(20) THE CHAIRMAN: To clarify, according to my  
 (21) records we have not received A6, A7, A8 into evidence yet,  
 (22) the board will receive those exhibits. I thought we did  
 (23) accept A5.

(24) MR. KOHNS: You did accept A5. This is 5a.

(25) THE CHAIRMAN: The board will accept Army

(1) Exhibit 5a into evidence.

(2) Q: (BY MR. KOHNS) Dr. Finley, if you would, please  
 (3) take a look at Army Exhibit A5a. Again, if you could,  
 (4) identify this document?

(5) A: This is the Preliminary Summary Report for the  
 (6) DFS demonstration burn.

(7) Q: All right. If you turn to the next page, which  
 (8) is labeled Table 14 DFSDTB Dioxin Summary. Doctor, can  
 (9) you describe real briefly to the board what this table is  
 (10) saying?

(11) A: This table reports the results of three trial  
 (12) burns for the DFS for dioxin and furans. The dioxin and  
 (13) furans are reported as emission rates in grams per second,  
 (14) and the dioxins and furans are reported in terms of total  
 (15) congener class, et cetera.

(16) Q: Doctor, I would like to address your attention  
 (17) to the column that says HRA Maximum - do know what that  
 (18) is?

(19) A: Yes.

(20) Q: Could you tell the board.

(21) A: Those are the emission rates in the Kearney Risk  
 (22) Assessment.

(23) Q: What is the number on the bottom of that column?

(24) A: The number on the bottom of that column is 5.6  
 (25) times 10 minus 9, total dioxins and furans grams per



(1) second.

(2) Q: Okay. Then the three numbers immediately to the  
(3) left of that column.

(4) A: Those are the results of the individual runs,  
(5) again in the same units.

(6) Q: Okay. Doctor, do you have any opinions about  
(7) what the implications of these results are for the Risk  
(8) Assessment results as pertains to dioxin?

(9) A: Yeah. Basically, the results of these three  
(10) runs - I guess it was January of this year - indicate  
(11) that the actual - at least the date in this - the  
(12) actual emissions of dioxin and furans are one to two and  
(13) is some case - one to two orders of magnitude lower than  
(14) the emission rates used by Kearney in their February '96  
(15) Risk Assessment.

(16) Q: And in risk assessment is exposure proportional  
(17) to the emissions?

(18) A: Yeah. It's not an exact linear correlation, but  
(19) I can tell you that if you were to input the actual  
(20) emission rates listed here in the Kearney Risk Assessment  
(21) the dioxin exposure and risk would drop one to two orders  
(22) of magnitude.

(23) Q: Doctor, if you turn to the next page it says  
(24) Table 3 on the top. Look at the middle and bottom blocks  
(25) of information on this page. Can you tell the board what

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(1) these are?

(2) A: These are the individual - this is more detail  
(3) on the results of the emission testing, same three runs.  
(4) They looked at in this case the individual 2378  
(5) substituted and dioxin furan congeners in addition to the  
(6) total groups we saw on the previous page.

(7) Q: Okay. Doctor, I see that 2378 TCDD in picogram  
(8) has a list there on the side and back in all three cases.  
(9) What does that mean?

(10) A: It means it was not detected. In fact, if you  
(11) look at - what's striking about this is a majority - I'm  
(12) guessing 90 percent or more - of the individual congeners  
(13) or congener classes were not detected in any of the three  
(14) runs. If you look just at the furans, you can basically  
(15) conclude that there were no furans detected associated  
(16) with the emissions.

(17) When you go to the dioxins above that, you can see  
(18) that, what, 10 out of the 11 congeners there were no  
(19) detects in any of the three runs. In two runs total TCDD  
(20) was detected. But, as you can see in the row underneath  
(21) that 2378 TCDD was not detected. 2378 TCDD is the only  
(22) TCDD that has any potency.

(23) So basically what this table indicates is that during  
(24) these three runs there were no detections of any dioxin or  
(25) furan congeners associated with the emissions that possess

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(1) any toxicity.

(2) Q: Doctor, there's a column here that says TEF.  
(3) What does that mean?

(4) A: TEF stands for toxicity equivalency factor and  
(5) that is a value we assign to the various dioxin and furan  
(6) congeners. As I indicated earlier there are 210, I  
(7) believe, different dioxin and furans. Only a handful of  
(8) these possess any potency. What we do in risk assessment  
(9) is we set 2378 TCDD as the benchmark. It has a TEF of  
(10) 1. It's the most potent of all congeners. Then all the  
(11) other 2378 substituted dioxins and furans get assigned a  
(12) TEF of less than one. They are a fraction as potent as  
(13) 2378.

(14) Q: Again, as a risk assessor, was the significance  
(15) of this data for risk assessment?

(16) A: Well, again, what it says to me is that, number  
(17) one, the emissions were far less than what was assumed to  
(18) be present in the February of '96 Kearney Risk Assessment;  
(19) and, number two, the most potent dioxin congener, 2378,  
(20) was never detected; and, number three, again, there isn't  
(21) a single measurable concentration reported here of any  
(22) dioxin or furan that has any potency that could be  
(23) associated with the emissions, the burning of the  
(24) material.

(25) Q: I would like you to turn now Army Exhibit A6.

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(1) Again, if you could just briefly look through that and  
(2) tell the board what it is.

(3) A: Oh, these are dioxin furan emission rates from  
(4) the JACADS incinerator. This is for VX. The first page  
(5) is for the LIC and the second page is for the DFS.

(6) Q: Okay. Did you review the entirety of appendix  
(7) RI in conjunction with this case?

(8) A: I may have.

(9) Q: I'm not going to ask terribly specific questions  
(10) about it. I'm just curious. I notice it says JACADS VX  
(11) LIC versus JACADS DFS. Now, the trial results are for BG.  
(12) Why would these be selected?

(13) A: Can you say the last part the question again?

(14) Q: Sure. I notice these are JACADS VX LIC and  
(15) JACADS VX GB - I'm sorry - JACADS BX for the DFS - is  
(16) there a reason why these would be useful comparisons?

(17) A: Well, yeah. You can compare the DFS rates to  
(18) the DFS rates in JACADS and see that - well, actually I'm  
(19) not sure.

(20) Q: I'll tell you what. Since there appears to be a  
(21) commonality here, let's talk about these numbers. In your  
(22) review of these numbers, did you find any relationship  
(23) between the numbers for dioxin and the JACADS LIC versus  
(24) the JACADS DFS?

(25) A: Yeah the JACADS LIC was consistently lower than

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[1] the JACADS DFS.  
 [2] Q: So then taking that fact -  
 [3] A: You could conclude that the LIC, which I'm not  
 [4] sure has been tested at DFS - you can conclude - let's  
 [5] see. What could you conclude? You could conclude that  
 [6] the LIC emissions from the Tooele incinerator would be  
 [7] lower than the ones that are reported here from the DFS.  
 [8] You could make that conclusion assuming that the  
 [9] commonality exist here as it does at JACADS.  
 [10] Q: Doctor, I would like you to turn to Kearney  
 [11] Exhibit A7. Then turn to page 3-144 of that document.  
 [12] A: Okay.  
 [13] Q: I want you to help put these dioxin emissions  
 [14] into some ever-day perspective. Do you see the first full  
 [15] paragraph?  
 [16] A: Yes.  
 [17] Q: Would you read that sentence, please.  
 [18] A: Based on above studies, the 1 nanogram T per Q  
 [19] per kilogram appears to be a reasonable average emission  
 [20] factor for residential wood burning.  
 [21] Q: Doctor, let me give you kind of a hypothetical  
 [22] now. Let's say if one took - if 13 pounds of EPA is  
 [23] hypothetical wood year burned off completely in four  
 [24] hours, on average-how much dioxin is emitted per second?  
 [25] A: You would be emitting about a half a picogram.

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[1] Q: Okay. Then if you would turn back, please,  
 [2] to -  
 [3] A: Per second.  
 [4] Q: - Exhibit A5a and look at Table 14. Again,  
 [5] there's a line here that says TEQ emission rates grams per  
 [6] second.  
 [7] A: Right.  
 [8] Q: What's the highest emission rate you see there?  
 [9] A: The highest emission rate in TEQ is  $2.48 \times 10$  to  
 [10] the -12 grams, which if you convert that to picograms per  
 [11] second is 2.48, 2.48 picograms per second.  
 [12] Q: So, basically, if say six of these panel members  
 [13] were to go home tonight and throw one of EPA's  
 [14] hypothetical logs on the fire and it burned off in four  
 [15] hours, they would actually be emitting more dioxins per  
 [16] second than the DFS.  
 [17] A: If six people went home and burned six pounds of  
 [18] wood in four hours, that's right.  
 [19] Q: I will have you refer to the next exhibit.  
 [20] That's Army A8. Doctor, I realize you may not be an  
 [21] expert in the laws regarding air pollution. Do you know  
 [22] what a MACT standard is?  
 [23] A: Do I know what a MACT standard is?  
 [24] Q: Just offhand.  
 [25] A: MACT stands for maximum achievable control

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[1] technology. It's basically - it's a technology that one  
 [2] arrives at in considering, obviously, technology and cost  
 [3] and efficiency, et cetera.  
 [4] Q: And what does it stand for?  
 [5] A: Maximum achievable control technology.  
 [6] Q: Doctor, if you turn this to the next page,  
 [7] 172081, do you see that little chart in the middle?  
 [8] A: Yes.  
 [9] Q: Okay. Can you read the heading on that table?  
 [10] A: The heading of this table is proposed MACT  
 [11] Standards or Existing Incinerators.  
 [12] Q: And what's the EPA's proposed MACT standards for  
 [13] existing incinerators for dioxin and furan?  
 [14] A: The proposed standard is .20 nanograms per DSCM,  
 [15] which, if I recall, stands for dry square cubic meters.  
 [16] That's in terms of TEQ.  
 [17] Q: Might it be dry standard?  
 [18] A: Yeah, you're right.  
 [19] Q: And .2 nanograms is how many picograms.  
 [20] A: That would be 200.  
 [21] Q: Okay. If you would turn back to Table 14 on  
 [22] Army Exhibit A5a. Look at the very bottom. You'll see  
 [23] column that says TEQ Concentration Standard Cubic Meter.  
 [24] A: Right.  
 [25] Q: What's the highest value there that you see of

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[1] those three?  
 [2] A: The highest value is the one in the middle,  
 [3] which is .00064 nanograms DSCM, which to convert to  
 [4] picogram, again, would be .64.  
 [5] Q: Okay. So how - how many times lower is this  
 [6] emission rate than the proposed MACT standard by the EPA  
 [7] for dioxins?  
 [8] A: The - well, the measured emission rate would be  
 [9] about 300 times less than what EPA is proposing as a MACT  
 [10] standard for existing incinerators.  
 [11] Q: Okay. I would like to cover just one last area.  
 [12] Focusing on the trial burns that are at issued for this  
 [13] board, have you had any risk calculations performed that  
 [14] would, say, address what might be possible risks and doses  
 [15] within, say, the next year?  
 [16] A: Yeah. That's summarized on Table 10.  
 [17] Q: Could you please describe for the board how you  
 [18] came about those numbers and what they mean?  
 [19] A: Sure. We basically use the Kearney Risk  
 [20] Assessment; that is, the Kearney emission rates exposure  
 [21] assumptions, et cetera. But we added some more exposure  
 [22] groups into some of the scenarios. If you look on  
 [23] Table 10 you can see we have the residents which was  
 [24] considered by Kearney, but we've added in the infant.  
 [25] We've also added in a child and infant and farmer C and

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(1) basically assumed that the incinerator was going to have  
 (2) its trial burn for a year using some assumption regarding  
 (3) when it would be burning. That's summarized on Table 5.  
 (4) Basically plug the emissions into the Kearney Risk  
 (5) Assessment and calculated the cancer risks you see here,  
 (6) the hazard and disease and the dioxin dose for each of  
 (7) these groups for those scenarios.

(8) Q: And, again, what kind of results do we see?

(9) A: These results - let me just go across the  
 (10) column. The cancer risks are in the range of 10 to the -7  
 (11) to 10 to the -9; obviously, below the 10 to the -5  
 (12) criteria that's being implied here. The hazard and  
 (13) disease are .1 or less, which, again, is well within the  
 (14) .25 benchmark that's being applied here. The dioxin doses  
 (15) range from .2 to - I'll just say very low doses of  
 (16) dioxin. The TEQ and all of these doses are below the  
 (17) range of doses that have been suggested by some agencies  
 (18) to be health effective.

(19) Q: One last thing. I see NC here under hazard and  
 (20) disease for infants. Why is that?

(21) A: We didn't calculate hazard and disease for  
 (22) infants. The reference doses that are set by EPA to be  
 (23) used in the calculation on the hazard index are set to be  
 (24) protective of daily exposure for 70 years of a lifetime.  
 (25) Nobody, EPA or anybody else that I know of, has thought

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(1) about setting reference doses that would be applicable for  
 (2) very short-term exposures like this, like an infant for a  
 (3) year. So the toxicity criteria basically don't exist for  
 (4) this kind of calculation. You would have to derive from  
 (5) the raw data, basically, all new reference doses to do  
 (6) this calculation. We just simply didn't do that.

(7) Q: Has EPA done that?

(8) A: No.

(9) MR. KOHNS: I have no further questions.

(10) MR. WIXOM: We have no questions.

(11) MR. HARRISON: Yes, Mr. Chairman. I had the  
 (12) pleasure of examining Dr. Finley in the Federal  
 (13) proceeding, and I think about 95 percent of my questions  
 (14) would be covered by that examination. If the board would  
 (15) entertain the submission of my examination for Dr. Finley  
 (16) in the Federal proceeding I would offer it, but I have a  
 (17) few clarifying questions from this Table 10 that is  
 (18) apparently very recent based on the trial burn results.  
 (19) So if I could do that and offer the transcript for the  
 (20) rest.

(21) THE CHAIRMAN: We accept the transcript from the  
 (22) Federal proceeding.

(23) MR. HARRISON: Thank you.

(24) THE CHAIRMAN: Counsel, do you agree with that.

(25) MR. GALLI: We don't object to it. In fact, we

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(1) have the transcripts right here that we're happy to  
 (2) provide the board members immediately.

(3) MR. WIXOM: No objection.

(4) MR. HARRISON: We appreciate knowing that we  
 (5) won't have to call a copy shop now. We appreciate it.

(6) THE CHAIRMAN: Is that agreeable to you?

(7) MR. HARRISON: It is agreeable.

(8) THE CHAIRMAN: Go ahead.

(9) MR. HARRISON: Thank you.

CROSS-EXAMINATION

BY MR. HARRISON:

(12) Q: Now, Dr. Finley, let me just clarify this Table  
 (13) 10 that you've been asked about. I understand this was  
 (14) prepared by you by plugging in trial burn results into the  
 (15) AT Kearney Risk Assessment with a modification or two for  
 (16) the infant.

(17) A: This doesn't have the trial burn data. This is  
 (18) still the Kearney February '96 information.

(19) Q: So why does it have Summary of Trial Burn at the  
 (20) top?

(21) A: That could be better worded. We were basically  
 (22) trying to use the Kearney Risk Assessment and ask the  
 (23) question, What would the risks be using those assumptions  
 (24) for a one-year trial burn, but it still has the Kearney  
 (25) emission rate estimates.

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(1) A: I appreciate that clarification.

(2) Now, you've indicated that no agency had ever set a  
 (3) standard for short-term exposures to dioxin. Is that  
 (4) correct?

(5) A: Set a standard.

(6) Q: Or suggested what might be a protective or  
 (7) dangerous level for short-term exposure.

(8) A: I don't know if I said that, but I know it's  
 (9) been discussed. The EPA has not set a reference dose  
 (10) that's been verified yet.

(11) Q: I'm not talking EPA. I'm talking about any  
 (12) agency. You made a broad statement?

(13) A: There's a table in my declaration that  
 (14) summarizes some doses that have been suggested by some  
 (15) agencies as being safe, yeah.

(16) Q: Do you recall ATSDR, the Federal Agency for  
 (17) Toxic Substances, setting such a level?

(18) A: They have an MRL of 1 to 10, I believe.

(19) Q: 1 to 10?

(20) A: Picogram kilogram day.

(21) Q: Isn't it 1 picogram rather than 1 to 10?

(22) A: Let me look.

(23) Q: Okay. I take it you're looking at your  
 (24) affidavit rather than the ATSDR document.

(25) A: No. I'm looking at my affidavit. It's one,

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[1] correct

[2] Q: Thank you. Now, the infant you've talked about

[3] adding here in your Table 10, that's not a breast feeding

[4] infant; is it?

[5] A: Yes.

[6] Q: So you calculated dose from breast feeding?

[7] A: Yes.

[8] Q: And where is that reflected?

[9] A: Where does it reflect?

[10] Q: Where does it calculate you showed a dose from

[11] breast feeding?

[12] A: We haven't presented any of the populations in

[13] the affidavit.

[14] Q: Where are those calculations?

[15] A: Those are on a spread sheets in a computer.

[16] Q: Would you be prepared to make them available so

[17] we can put them in this record?

[18] MR. KOHNS: Subject to the time lines that this

[19] board might set.

[20] MR. HARRISON: Mr. Chairman, I believe we have a

[21] right under the Rules of Evidence to obtain the underlying

[22] calculations that this expert relied upon in offering this

[23] opinion. That's all we're asking for.

[24] MR. KOHNS: As I said, I'm not sure exactly when

[25] this board wants this record to close. I don't know if

[1] physically we can get them here in that time.

[2] Mr. Harrison has known about Dr. Finley being on the

[3] witness list since of last year. He has had ample

[4] opportunity to depose what have you. I'm not trying to

[5] hide the calculations. It's more a logistical concern.

[6] MR. HARRISON: Mr. Chairman, the Petitioner

[7] didn't know that Dr. Finley was going to be giving

[8] testimony that appears to be inconsistent with his Table

[9] 10. I'll explore that. Let me explain to Dr. Finley, and

[10] you can rule after the explanation.

[11] Q: (BY MR. HARRISON) If you would look at footnote

[12] C on your table. You see there it says, "Dioxin TEQ dose

[13] to the infant is assumed as a worse case to be equal to

[14] the daily uptake for an adult and then modified for body

[15] weight?"

[16] A: That's correct.

[17] Q: Now, adults don't breast feed; do they?

[18] A: None that I know of.

[19] Q: You're not assuming this in this case; are you?

[20] A: I believe breast feeding is actually in the

[21] calculation in addition to taking the adult dose and

[22] squeezing it into an infant.

[23] Q: And why doesn't this footnote say that?

[24] A: Good question.

[25] Q: Thank you. We would like to see the

[1] calculations?

[2] MR. KOHNS: Again, Mr. Utley, if this board

[3] decides to rule this afternoon, no doubt, Mr. Harrison,

[4] once he sees these calculations, will want an opportunity

[5] to examine Dr. Finley or will present some type of

[6] analysis or response. And, frankly, I don't know if we

[7] can get those things here in whatever time remains today,

[8] much less have to reopen the record to consider that type

[9] of thing. On a substantive basis it's no problem. It's

[10] more of a logistical timing concern.

[11] MR. HARRISON: Mr. Chairman, if I could.

[12] THE CHAIRMAN: Can I just ask, did you ask for

[13] this document in discovery?

[14] MR. HARRISON: Asked for underlying

[15] calculations?

[16] THE CHAIRMAN: Yes.

[17] MR. HARRISON: No, we didn't, because we didn't

[18] anticipate he would give testimony inconsistent with his

[19] footnote.

[20] MR. KOHNS: Mr. Utley, I apologize. A momentary

[21] clarification. We have nothing to add.

[22] THE CHAIRMAN: It seems to me the breast feeding

[23] infant has been a high profile topic in this hearing. I

[24] think the board would sort of appreciate that information

[25] to be included in the record if at all possible.

[1] MS. NIELSON: Mr. Chairman, could I ask a

[2] question?

[3] I think what the Petitioner is asking for is the

[4] underlying data. The board doesn't necessarily have the

[5] capability to interpret that data, but we probably are

[6] interested in confirming the question that's the basis for

[7] that request, which is whether the infant scenario in

[8] Table 10 was calculated in the underlying data as a

[9] breast-feeding infant or a non-breast-feeding infant. I

[10] think what we have heard the witness say is the

[11] calculations for a breast feeding infant.

[12] Is it possible for us to get some - or for the

[13] witness to give some clarification on that point today

[14] short of supplying the data?

[15] MR. HARRISON: Mr. Chairman, it wouldn't satisfy

[16] us. We believe we have a right to it under the Rules of

[17] Evidence. We have a right to establish where this

[18] calculation supports his document on this issue, so we

[19] would object to that. The alternative, if this data is

[20] not made available before your record closes, we would

[21] move the strike the affidavit in the table.

[22] MR. KOHNS: Mr. Utley, again, Plaintiff's had

[23] ample opportunity to approach this witness, find out

[24] whatever type of analysis he was going to perform in

[25] conjunction with this. He was not deposed. He has known

[1] about Dr. Finley since -

[2] MR. HARRISON: Mr. Chairman, I just explained  
[3] it's based on his testimony. He's using my time now.

[4] THE CHAIRMAN: Go ahead and finish.

[5] MR. KOHNS: Consequently, this is why you do  
[6] discovery, is to find out things like this.

[7] MR. HARRISON: Objection. That's a  
[8] mischaracterization.

[9] THE CHAIRMAN: Let him finish, please.

[10] MR. KOHNS: Nonetheless, I think with respect to  
[11] the question raised by Commissioner Nielsen, can we find  
[12] out, yes or no, did this include breast feeding,  
[13] Dr. Finley may know or he can make a quick phone call and  
[14] before this afternoon is out give you an oral answer.  
[15] Now, getting the spread sheet here, I'm not sure if that's  
[16] going to be logistically possible. If the board desires,  
[17] we'll attempt that immediately. But if he doesn't have it  
[18] here, it's back in California some place, so we'll have to  
[19] see what we can do.

[20] THE CHAIRMAN: Do you have another comment,  
[21] Mr. Harrison.

[22] MR. HARRISON: That proposal is totally  
[23] unsatisfactory. We're not willing to accept the witness'  
[24] word for it. We want the evidence. It may be impeaching.

[25] MR. KOHNS: Well, a clarification, Mr. Utley.

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[1] this type of calculation, it certainly put them on notice.  
[2] Table 10, of this underlying analysis.

[3] THE CHAIRMAN: If you can get the information to  
[4] the Petitioners so we can accept it, that would be great;  
[5] if not, we'll redact it.

[6] MR. KOHNS: I think just to bring this to close  
[7] right now we'll agree the to the redaction.

[8] MR. HARRISON: We don't accede to that offer,  
[9] and we would object to redaction in lieu of providing the  
[10] date. We now have a credibility question regarding this  
[11] witness and this entire calculation, which I'm not sure we  
[12] can answer until we see the calculation. The board is not  
[13] going to have the benefit of whether there's an integrity  
[14] problem with this document until we review that. If  
[15] that's the board's decision, so be it.

[16] We object to it as a due process violation. We have  
[17] a right in the Rules of Evidence to receive the underlying  
[18] calculations, and in particular when a discrepancy is  
[19] noted in testimony.

[20] THE CHAIRMAN: Well, your answer.

[21] Mr. Harrison - We're on page 13. That includes up  
[22] to the breast milk.

[23] MR. HARRISON: Can I have the reference in  
[24] particular that you're referring to?

[25] THE CHAIRMAN: Well on page 13.

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[1] I'm just curious as to whether Mr. Harrison intends upon  
[2] receiving this spreadsheet, or however many spreadsheets  
[3] it is, to reopen cross-examination of Dr. Finley.

[4] MR. HARRISON: It depends on what it says, I  
[5] guess. I would at least like to offer it into evidence.

[6] THE CHAIRMAN: Mr. Kohns, what do you think the  
[7] chances are of obtaining that information this afternoon.

[8] MR. KOHNS: Honestly, I'm not sure. We have  
[9] another proposal that may solve this; that is we redact  
[10] it, to black it out and will not be considered part of the  
[11] record.

[12] THE WITNESS: It's in the text of the affidavit  
[13] on Page 13. It does say that breast milk was included in  
[14] the calculations of Table 10.

[15] THE CHAIRMAN: Which paragraph? Page 13 did you  
[16] say?

[17] THE WITNESS: Yeah. The first full paragraph,  
[18] about halfway, third sentence - I'm sorry - fourth  
[19] sentence. Maximum dose for the TOCDF intake by infant to  
[20] be of breast milk, et cetera.

[21] MR. KOHNS: Mr. Utley, if I may. The  
[22] significance of that sentence is - I'm glad the witness  
[23] is far more familiar with this declaration than I. This  
[24] declaration was provided in conjunction with the  
[25] pre-hearing brief. If the Petitioners had a concern about

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[1] MR. HARRISON: Which paragraph?

[2] THE CHAIRMAN: It's the first full paragraph.

[3] MR. HARRISON: It's not clear to me that this  
[4] reference to a maximum dose for TOCDF for infants eating  
[5] breast milk when he says, Suggests no appreciable health  
[6] risk. It doesn't reference this table. It doesn't  
[7] reference this number. He could have been referring to  
[8] the January '96 Risk Assessment that we do have a  
[9] calculation for infants in. I don't know. I mean, this  
[10] is near the conclusion of the document. It doesn't  
[11] reference this table or this number.

[12] THE WITNESS: Table 10 is -

[13] THE CHAIRMAN: It doesn't reference Table 10.

[14] MR. HARRISON: Before that statement. It  
[15] doesn't reference it in that statement. I mean, maybe  
[16] that's what he means. But I took this footnote which is  
[17] much more precise. This footnote is footnoted to these  
[18] particular figures. I took it at face value. I do have  
[19] another question for the witness if you could hold your  
[20] ruling here just a moment.

[21] MR. KOHNS: I do not agree there's any type of  
[22] inconsistency between this declaration and tables and  
[23] testimony, but maybe you'll ask the witness what he meant  
[24] by this sentence and consequently gain insight.

[25] MR. HARRISON: Mr. Chairman, I'm examining the

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[1] questions at the moment.  
 [2] MR. KOHNS: I don't believe that has been  
 [3] resolved.  
 [4] MR. HARRISON: I would a potential way of  
 [5] helping the resolution, but I would like to ask the  
 [6] questions if counsel wouldn't mind.  
 [7] MR. KOHNS: Feel free.  
 [8] THE CHAIRMAN: I'm not sure when we're going to  
 [9] close the record. Myself, I would like to see at least  
 [10] some verification that this information does pertain to a  
 [11] breast-feeding infant.  
 [12] MS. NIELSON: Mr. Chairman, I realize that my  
 [13] solution to your question isn't acceptable to the  
 [14] Petitioner, but what I suggested is that we have an expert  
 [15] witness who is the individual who prepared this or who  
 [16] gave the statements in this Affidavit and who was  
 [17] responsible for Table 10. It seem to me that if that  
 [18] witness were able to verify to the board by the end of the  
 [19] day that that is what the calculations show. The  
 [20] Petitioner may still want the data and has a right to it,  
 [21] and that may be a legal argument. At least we would have  
 [22] had verification on the part of the witness for  
 [23] verification of the information that he provided.  
 [24] From my perspective as a member of this board, that  
 [25] would answer me questions. I think that's a good

[1] question. I would at least like to have that piece of  
 [2] information before we either redact or extract or  
 [3] disregard something that may be valuable for our  
 [4] consideration.  
 [5] MR. KOHNS: Mr. Utey, we can try to make that  
 [6] happen at the conclusion of this cross-examination.  
 [7] Additionally, if the board so desires, we'll try to get  
 [8] that spreadsheet or spreadsheets or volume or whatever it  
 [9] is here. As I said, the concern that arises is  
 [10] Mr. Harrison may want to cross examine in light of the  
 [11] fact we think has had notice or opportunity. We'll try to  
 [12] get that here.  
 [13] MR. HARRISON: If I might, in response to the  
 [14] statement just made. We are uncomfortable with an attempt  
 [15] to verify an apparent inconsistent statement by the  
 [16] witness with their document by asking the witness. Our  
 [17] concern is that there may be a credibility problem with  
 [18] this witness on this issue, so asking the witness to  
 [19] resolve it doesn't satisfy our concerns.  
 [20] MRS. FARRELL-POE: I have a question on how it  
 [21] could be resolved. So if it's his table, his spreadsheet,  
 [22] that he's going to bring to you, how else is it going to  
 [23] be resolved.  
 [24] MR. HARRISON: I can help you out with that  
 [25] Mrs. Farrell-Poe. If the calculations show intakes were

[1] from a breast feeding rather than for an adult - and we  
 [2] can tell by the numbers - I expect that the calculations  
 [3] would also indicate that in the text. It answers the  
 [4] question.  
 [5] So all I want to know is, was the procedure used to  
 [6] take an adult intake and then adjust for body weight -  
 [7] which those numbers will show - or was it an infant  
 [8] intake with the proper body weight for an infant? Now,  
 [9] there's no way those numbers can be ambiguous about that.  
 [10] They're going to be one way or the other.  
 [11] MRS. FARRELL-POE: So it was my understanding  
 [12] you just said if he supplied the spreadsheet that that  
 [13] would not be acceptable. Did I misunderstand that?  
 [14] MR. HARRISON: I'm sorry. You did. What I'm  
 [15] saying is his testimony would not be acceptable. His  
 [16] calculations would be.  
 [17] MR. KOHNS: We may have a solution, then. Were  
 [18] proposing that we endeavor to get the spreadsheet or  
 [19] spreadsheets as quickly as possible. They can go into the  
 [20] record, and then parties are able to comment on their  
 [21] weight or lack thereafter in whatever post-hearing briefs  
 [22] may be allowed, if, in fact, the board decides to allow  
 [23] post-hearing briefs.  
 [24] THE CHAIRMAN: I would like to defer on the  
 [25] ruling hoping we can get that information here to the

[1] satisfaction of the Petitioner.  
 [2] MR. HARRISON: Thank you, Mr. Chairman.  
 [3] THE CHAIRMAN: Dr. Nielson wanted to ask a  
 [4] question.  
 [5] MS. NIELSON: Do you believe, based on the  
 [6] information that you've provided in your Affidavit,  
 [7] including Table 10, that the information in Table 10 for  
 [8] the infants scenarios are based on breast feeding?  
 [9] THE WITNESS: Yes.  
 [10] MS. NIELSON: Thank you.  
 [11] MR. HARRISON: Mr. Chairman, if I could proceed  
 [12] with my examination.  
 [13] THE CHAIRMAN: Go ahead.  
 [14] CROSS-EXAMINATION (Continued)  
 [15] BY MR. HARRISON"  
 [16] Q: Dr. Finley, did you type this table yourself?  
 [17] A: No.  
 [18] Q: Who typed it?  
 [19] A: You want the name of the person? Probably David  
 [20] Dodge.  
 [21] Q: And what's his role?  
 [22] A: He's assistant in the company.  
 [23] Q: All right. Who performed the calculations,  
 [24] selected numbers, and did the mathematics to determine the  
 [25] dose for the infant represented in the table?

(1) A: The actual crunching of the numbers would have  
(2) been done by David Dodge and Brent Kuringer.

(3) Q: You didn't do those calculations or select those  
(4) numbers yourself, did you?

(5) A: I didn't sit down and do this by hand or punch  
(6) the computer keyboard, no.

(7) Q: Did you go and verify the numbers they selected  
(8) and determine where they selected them from and their  
(9) mathematics

(10) A: Again, I didn't hand check their calculation,  
(11) but we discussed what scenarios we were going to put  
(12) together in this table.

(13) Q: Did you hand check their data to see what  
(14) numbers they were inputting?

(15) A: That I believe I did, yeah.

(16) Q: What data were they inputting? What was it  
(17) from?

(18) A: Again, the February '96 Kearney -

(19) Q: The data that - I beg your pardon. The  
(20) February 1996 Kearney Risk Assessment didn't include an  
(21) infant, did it?

(22) A: No.

(23) Q: You realize we're talking about the infant data  
(24) at the moment?

(25) A: That's right.

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(1) Q: You do realize that.

(2) A: We're talking about infant exposure to  
(3) emissions.

(4) Q: So what I'm trying to figure out is, the dioxin  
(5) dose for the infant, the numbers that were the basis for  
(6) determining that dose, didn't come Kearney Risk  
(7) Assessment, did it?

(8) A: What we used for the Kearney Risk Assessment was  
(9) the emission data. We had to add in an infant scenario of  
(10) our own because Kearney didn't have one.

(11) Q: So the answer is no, it didn't come from the  
(12) Kearney Risk Assessment. The infant dioxin dose date, it  
(13) wasn't in there.

(14) A: No, because there isn't one.

(15) Q: Thank you. So where did it come from?

(16) A: This is the infant dose that we calculated from  
(17) the Kearney emission.

(18) Q: When you say "we," you mean David Dodge.

(19) A: My colleagues I, sure.

(20) Q: You didn't do those calculation you just  
(21) testified. So where did the numbers come from they  
(22) inputted in their calculations?

(23) A: We used Kearney emission rates from October of  
(24) '96.

(25) Q: For the infant dioxin dose.

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(1) A: We input the Kearney emission rates. The  
(2) emissions land on an infant that's living at a fence line  
(3) or Farmer C.

(4) Q: Land on the soil.

(5) A: On the soil, in the food. That infant breast  
(6) feeds, and we calculate the dioxin dose for that infant?

(7) Q: How do you know that those numbers represented  
(8) breast feeding exposures?

(9) A: We're relying on the same infant scenario we've  
(10) used in this proceeding and the last one.

(11) Q: You say "we." How do you know that your  
(12) colleagues in doing this calculation were using numbers  
(13) representing breast feeding exposure rather than adult  
(14) exposure? Did you verify that yourself?

(15) A: Yeah.

(16) Q: How did you do that?

(17) A: I walked through the calculations verbally.  
(18) What assumption are we going to use as far as how much  
(19) breast milk a kid ingests for a year? What emission rates  
(20) are we going to use? How are we going to adjust an adult  
(21) dioxin dose to an infant body weight? Again, I didn't sit  
(22) down and hand check the calculations with them.

(23) Q: This was conversations before they did the  
(24) calculations.

(25) A: That's right.

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(1) Q: All right. Now did you ask anyone, David, who  
(2) typed this why this footnote indicated an adult exposure  
(3) rather than a breast feeding expose?

(4) A: Well, what the footnote is saying is that we  
(5) took an adult dose, dioxin dose -

(6) Q: Excuse me. If you could answer my question.  
(7) Did you ask Mr. Dodge about that footnote?

(8) A: There was - I didn't see any need to, no.

(9) Q: Do you think this footnote reflects a breast  
(10) feeding dose for the infant?

(11) A: That footnote doesn't discuss breast feeding.

(12) Q: Does it reflect information to the contrary that  
(13) it's an adult dose being adjusted for body weight only?

(14) A: No, it's not to the contrary.

(15) Q: Does this footnote reflect that your dose is  
(16) calculated by taking an adult dose and adjusted for body  
(17) weight only?

(18) A: For the non-breast-feeding pathways, so the  
(19) adult dose, we basically just squeeze it into an infant.

(20) Q: Dr. Finley, do you see the word "infant" in your  
(21) footnote there, footnote C?

(22) A: That's right.

(23) Q: Do you see that?

(24) A: Correct.

(25) Q: Doesn't this footnote in its entirety with the

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[1] word infant indicate that the dose for the infant was  
 [2] calculated by taking an adult dose and adjusting for body  
 [3] weight only?  
 [4] A: That's what it says.  
 [5] Q: All right. Now, if you'll turn to your  
 [6] Affidavit on Page 12. You note in the second full  
 [7] paragraph, first sentence, "As shown in Table 2, all of  
 [8] the dioxin dose estimates calculated in the Kearney Risk  
 [9] Assessment are well below the acceptable intake range of 1  
 [10] to 10 picograms per kilogram per day." Do you see that?  
 [11] A: Right.  
 [12] Q: You're familiar, are you not, that the State  
 [13] through AT Kearney in January '96 calculated a 50  
 [14] picograms per kilogram dose per day dose for the infant?  
 [15] A: My recollection is they calculate a 50  
 [16] picogram/kilogram day dose for the infant for the  
 [17] subsistence farmer.  
 [18] Q: I appreciate that clarification. That is  
 [19] correct. That number is outside your range here?  
 [20] A: That number is outside the range, yes.  
 [21] Q: All right. Now, go back to your Table 10. You  
 [22] have a .2 figure in the farmer C in the TEX dioxin dose  
 [23] column.  
 [24] A: Right.  
 [25] Q: For the infant?

[1] A: That's right.  
 [2] Q: Now, are you aware that - first let me ask you:  
 [3] Have you read EPA's September '94 Dioxin Reassessment?  
 [4] A: Which part?  
 [5] Q: Chapter 9, the final chapter in Volume 3?  
 [6] A: Yes, some of it.  
 [7] Q: Already. Are you aware on approximately 9-84  
 [8] that the agency states that the current background  
 [9] exposures are 10 to 100 times higher than any reference  
 [10] dose they might calculate?  
 [11] A: I'm aware that they make that statement, yeah.  
 [12] Q: All right. Now, if you could do a small  
 [13] calculation for me on your paper or if you prefer to use  
 [14] the flip chart, which ever. You're aware, are you not,  
 [15] about the background exposure for dioxin is as reflected  
 [16] in EPA's Dioxin Reassessment?  
 [17] A: I believe background exposure they discuss in  
 [18] that document is 1 to 3 picogram/kilogram day for adults  
 [19] and 50 to 60 picogram/kilogram day for infant.  
 [20] Q: Now, if you take - well, let me just ask you.  
 [21] I assume - you tell me if I'm wrong - when they said the  
 [22] background exposure is 10 to 100 times higher than any  
 [23] reference dose, they were talking about adults, weren't  
 [24] they, not infants?  
 [25] A: I'm sure they were.

[1] Q: So the background level you indicated for adults  
 [2] is 1 to 3 picograms per kilogram per day?  
 [3] A: For adults, right.  
 [4] Q: If you could, tell me what 10 to 100 times lower  
 [5] than that range would be just as matter of mathematics.  
 [6] A: 1 to 3 would be .1 to .3  
 [7] Q: .1 to .03?  
 [8] A: .1 to .3 would be 10 times lower.  
 [9] Q: What about 100 lower?  
 [10] A: Or .01. to .03.  
 [11] Q: Okay. Now, the number in your table there for  
 [12] the infant for Farmer C, .2, is considerably larger than  
 [13] the .01 to .03 if one were to divide by 100.  
 [14] A: That's correct.  
 [15] MR. HARRISON: Nothing further, Mr. Chairman.  
 [16] THE CHAIRMAN: Anything else? Anything from the  
 [17] board?  
 [18] MR. WHITE: Good morning, Mr. Finley.  
 [19] THE WITNESS: Good morning.  
 [20] MR. WHITE: There was some discussion of Army  
 [21] Exhibit 5a. Just explain to me - in those right two  
 [22] columns one was labeled "without multiplier" and one was  
 [23] labeled "with multiplier." What are the multipliers?  
 [24] THE WITNESS: The multipliers - again, this is  
 [25] adjustments that Kearney made - has to do - it's either

[1] with the upset start conditions or a TOC adjustment. I'm  
 [2] not sure. I believe it's something on that order.  
 [3] MR. WHITE: With the multiplier the number is  
 [4] higher.  
 [5] THE WITNESS: It's higher, right.  
 [6] MR. WHITE: I assume that's taking, then, some  
 [7] kind of extra risk into account that may occur on  
 [8] occasion.  
 [9] THE WITNESS: Right.  
 [10] MR. WHITE: And on Table 3 of that same exhibit,  
 [11] Army Exhibit 5a, there were the numbers that were provided  
 [12] for the dioxins and the furans. Can you put those into  
 [13] some kind of perspective as to how the magnitude of those  
 [14] numbers can be interpreted? Are those - let me back up  
 [15] just a second. On Table 14 of that you put it into  
 [16] perspective of comparing it against the - you put the  
 [17] trial burn data into the perspective of the Health Risk  
 [18] Assessment, and we're able to make a comparison with the  
 [19] trial burn data. We're lower than the what the Health  
 [20] Risk Assess assumed.  
 [21] Is there anything similar to that that we could do  
 [22] with the data in Table 3 of that exhibit?  
 [23] THE WITNESS: Not really. Not that I can see,  
 [24] other than to say these are low detection limits. I can't  
 [25] draw from these numbers right here.



[1] MR. WHITE: Are these data that - the Table 3  
 [2] data, is that what's used to input into the calculations  
 [3] to generate the numbers that are on Table 14?  
 [4] THE WITNESS: Right.  
 [5] MR. WHITE: Okay. Then with respect to the 50  
 [6] picogram per kilogram day number, did I understand you  
 [7] right to say that an EPA guidance document indicates that  
 [8] the background exposure of infants to dioxins is 50 to 60  
 [9] picograms per kilogram day?  
 [10] THE WITNESS: It's either 50 to 60 or 60 to 70.  
 [11] I think it's 50 to 60.  
 [12] MR. WHITE: It's something in excess equal to or  
 [13] greater than 50.  
 [14] THE WITNESS: Yes.  
 [15] MR. WHITE: And I assume that background number  
 [16] for infants is higher than it is for adults because of the  
 [17] lower infant weight, lower body weight of the infant.  
 [18] THE WITNESS: That's part of it, right.  
 [19] MR. WHITE: So you're dividing by a smaller  
 [20] number, smaller weight.  
 [21] THE WITNESS: Right.  
 [22] MR. WHITE: Thank you.  
 [23] THE CHAIRMAN: Anything else? Counsel, anything  
 [24] else?  
 [25] MR. HARRISON: Just a clarification.

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[1] Dr. Finley, when the board member asked you whether the  
 [2] higher level for the infant was due to the different body  
 [3] weight, you said that's part of it. What's the rest of  
 [4] it?  
 [5] THE WITNESS: The rest of it is that an infant's  
 [6] diet is made up, obviously, more of breast milk than an  
 [7] adult diet, and there's dioxin in breast milk to some  
 [8] degree.  
 [9] MR. HARRISON: Is it your opinion that an  
 [10] exposure is acceptable merely because it is equal to or  
 [11] nearer to current exposures?  
 [12] THE WITNESS: I don't think you can make that  
 [13] broad conclusion, no.  
 [14] MR. HARRISON: That's because at some point  
 [15] current exposures might impose a danger themselves.  
 [16] THE WITNESS: That's correct.  
 [17] MR. HARRISON: Nothing further.  
 [18] THE CHAIRMAN: Thank you very much.  
 [19] Call your next witness.  
 [20] MR. MULLIGAN: Mr. Utley, can we have a  
 [21] five-minute conference break? I drank quite a bit of  
 [22] coffee.  
 [23] THE CHAIRMAN: Reconvene at twenty-five to.  
 [24] (Recess.)  
 [25] THE CHAIRMAN: Let's go ahead and reconvene.

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[1] The documents you have from the transcripts from the  
 [2] Federal hearing, do you have transcripts for Dr. Guzelian  
 [3] and Dr. Finley?  
 [4] MR. GALLI: Yes. I have those right now, and  
 [5] I'm happy to pass them out.  
 [6] THE CHAIRMAN: Can we do that?  
 [7] MR. HARRISON: Absolutely.  
 [8] MR. MULLIGAN: While we're doing that, can we  
 [9] get a time pact. I'm cognizant of running out of time.  
 [10] THE CHAIRMAN: Yes.  
 [11] MR. MULLIGAN: With the board's permission, I'll  
 [12] have our next witness, Mr. Cudahy, sit in the chair.  
 [13] MR. RATHBUN: I just checked with the time  
 [14] keeper, Shelly Milligan, who indicated that by her  
 [15] calculation the Army has used 6 hours and 49 minutes of  
 [16] their allocated 10 hours. Of the additional time that was  
 [17] given to the Petitioners, our calculation is that there's  
 [18] 20 minutes remaining of the Petitioners time. I had  
 [19] calculated 22.  
 [20] MS. LOCKHART: Does that include the time we  
 [21] gave them?  
 [22] MR. RATHBUN: That's all the additional time the  
 [23] Petition has. It's 11:40 right now.  
 [24] THE CHAIRMAN: Okay.  
 [25]

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[1] DR. CUDAHY  
 [2] was called as a witness, having been first duly  
 [3] sworn, was examined and testified on his oath as follows:  
 [4] EXAMINATION  
 [5] BY MR. MULLIGAN:  
 [6] Q: Mr. Cudahy, have you been provided since the  
 [7] submission of your Affidavit in this case Petitioner's  
 [8] Exhibit 2, which was an extract of documents from the DEQ  
 [9] files?  
 [10] A: Yes, I have.  
 [11] Q: And having reviewed those documents, is there  
 [12] anything in your Affidavit which you wish to change or  
 [13] amend?  
 [14] A: No, sir. This would not change any of my  
 [15] opinions.  
 [16] Q: Mr. Chairman, I submit Mr. Cudahy for  
 [17] examination by the board.  
 [18] MR. WIXOM: We have no questions.  
 [19] MR. HARRISON: We're in the same predicament,  
 [20] even more so, Mr. Chairman, so we'll waive cross in the  
 [21] sense that we have no time for it. We would appreciate  
 [22] the chance to offer our examination of Mr. Cudahy in the  
 [23] Federal proceeding by transcript.  
 [24] THE CHAIRMAN: Any objections to that?  
 [25] MR. GALLI: We have no objection, and at this

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 Attachment U, Page U-13

[1] time I would like to provide the board with copies of that  
 [2] testimony.  
 [3] THE CHAIRMAN: Any objection?  
 [4] MR. HARRISON: No objection, unless they're  
 [5] sending us a bill.  
 [6] MR. WIXOM: No objections from the state.  
 [7] THE CHAIRMAN: Board members, any questions?  
 [8] Rich, go ahead.  
 [9] MR. WHITE: Could you just very briefly  
 [10] summaries what your involvement was in the TOCDF project  
 [11] for the record?  
 [12] THE WITNESS: I have been involved since the  
 [13] first Federal hearing, submitted a declaration for that,  
 [14] two declarations for the second hearing that just finished  
 [15] up and have visited the facility twice since that process.  
 [16] MR. WHITE: My question went more to what it was  
 [17] that you reviewed and what you were asked to do.  
 [18] THE WITNESS: Well, I was asked to look at the  
 [19] operation of the facility, the design, permitting process,  
 [20] the safety and overall operation of the facility.  
 [21] MR. WHITE: No other questions.  
 [22] THE CHAIRMAN: I just have a couple of  
 [23] questions, sir. From your Affidavit you looked at some  
 [24] alternative technologies. You made a statement that these  
 [25] three alternative technologies have potential of agent

[1] with a high degree of development work necessary.  
 [2] Could you give us an idea of how much time would be  
 [3] involved for these alternative treatments to be  
 [4] commercially available, if available, to use?  
 [5] THE WITNESS: I would say for the type of waste  
 [6] that we're talking, the type of emissions and agent that  
 [7] we're talking about at Toocle, in the range of five to ten  
 [8] years. There's a National Research Counsel Report that  
 [9] was done recently that looked at commercialization of some  
 [10] of these technologies for ton containers only, and those  
 [11] periods of time were consistent with what I just said,  
 [12] because the time necessary would be extended because of  
 [13] the fact that you would have to be treating the rockets  
 [14] now and other things besides just the liquids from the ton  
 [15] containers thank.  
 [16] THE CHAIRMAN: Thank you. The other comment you  
 [17] made you is didn't think these three technologies were  
 [18] good. Can you expand on that, why you think they're good  
 [19] alternatives?  
 [20] THE WITNESS: There has been no research done on  
 [21] that. The ecologic technology is working with SAIC to see  
 [22] if it can take munitions and process explosive munitions.  
 [23] But it has not, to my knowledge, started that project yet.  
 [24] The use of these technologies, for example the molten  
 [25] metal technology, is a bath full of molten, hot metal, at

[1] about 2,600 to 3,000 degrees, so an accident with  
 [2] munitions could be a problem, for example.  
 [3] THE CHAIRMAN: Thank you.  
 [4] MS. NIELSON: I have a question about the  
 [5] context of using alternative technologies. You indicated,  
 [6] I think, six to ten years in terms of bringing that on  
 [7] line. What sort of tests do you envision having to go on  
 [8] during that period of time? Assuming all the answers are  
 [9] go based on that, what sort of -  
 [10] THE WITNESS: Well, I believe that the Army  
 [11] would require pilot scale testing first at a small scale  
 [12] to show, like they did at CAMDS, to show that the  
 [13] technologies were viable and that they would be workable.  
 [14] There would be process designs involved in that, and then  
 [15] the pilot studies would show certain problems that would  
 [16] have to solved on a full-scale basis. So all of those  
 [17] activities would result in the five to ten years.  
 [18] MS. NIELSON: Would that also include  
 [19] quantitative risk assessments of the operation of  
 [20] screening health risk assessments, shakedown, trial -  
 [21] THE WITNESS: Yes, ma'am.  
 [22] MS. NIELSON: - activities?  
 [23] THE WITNESS: All of those things would have to  
 [24] be done just as they were with the incineration systems.  
 [25] MS. NIELSON: Thank you.

[1] MR. HARDY: Mr. Cudahy, in your declaration,  
 [2] could I direct your attention to Page 8?  
 [3] THE WITNESS: Dated which one?  
 [4] MR. HARDY: It was one that was prefled.  
 [5] THE CHAIRMAN: The one we have is July 15th,  
 [6] 1996.  
 [7] THE WITNESS: Yes, sir, I have that. Page 8?  
 [8] MR. HARDY: I'm not sure. On my Page 8 there's  
 [9] a number 46 at the bottom of the page. Do you have one of  
 [10] those on yours?  
 [11] THE WITNESS: Yes, sir.  
 [12] MR. HARDY: Thank you.  
 [13] THE CHAIRMAN: Tom, I don't think we are with  
 [14] you. Paragraph 46?  
 [15] MR. HARDY: Yes.  
 [16] THE CHAIRMAN: Thank you. You expressed an  
 [17] opinion in paragraph 46 about dioxins and a proposed  
 [18] hazardous waste maximum standard?  
 [19] THE WITNESS: Yes, sir.  
 [20] MR. HARDY: In your opinion, is that standard  
 [21] conservative, or how would you character characterize it?  
 [22] THE WITNESS: Well, I can't speak to whether  
 [23] it's conservative or not because I'm not a health  
 [24] professional. What I can say is that the proposed MACT  
 [25] standard of .2 nanograms per dry standard square cubic

99-1724

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF UTAH, CENTRAL DIVISION

\* \* \*

CHEMICAL WEAPONS WORKING )  
GROUP (CWWG), INC., SIERRA )  
CLUB and VIETNAM VETERANS )  
OF AMERICA FOUNDATION, )

Plaintiffs, )

vs. )

UNITED STATES DEPARTMENT )  
OF THE ARMY, UNITED STATES )  
DEPARTMENT OF DEFENSE and )  
EG&G DEFENSE MATERIAL, )  
INC., )

Defendants. )

\* \* \*

**CERTIFIED COPY**

Civil No. 2:96CV 425 C

Deposition of:

TIMOTHY W. THOMAS

BE IT REMEMBERED that on the 5th day of  
February, 1998, the deposition of TIMOTHY W. THOMAS  
was taken before Sharon R. Morgan, Registered  
Professional Reporter and Notary Public in and for the  
State of Utah, at the hour of 9:00 a.m. at the offices  
of Jones, Waldo, Holbrook & McDonough, 170 South Main  
Street, Suite 1500, Salt Lake City, Utah.

\* \* \*

Sharon R. Morgan  
Registered Professional Reporter

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I N D E X

EXAMINATION	PAGE
By Mr. Harrison	3

MERIT REPORTERS

EQC Meeting May 18, 2000  
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1 TMA area, the toxic maintenance area?

2 A I have no knowledge of transporting vials to  
3 the TMA area.

4 Q All right. Do you have knowledge of  
5 transporting vials to any area where they would not  
6 normally be transported to?

7 A No. I have no knowledge of that.

8 Q Do you have any knowledge that an incident  
9 occurred in which a control room operator contacted  
10 your toxic maintenance area crew or TMA crew,  
11 including one of your staff members by the name of  
12 Brenda Moore, and asked one or more of them to search  
13 the TMA area or some other area for misplaced vials of  
14 chemical warfare agent?

15 A I have no knowledge of that.

16 Q Now, Mr. Thomas, do you recall testifying in  
17 a prior proceeding before the Utah Solid and Hazardous  
18 Waste Board?

19 A Do I recall it?

20 Q Yes.

21 A I do vaguely recall that.

22 Q Is it slipping from your memory at the  
moment?

A Well, it's been a long time, but I do recall  
it. Yes, I do.

19

MERIT REPORTERS

1 Q All right. Do you recall that I asked you a  
2 question during that proceeding regarding how many  
3 ACAMS alarms had occurred at the Tooele facility  
4 site?

5 A Yes.

6 Q Do you recall saying that you could not  
7 recall the number?

8 A That's correct.

9 Q All right. Do you recall my asking even if  
10 you couldn't recall the specific number, whether the  
11 number was a large one in any case? Do you recall my  
12 asking you that?

13 A Yes.

14 Q Sitting here today, is your information any  
15 fresher in your mind regarding the number of ACAMS  
16 alarms at the Tooele facility site right up to this  
17 date?

18 A As far as the number?

19 Q Do you know the number?

20 A I do not know the number.

21 Q Do you know whether it's a large number?

22 A Define large.

23 Q More than 100?

24 A Over what period of time?

25 Q Since August 22nd, 1996.

20

MERIT REPORTERS

1 A It could be.  
2 Q You know that it is, don't you?  
3 A I don't know. I haven't gone back to look  
4 at the number of ACAMS alarms that we have had. I  
5 know we have had a number of them. I don't know if  
6 it's above 100 or not.  
7 Q Would you know whether it was less than  
8 1,000?  
9 A Again, I don't know the number of the ACAMS  
10 alarms we've had.  
11 Q Have you not consulted with anyone regarding  
12 the number of such alarms since I interviewed you in  
13 the state proceeding?  
14 A No, I have not. It is not relevant to --  
15 Q Not relevant to what?  
16 A To me in performing my duties.  
17 Q So you are not really concerned with ACAMS  
18 alarms?  
19 A Oh, definitely I am.  
20 Q But not the number?  
21 A Right.  
22 Q Now, do you recall in that same state  
proceeding before the board that you volunteered a  
number in response to my questions that there had been  
six confirmed stack alarms at the facility? Do you

21

MERIT REPORTERS

1 recall saying that?  
2 MAJOR ZOLPER: Objection to assuming facts  
3 as to what your question was at that hearing.  
4 MR. HARRISON: Well, I am assuming nothing.  
5 I am simply telling you that in response to some  
6 question I asked, and the question I asked is  
7 irrelevant at the moment. You gave an answer.  
8 MAJOR ZOLPER: The question at the time --  
9 of course you are not reading the testimony from the  
10 hearing, but the question was the number of ACAMS  
11 alarms, whether confirmed or unconfirmed.  
12 MR. HARRISON: I am not concerned about the  
13 question, Counsel, and I will object to your coaching  
14 the witness in the form of restating my question when  
15 it's irrelevant. The relevancy is the answer.  
16 Q Mr. Thomas, you understand, don't you, in  
17 that hearing that you gave a very clear answer that  
18 there had been six confirmed stack alarms at the  
19 Tooele facility? Do you recall saying that?  
20 A It was not a clear answer, no.  
21 Q Do you recall saying those words?  
22 A As part of an effort to clarify some  
23 information.  
24 Q Do you recall saying those words, sir?  
25 A Yes, I do.

22

MERIT REPORTERS

1 Q Now, when you said there were six confirmed  
2 stack alarms at Tooele, were you not telling the  
3 truth?

4 A What I was referring to were -- that was a  
5 misstatement and what I was talking about was an issue  
6 relative to the fact that somebody had said that there  
7 were six. I was trying to clarify what they were.

8 Q Somebody said there were six confirmed stack  
9 alarms; is that correct?

10 A Yes. Somebody outside, not related to our  
11 activity said that.

12 Q Who said that?

13 A I think Cindy King said that.

14 Q Is that who you were referring to?

15 A Yes.

16 Q Now, Mr. Thomas, you understand that when I  
17 was asking you to give testimony in the state  
18 proceeding that I wanted to know the number of alarms,  
19 as you understood them, as the chief official for that  
20 facility for the Army. I wasn't asking you to tell me  
21 what my client said.

22 A I understand.

MR. OWENS: I object. The witness can't  
know what you had in mind.

MR. HARRISON: Of course he knows that. He

23

MERIT REPORTERS

1 just said he did. I don't need to know what my client  
2 says because I can ask my client.

3 Q Now, Mr. Thomas, what basis did you have at  
4 the time of that hearing for stating there were six  
5 confirmed stack alarms beyond Ms. King maybe having  
6 mentioned it?

7 A As I mentioned, it was a misstatement and I  
8 was trying to provide some clarifying information. It  
9 was a misstatement on my part.

10 Q So you're telling me that there have not  
11 been six confirmed stack alarms at Tooele?

12 A There has not been six confirmed stack  
13 alarms at Tooele.

14 Q There have been six stack alarms, haven't  
15 there?

16 A Yes. At that point there were six alarms,  
17 but they were not confirmed.

18 Q So there had been more than six stack alarms  
19 at that point, weren't there, more than six ACAMS  
20 alarms?

21 A On the stack, that's all I have knowledge  
22 of.

23 Q At that time?

24 A At that time.

25 Q So the number six would have reflected every

24

MERIT REPORTERS

1 ACAMS alarm, whether confirmed in any manner or not,  
2 at that time?

3 A On the stack.

4 Q On the stack.

5 A During that period of operations.

6 Q Why did you use the word confirmed?

7 A Like I say, it was a misstatement.

8 Q Well, it may have been, but I want to know  
9 why. Why did you use the word confirmed?

10 A Because it was a misstatement. I was trying  
11 to clarify some information and it was a  
12 misstatement.

13 Q You are saying there was no reason for using  
14 the word confirmed?

15 A There was no reason.

16 Q Isn't it true that the six incidents you  
17 were thinking about were instances in which not only  
18 an ACAMS alarmed, but at least one DAAMS tube  
19 indicated the presence of agent?

20 A No.

21 Q You are saying that in these six incidents,  
22 that in none of those cases did any DAAMS tube show  
23 the presence of agent?

24 A Not to my knowledge.

25 Q Really? What do you understand the

25

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EOC Meeting May 18, 2000  
Attachment U, Page U-19

1 definition of confirmed stack alarm to be as you or  
2 your colleagues use it at the Tooele facility?

3 A Confirmed means validation through alternate  
4 means, that when an ACAMS goes into alarm, there's a  
5 parallel method of validating that agent was truly  
6 seen.

7 Q What is the parallel method you are  
8 referring to?

9 A DAAMS tubes that are run parallel with the  
10 ACAMS.

11 Q All right.

12 A Which are then analyzed in a laboratory.

13 Q Now, the DAAMS tubes have the capability of  
14 having more than one tube analyzed for the same sample  
15 period; is that correct?

16 A We have an A and B to be run, yes.

17 Q Now, for a stack alarm to be confirmed by  
18 your definition for agent, is it required that one  
19 tube show the presence of agent or that both tubes  
20 show the presence of agent?

21 A Both tubes.

22 Q Now, isn't it true that in some of the six  
23 instances you were referring to, that one of the DAAMS  
24 tubes showed the presence of agent even if the other  
25 one did not?

26

MERIT REPORTERS

1 A I don't recall.  
2 Q Are you sure, Mr. Thomas, that that isn't  
3 what you were thinking about when you said six  
4 confirmed stack alarms?  
5 A No, absolutely not.  
6 Q You are sure it wasn't?  
7 A Uh-huh (affirmative).  
8 Q After that hearing before the state board,  
9 did you talk with anyone soon thereafter about your  
10 testimony that there were six confirmed stack alarms?  
11 A Oh, yeah.  
12 Q Who did you talk with about your stating  
13 that?  
14 A My lawyers.  
15 Q Pardon me?  
16 A My lawyers.  
17 Q Your lawyers. Anyone else?  
18 A We went back and researched it.  
19 Q Who else did you talk with besides your  
20 lawyers about this statement?  
21 A There probably were a few people I talked to  
22 on that. I can't remember everybody's name.  
2 Q Give me one.  
3 A Rick Holmes.  
4 Q And what did you and Mr. Holmes say about

27

MERIT REPORTERS

1 your statement in the state proceeding that there had  
2 been six confirmed stack alarms?  
3 A That I misstated what happened.  
4 Q And who first made the statement that you  
5 had misstated, you or Mr. Holmes?  
6 A I think I recognized it as part of the --  
7 when I received the minutes from the deposition or  
8 the --  
9 Q The transcript?  
10 A The transcript, yes.  
11 Q You may have recognized it, but that's not  
12 my question. In your conversation with Mr. Holmes,  
13 who first stated that your statement that there were  
14 six confirmed stack alarms was a misstatement? Was it  
15 you or Mr. Holmes?  
16 A It was a conversation. I can't tell you  
17 exactly who. He indicated that I stated that. I  
18 said, gees, I did not want to provide that -- that is  
19 not the information I wanted to convey.  
20 Q Now, Mr. Thomas, it's true, isn't it, that  
21 it did not occur to you you had made a misstatement  
22 until Mr. Holmes brought it to your attention?  
23 A Again, I was trying to clarify an issue that  
24 I felt was important at the time and I misstated that  
25 fact.

28

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1 Q Mr. Thomas, you can say that as many times  
2 as you want, but you still need to answer my  
3 question.

4 A Would you repeat the question?

5 Q Isn't it true that it had not occurred to  
6 you that your statement that there were six confirmed  
7 stack alarms at Tooele was a misstatement until Mr.  
8 Holmes brought it to your attention?

9 A No, I was well aware of that when I was  
10 making my statement.

11 Q You knew it was a misstatement when you were  
12 saying it?

13 A It was a misstatement. I did not have an  
14 opportunity to clarify my statement at that time.

15 Q Really?

16 A That's correct.

17 Q Okay. Now, it's true, is it not, that in  
18 your conversation with Mr. Holmes, that he is the  
19 first one who mentioned that this statement was a  
20 misstatement?

21 MR. OWENS: Objection, asked and answered.

22 MR. HARRISON: We are still trying to get  
the answer.

THE WITNESS: I realized I made a mistake  
directly after that hearing at that point.

29

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1 Q BY MR. HARRISON: Mr. Thomas, I am not going  
2 to get off this question until you give me a direct  
3 statement. Save us some time.

4 A Please repeat the question.

5 Q Mr. Holmes, in his conversation with you  
6 regarding your statement in the state proceeding that  
7 there were six confirmed stack alarms at Tooele, Mr.  
8 Holmes was the first one who mentioned that that was a  
9 misstatement and you were not. That's true, isn't  
10 it?

11 A True.

12 Q Was that true?

13 A Yes.

14 Q Okay. Thank you. Now, Mr. Thomas, do you  
15 have any information at your disposal that since the  
16 time of that state hearing that there have been any  
17 confirmed stack alarms for agent at the Tooele  
18 facility?

19 A Would you repeat the question, please?

20 Q Sure. Since the hearing, the state hearing  
21 we have been talking about, since that time has any  
22 information been brought to your attention regarding  
23 stack alarms at Tooele, whether they occurred before  
24 or subsequent to that hearing, that indicates to you  
25 that confirmed stack alarms have occurred at the

30

MERIT REPORTERS

1 Tooele facility?

2 A No information has been provided.

3 Q Were you aware that any such information  
4 exists?

5 A I am not aware of any information.

6 Q To that effect, I take it?

7 A That's correct.

8 Q Now, there have been a number of stack  
9 alarms at the Tooele facility beyond the six you  
10 referenced in the state hearing. That's true, isn't  
11 it?

12 A Would you give me a time frame on that?

13 Q Yes. Since August 22nd, 1996.

14 A Up to that point where we had the hearing,  
15 the only ones I knew of were six.

16 Q That's your complete answer to my question?

17 A Well, I don't understand your question.  
18 Please repeat it.

19 Q All right. You know, don't you, that there  
20 have been stack alarms -- notice I am not using the  
21 word confirmed at the moment -- that there have been  
22 stack alarms at the Tooele facility beyond the six you  
were referencing during the state hearing? You know  
that, don't you?

A Yes, I do know that.

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MERIT REPORTERS

1 Q All right. Now, do you know at this moment  
2 whether there were stack alarms at the Tooele facility  
3 beyond the six you were referencing in that hearing  
4 that had occurred prior to that hearing?

5 A No.

6 Q So those six were the only ones you were  
7 aware of and are aware of today that have occurred  
8 prior to that hearing?

9 A Correct.

10 Q So the additional stack alarms that you  
11 acknowledge knowing about today would have occurred  
12 after that hearing?

13 A That's correct.

14 Q How many stack alarms have there been at the  
15 Tooele facility since the time of that hearing?

16 A I don't have an exact number.

17 Q I am not too concerned with precision. Give  
18 me a ballpark.

19 A 10, 12, in that range.

20 Q All right. And would there be Army records  
21 reflecting the dates on which these stack alarms  
22 occurred?

23 A Yes, there would be.

24 Q And do you know whether those records are  
25 among those records either physically produced or

32

MERIT REPORTERS

1 offered for inspection to the Plaintiffs?  
2 A I believe they have been, yes.  
3 Q So I take it you would have no objection to  
4 Plaintiffs inspecting those records?  
5 A I have none.  
6 Q Do you happen to know sitting here today the  
7 date of any of those stack alarms?  
8 A I do not.  
9 Q Did you make a determination regarding any  
10 or all of those stack alarms as to whether they were  
11 confirmed or not or did someone else make that  
12 determination?  
13 A I reviewed those and none were confirmed.  
14 Q Did any of those 10 to 12 or so stack alarms  
15 that have occurred since the hearing we have been  
16 discussing, the state hearing, in any of those cases  
17 was there one DAAMS tube that indicated the presence  
18 of agent?  
19 A I have no knowledge of that occurring.  
20 Q Are you saying that didn't happen?  
21 A To my knowledge, yes.  
22 Q Now, when a stack alarm occurs at the Tooele  
facility, is there a masking alarm that goes along  
with it or are the personnel required to put on their  
respirators?

33

MERIT REPORTERS

1 A Yes.  
2 Q And that's true in every incident of a stack  
3 alarm?  
4 A Yes.  
5 Q And do you know whether in fact the masking  
6 alarm was sounded in each of those incidents, the 12  
7 you referenced?  
8 A My understanding is it was.  
9 Q Do you have any uncertainty about that?  
10 A No.  
11 Q Now, during these incidents where a stack  
12 alarm, meaning an ACAMS alarm, for agent in the stack  
13 was occurring -- and you're telling me, I take it,  
14 today that in none of those cases did your DAAMS tube  
15 confirm agent being present -- did the DAAMS tube  
16 indicate that some chemical other than agent was  
17 present?  
18 A I have no knowledge of that.  
19 Q Really? Well, how do you determine whether  
20 the DAAMS tube shows agent or not? Isn't it by  
21 looking at a readout showing a retention time?  
22 A Pardon? Would you repeat that?  
23 Q Do you ever look at a DAAMS tube data to see  
24 whether agent is present or not?  
25 A I do not.

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MERIT REPORTERS

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF UTAH, CENTRAL DIVISION

\*\*\*

CHEMICAL WEAPONS WORKING  
GROUP (CWWG), INC., SIERRA  
CLUB and VIETNAM VETERANS  
OF AMERICA FOUNDATION,

Plaintiffs,

vs.

UNITED STATES DEPARTMENT  
OF THE ARMY, UNITED STATES  
DEPARTMENT OF DEFENSE and  
EG&G DEFENSE MATERIAL,  
INC.,

Defendants.

**CERTIFIED COPY**

Civil No. 2:96CV 425 C

Deposition of:

TIMOTHY W. THOMAS

\*\*\*

BE IT REMEMBERED that, on the 5th day of  
February, 1998, the deposition of TIMOTHY W. THOMAS  
was taken before Sharon R. Morgan, Registered  
Professional Reporter and Notary Public in and for the  
State of Utah, at the hour of 9:00 a.m. at the offices  
of Jones, Waldo, Holbrook & McDonough, 170 South Main  
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Sharon R. Morgan

Registered Professional Reporter

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EQC Meeting May 18, 2000  
Attachment U, Page U-24

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Major Peter Zolper  
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For the Defendant: H. Douglas Owens  
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I N D E X

EXAMINATION

PAGE

By Mr. Harrison

3

1 A The best I can tell you is it covered a  
2 year's operation. I don't know the period, when it  
3 started and when it ended.

4 Q It's a 12-month period?

5 A That's my understanding, yes.

6 Q Did the Army dispute every violation  
7 indicated in that notice?

8 A No.

9 Q Has the Army given written response to the  
10 state on its position regarding each of the violations  
11 in that notice?

12 A Yes.

13 Q Now, Mr. Thomas, I chatted with Mr. Gray  
14 yesterday about a new sampling plan or program that's  
15 in progress at the moment that involves testing ton  
16 containers that were and are, I assume, intended to be  
17 burned at your TOCDF facility. Are you familiar with  
18 that sampling program?

19 A Yes, I am.

20 Q And does it involve sampling of any material  
21 other than ton containers?

22 A No.

23 Q All right. What is the purpose of this  
sampling program as you understand it?

A To assure that we have properly

1 characterized the agent we are feeding into our  
2 incinerator.

3 Q All right. And was it your idea to do this  
4 sampling program?

5 A No, it was not.

6 Q Was it the Army's idea?

7 A No, it was not.

8 Q Was it EG&G's idea?

9 A No, it was not.

10 Q Was it the State of Utah's idea?

11 A Yes.

12 Q All right. Had the state not directed the  
13 sampling program, would the Army or EG&G have  
14 performed it voluntarily?

15 MAJOR ZOLPER: I would object, it calls for  
16 speculation.

17 MR. HARRISON: I'll note your objection. I  
18 think being the director of the Army's program he can  
19 tell us whether they would have performed such testing  
20 on their own initiative.

21 MAJOR ZOLPER: He's not the director of the  
22 Army's program.

23 MR. HARRISON: Director of the TOCDF for the  
24 Army.

25 THE WITNESS: As information came to light,

1 we probably would have wanted to confirm what we  
2 already knew about the agent.

3 Q BY MR. HARRISON: So had the state not  
4 insisted at some point in time, you may have taken  
5 that initiative yourself?

6 A We may have.

7 Q But in this case it was the state's  
8 initiative?

9 A Yes.

10 Q Mr. Thomas, has there been processing of ton  
11 containers at TOCDF that you now know or have reason  
12 to believe previously contained the chemical warfare  
13 agent lewisite?

14 A Yes.

15 Q Do you know how many such ton containers  
16 have been processed to date?

17 A My understanding is three.

18 Q And have there been, to your knowledge, ton  
19 containers processed to date at TOCDF that, according  
20 to your records, previously contained some form of  
21 mustard agent?

22 A The answer is yes.

23 Q Do you know the numbers of such containers  
that have been processed?

24 A Not offhand.

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MERIT REPORTERS

1 Q Mr. Gray indicated yesterday that there  
2 would be, based on his spread sheets, about 135 such  
3 containers that previously contained mustard agent.  
4 Does that sound like the ballpark is correct?

5 A I would assume so if Marty said that.

6 Q Now, Mr. Thomas, have you acknowledged that  
7 some containers have been processed at the TOCDF  
8 facility that your records indicate previously  
9 contained the substance called freon?

10 A The question is, did the containers  
11 previously contain freon?

12 Q Yes, sir.

13 A That may have happened. I don't know the  
14 specific number.

15 Q Do you know whether it happened at least on  
16 one occasion?

17 A It may have. I haven't looked closely at  
18 freon, but it's possible.

19 Q Are you aware that some containers that have  
20 been processed at TOCDF appear from a review of your  
21 records to have at this time an unknown history?

22 A That's correct.

23 Q All right. Do you know how many such  
24 containers fall in that category?

25 A I could not give you a number.

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MERIT REPORTERS

1 Q All right. Do you understand that the  
2 circumstances we have just discussed is one of the  
3 bases for the state's requiring the new sampling  
4 program?

5 A I understand that.

6 Q Now, regarding the containers that have  
7 already been processed at TOCDF, the ton containers,  
8 do you have any way of knowing at this time the  
9 quantity of actual lewisite that may have been  
10 processed at TOCDF?

11 MAJOR ZOLPER: Objection, you're assuming  
12 facts not in evidence. There's been no testimony here  
13 that there has been lewisite processed.

14 MR. HARRISON: I didn't say that there was  
15 and my question doesn't assume it. It's asking for a  
16 quantity, if Mr. Thomas knows a quantity. Of course  
17 it could be zero. It could be something considerably  
18 above zero. So I am assuming nothing, sir.

19 Q Mr. Thomas, do you remember the question?

20 A Repeat that, please, if you would.

21 Q Do you have information that would allow you  
22 to determine or your staff to determine the amount of  
lewisite that has been processed at TOCDF at this  
point?

A We have processed no lewisite through our

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MERIT REPORTERS

1 facility.

2 Q Zero?

3 A Zero.

4 Q Do you know that with certainty?

5 A Based on all the information I have.

6 Q Is the information sufficient for you to be  
7 certain?

8 A I believe it is.

9 Q So you are telling me that you processed  
10 three containers that are previously known to have  
11 contained lewisite, but you are certain that there was  
12 no lewisite left in them at the time they were  
13 processed at your facility?

14 A Based on the information I have, that's a  
15 conclusion I have reached.

16 Q What information do you have to that effect,  
17 sir?

18 A Just a knowledge of what happened and based  
19 on information that has been given to me about that.

20 Q I want to know what information that is.

21 A There is nothing that would lead me to  
22 believe we have burned any residual amounts of  
23 lewisite.

24 Q Nothing at all?

25 A Nothing at all.

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MERIT REPORTERS

1 Q Are you aware that arsenic has been found in  
2 the brine from the pollution abatement system?

3 A I am aware of that.

4 Q And arsenic is a primary component of  
5 lewisite, is it not?

6 A Yes.

7 Q And can you explain the quantities of  
8 arsenic found other than from lewisite left in a  
9 container?

10 A Yes.

11 Q And what is the source of the arsenic as you  
12 understand it?

13 A There could be several sources, but the  
14 source that I believe it could be was due to the  
15 manufacturing process related to GB.

16 Q That's a very general answer, sir. How is  
17 it arsenic comes to fall into a container with GB when  
18 GB as it's manufactured has no arsenic component?

19 A Because of -- I don't know. I do know that  
20 the GB that we looked at in the past does have a  
21 residual amount or small amount of arsenic in it.

22 Q I understand that. But might that be  
23 because it has come in contact with lewisite?

A My belief is it is not as a result of that.

Q And what is the source of the arsenic if not

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MERIT REPORTERS

1 lewisite?

2 A I don't know.

3 Q That doesn't create any uncertainty in your  
4 mind about the potential for having burned lewisite?

5 A No, it doesn't.

6 Q All right. I take it you would agree with  
7 me that arsenic is not a component of agent GB?

8 A Not a planned component.

9 Q I understand you find it in the GB  
10 containers, but it's not by design manufactured as  
11 part of the GB compound?

12 A Right, not as a planned component.

13 Q I understand. Nor do you know the source of  
14 its presence with GB?

15 A Correct.

16 Q All right. Now, do you have any information  
17 that would allow you to determine the quantity of any  
18 mustard agent that may have been processed at TOCDF up  
19 to this date?

20 A I am sorry, would you repeat that?

21 Q Yes, sir. Do you have any information that  
22 would allow you to determine the quantity of any  
23 mustard agent that has been processed at TOCDF up to  
24 this date?

25 A To my knowledge, no mustard has been

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1 processed through our facility up to this date.

2 Q And are you certain about that?

3 A Yes.

4 Q Now, you recognize that several containers,  
5 ton containers, that previously contained mustard  
6 agent have been processed at TOCDF?

7 A I understand that.

8 Q Now, did you test those containers for  
9 residual mustard agent before you processed them?

10 A No, we did not.

11 Q Do you have a history of documentation that  
12 shows the extent to which mustard agent was removed or  
13 cleaned from these containers before GB was added?

14 A We do have a plan that defines how the ton  
15 containers were reconditioned back in the early days  
16 when they were used.

17 Q In the 1950s?

18 A Yes.

19 Q And this would be the protocol for how the  
20 containers should have been reconditioned for use for  
21 another agent?

22 A Right.

Q Have you interviewed workers that might  
still be alive who were present at that time to  
determine whether the cleaning was 100 percent

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1 effective?

2 A No, I have not.

3 Q Have any of your staff made an attempt to do  
4 that?

5 A No.

6 Q Do you have any reason to believe that the  
7 reconditioning protocol was not followed to the letter  
8 in some cases?

9 MAJOR ZOLPER: Objection as to calling for  
10 speculation.

11 MR. HARRISON: I am asking if he had any  
12 reason to believe it. That's hardly calling for  
13 speculation.

14 THE WITNESS: Right now I have no reason to  
15 believe that they did not follow the protocol.

16 Q BY MR. HARRISON: Okay. Have you ever heard  
17 from any of your staff that they have reason to  
18 believe that some of these containers were not  
19 completely emptied or cleaned prior to being filled  
20 with GB?

21 A No.

22 Q You have not heard that?

23 A It has been discussed, but there was nothing  
24 that would lead me to believe that the protocol was  
25 not followed.

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1 Q And who was this issue discussed with, as  
2 you recall?  
3 A One of my employees, Steve O'Neil.  
4 Q Steve O'Neil?  
5 A Uh-huh (affirmative).  
6 Q All right. And why would you be talking  
7 about this issue with Steve O'Neil?  
8 A Steve has a good history and did a lot of  
9 research on the history of those ton containers.  
10 Q All right. Is that because you assigned him  
11 that task?  
12 A Yes.  
13 Q So Mr. O'Neil and you discussed the  
14 possibility, or the questions, at least, of whether  
15 these containers were completely cleaned before they  
16 were filled with GB?  
17 A Uh-huh (affirmative).  
18 Q And what did Mr. O'Neil tell you regarding  
19 that question?  
20 A He doesn't have enough knowledge to dispute  
21 the cleaning method.  
22 Q All right. So he's not in a position to  
prove that they weren't cleaned completely. Is he in  
a position to believe they were cleaned completely?  
A I believe that to be correct.

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1 Q Do you know what his basis of knowledge  
2 would be for having that level of certainty?  
3 MAJOR ZOLPER: Object to your request for  
4 speculation as to another person's basis for opinion.  
5 MR. HARRISON: Really, I think we would be  
6 better off not making this type of objection in terms  
7 of speeding up the deposition. I think it's clear  
8 that Mr. Thomas assigned one of his staff members to  
9 this task. The staff member apparently conducted some  
10 inquiry and reported back to Mr. Thomas and he would  
11 have a basis for what he reported back. I am just  
12 exploring what that basis is.  
13 MAJOR ZOLPER: My objection would stand. I  
14 think it's a valid objection. If this witness can  
15 testify as to the basis of someone else's evaluation  
16 of an assigned task and conclusion, fine, but --  
17 MR. HARRISON: Well, he's asked this person  
18 to report back to him, so I think we are about to find  
19 out what that report was.  
20 Q So, Mr. Thomas, what would be Mr. O'Neil's  
21 basis for drawing this conclusion that the ton  
22 containers were cleaned completely?  
23 A I don't know.  
24 Q He didn't tell you that?  
25 A No.

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1 Q But you have confidence in his conclusion  
2 without knowing his basis?

3 A His basis probably is the same as mine.  
4 This occurred a long time ago and we know that a  
5 protocol existed at the time and we would assume that  
6 the people during that period of time followed that  
7 protocol.

8 Q He didn't tell you that, though?

9 A Right, he did not tell me that.

10 Q You're assuming that's his basis?

11 A That's correct.

12 Q Did he identify any other basis for you for  
13 his conclusion?

14 A No.

15 Q Did you or he decide to not interview  
16 workers who might have been involved in the  
17 reconditioning of ton containers or the failure to do  
18 so in order to avoid collecting evidence?

19 A No.

20 Q Do you know, Mr. Thomas, the containers that  
21 were processed at TOCDF, according to Mr. Gray, some  
11 of them that previously contained freon, what the  
freon would have been used for and why it was stored  
in ton containers?

A I have no idea.

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MERIT REPORTERS

1 Q Are you aware that ton containers have been  
2 processed at TOCDF that previously contained  
3 chlorine?

4 A I am aware of that, yes.

5 Q Do you know the number?

6 A I do not.

7 Q Do you know the content of chlorine that may  
8 have been processed at TOCDF in any of these  
9 containers?

10 A The content?

11 Q The quantity.

12 A I would assume zero.

13 Q Did you test the ton containers for chlorine  
14 before processing them?

15 A Those specific tons? I don't know if we  
16 processed those tons that had chlorine. It depends on  
17 when we processed them, I guess.

18 Q You don't know if the tons have been tested  
19 for chlorine systematically before processing at  
20 TOCDF?

21 A No, not specifically, no.

22 Q When did you first discover or come to know  
23 that ton containers containing GB intended to be  
24 processed at TOCDF had in some cases previously  
25 contained lewisite, mustard agent or other compounds?

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MERIT REPORTERS

1 A It was less than a year ago.  
2 Q All right. And what prompted you to come to  
3 know this?

4 A Based on a complaint by an individual.

5 Q Anyone that I might recognize?

6 A I think so. Trina Allen.

7 Q All right. Yes. And what was it about Ms.  
8 Allen's complaint that brought this information to  
9 your attention that ton containers had been reused?

10 A Ms. Allen made a direct correlation between  
11 arsenic in the brine to the potential of lewisite  
12 being in the ton containers.

13 Q All right. And who brought this information  
14 directly to your attention?

15 A I think I was first apprised of that when I  
16 was made aware of the complaint that was filed by Ms.  
17 Allen.

18 Q In her Department of Labor case?

19 A Yes.

20 Q Do you know who it was that informed you of  
21 that?

22 A No, I don't recall.

Q So no one from Batelle, your contractor, had  
informed you of the issue of arsenic in the brine  
prior to your being told of Ms. Allen's complaint?

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1 A I think that I heard about it -- once I  
2 heard about it as part of the complaint, I asked Mr.  
3 Ray Bills to provide additional information to me.

4 Q All right. So Mr. Bills had not told you of  
5 this issue prior to Ms. Allen's complaint coming to  
6 your attention?

7 A As I recall, that's correct.

8 Q And what additional information did Mr.  
9 Bills provide you at that time?

10 A He basically told me that Ms. Allen made the  
11 connection between the arsenic in the brine to  
12 lewisite, and Mr. Bills did not agree with that  
13 conclusion until they had an opportunity to  
14 investigate what the source of that arsenic was.

15 Q All right. Now, apart from the connection  
16 or the conclusion that there was a connection between  
17 arsenic in the brine and lewisite in the tons, had Mr.  
18 Bills or anyone at Batelle ever informed you that  
19 arsenic itself, totally apart from the lewisite  
20 question, that arsenic itself had been detected in the  
21 brine?

22 A No.

23 Q So that matter as well came to your  
24 attention only after Ms. Allen's complaint?

25 A Right.

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1 Q Were you aware prior to Ms. Allen's  
2 complaint that Mr. Bills and/or one of his Batelle  
3 associates or staff who work under him had told Ms.  
4 Allen to not talk about the potential lewisite  
5 contamination?

6 A I was only informed of that after the  
7 complaint.

8 Q Have you ever discussed that issue with Mr.  
9 Bills?

10 A I asked him to provide a report to me as to  
11 what happened.

12 Q Did you ever ask him if he instructed Ms.  
13 Allen not to talk about this, the lewisite potential?

14 A Yes, and he explained to me that there was  
15 not enough evidence to make a direct correlation  
16 between arsenic and lewisite.

17 Q Did he admit to you that he had communicated  
18 to Ms. Allen that she should not speak about the  
19 lewisite issue?

20 A No, he did not.

21 Q Did you ask him point-blank if he had told  
22 this to Ms. Allen?

A No, I did not.

Q Mr. Thomas, do you have any information that  
would lead you to conclude that there are mixtures of

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1 chemical warfare agent present in some of the ton  
2 containers that are intended to be processed at  
3 TOCDF?

4 A There is nothing that would lead me to  
5 believe that there's a mixture of chemical warfare  
6 agents in those tons.

7 Q All right. And is the answer the same for  
8 the tons you already processed?

9 A That's correct.

10 Q Would the answer be the same for the other  
11 munitions that have already been processed at TOCDF,  
12 including the rockets?

13 A That's correct.

14 Q And would the answer be the same for those  
15 remaining munitions other than tons that are intended  
16 to be processed at TOCDF?

17 A That's correct.

18 Q Has there been any discussion of the issue  
19 of mixtures of chemical warfare agents and the  
20 possibility that they might exist in any of these  
21 weapons or containers?

22 A No, there has not been.

23 Q You never talked about that possibility with  
24 anyone?

25 A Only to absolutely rule that out.

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MERIT REPORTERS

1 Q Who did you talk about it with?

2 A Probably Dave Jackson.

3 Q And what was the substance of your  
4 conversation with Mr. Jackson regarding this issue?

5 A Basically we both concluded that there's  
6 nothing that would lead us to believe that there's any  
7 kind of mixing of chemical agents in the munitions  
8 processing.

9 Q Have you made any inquiries with the depot  
10 or with Aberdeen or Edgewood as to whether such  
11 mixtures were produced by the Army?

12 A No, not directly. There's nothing that led  
13 me to believe that we need to ask that question.

14 Q So you haven't asked it?

15 A No.

16 Q Are you familiar with the incident that  
17 happened, and I have forgotten the year now, for some  
18 reason 1968 rings a bell, where approximately 2,000  
19 sheep were killed that at about the same time a live  
20 agent spraying occurred at Dugway?

21 MAJOR ZOLPER: Objection to the  
22 characterization of that incident. I think that  
assumes facts not known.

Q BY MR. HARRISON: Well, Mr. Thomas, you are  
aware that 2,000 sheep were killed near Dugway at some

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1 time in the past?

2 A Only through the news.

3 Q You have read it in the news?

4 A Yes.

5 Q All right. And you're also familiar with at  
6 least the alleged connection to spraying of chemical  
7 warfare agent at Dugway?

8 A I have heard it discussed, yes.

9 Q Have you ever asked anyone questions  
10 regarding that incident?

11 A No.

12 Q So do you know what agent was involved or  
13 what agents were involved in that incident?

14 A Only secondhand information is all I have  
15 received on that.

16 Q All right. What secondhand information did  
17 you receive?

18 A I have heard that it was VX.

19 Q Did anyone who gave you this information  
20 also indicate that it may have been a mixture of two  
21 agents?

22 A No.

23 Q Are you aware, Mr. Thomas, that the Army has  
24 done a study in the past, approximately 1972,  
25 examining the toxicity of a -- I wouldn't call it a

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1 mixture but of combined exposure to a chemical warfare  
2 agent and a pesticide?

3 A No, I am not familiar with that.

4 Q Mr. Thomas, are you aware of the data  
5 indicating that the agent in the ton containers  
6 weapons that is being processed or intended to be  
7 processed at TOCDF is less than 100 percent pure?

8 A I am aware of that, yes.

9 Q Are you aware of the ranges of purity that  
10 have been found in the testing performed so far?

11 A Yes, I am somewhat aware of that.

12 Q All right. What ranges do you recall for  
13 the purity measurements?

14 A I could just give you the best information I  
15 have. From the range of 60 to 100 percent.

16 Q The purity testing that's been done, when it  
17 identifies a purity less than 100 percent, do you know  
18 whether the testing goes on to fully characterize the  
19 remaining components that would make up 100 percent of  
20 the mixture?

21 A If we are conducting a purity test, then the  
22 answer is no.

Q So it might identify perhaps some  
degradation components and possibly some  
preservatives, but not everything else that might be

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MERIT REPORTERS

1 in the mixture?

2 A The purity tests are not designed to do  
3 that.

4 Q Do they routinely identify anything other  
5 than agent?

6 A We do have -- as I recall, we do on certain  
7 occasions look at metals as part of our information  
8 that we are providing the State of Utah.

9 Q All right.

10 A And on some samples we do look at major  
11 components of the constituents of the GB and its  
12 breakdown products.

13 Q All right. Would this be a testing other  
14 than the routine purity testing or is it the routine  
15 purity testing you are talking about?

16 A No, I am talking about in special tests that  
17 were requested by the State of Utah.

18 Q To your knowledge, has there been any test  
19 performed to date on an agent sample that has  
20 completely identified each of the constituents that  
21 make up 100 percent of the quantity of the  
22 containers?

23 A To my knowledge, no.

24 Q All right. Do you know whether the Army has  
25 been reluctant to do that for any reason?

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1 MAJOR ZOLPER: Why don't we just make it  
2 five minutes.

3 MR. HARRISON: That's fine.

4 (Recess:)

5 Q BY MR. HARRISON: Now, Mr. Thomas, I take it  
6 the state has issued some restriction on which ton  
7 containers you can process at this time; is that  
8 correct?

9 A That's correct.

10 Q All right. How many ton containers are  
11 available for processing in the absence of this state  
12 restriction? How many are intended for processing?

13 A I don't know. I couldn't give you the  
14 number.

15 Q Do you have a ballpark?

16 A Several hundred.

17 Q Isn't it several thousand?

18 A Did you say -- would you repeat your  
19 question?

20 Q Sure. I am looking for the total pool or  
21 population of ton containers that have yet to be  
22 processed, that were intended to be processed at  
23 TOCDF.

24 A Yes, you're correct, several thousand.

25 Q And the number that the state is currently

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1 A No.

2 Q So if the state or EPA or some other party,  
3 government party, requested that that be done, the  
4 Army would have no reason to object?

5 A Only from the technical basis as to whether  
6 or not we can achieve that level of clarification or  
7 understanding of what is there.

8 Q I understand.

9 A We are just limited by our testing  
10 techniques.

11 Q Do you know, Mr. Thomas, whether the Army  
12 has ever intentionally placed metals into an agent  
13 container or weapon for military purposes?

14 A I have no knowledge of anything like that.

15 Q So you would presume the metal to be an  
16 unintended contaminant?

17 A Or from the container that's holding those.

18 Q I understand. But the Army still would not  
19 put the metals in the agent?

20 A Correct.

21 MAJOR ZOLPER: Mr. Harrison, I've got just  
22 about 10 after 3:00 now. We have been going almost an  
23 hour. I suggest we take a comfort break.

24 MR. HARRISON: I don't have a problem with  
25 that. How long would you suggest?

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1 authorizing TOCDF to resume processing would be a few  
2 hundred?

3 A Several hundred.

4 Q And why is it that the state is  
5 distinguishing between those which it is allowed to  
6 process and those that it is not allowed to process?

7 MAJOR ZOLPER: Objection as to calling for  
8 speculation.

9 Q BY MR. HARRISON: If you know, Mr. Thomas,  
10 as to why the state has imposed this restriction. I  
11 expect they told you?

12 A Yes. Looking at the records on those ton  
13 containers that are allowed to be processed, there's  
14 no history indicating that they had prior use.

15 Q All right. And this, I believe, is what the  
16 state is referring to as first-time use containers?

17 A Yes.

18 Q Now, do you know, Mr. Thomas, whether the  
19 containers that the state is allowing the Army to  
20 process at this time, the ones that the state  
21 considers first-time use, are containers that had GB  
22 put into them when they were essentially new?

A That's my understanding.

Q Do you know what basis there is for that  
conclusion in your records?

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1 A It was based on a historical search of the  
2 records.

3 Q Who did that search?

4 A Mr. O'Neil.

5 Q Steve O'Neil?

6 A Yes.

7 Q Has anyone besides Mr. O'Neil reviewed those  
8 records?

9 A Yes, Mr. Kevin Dolan.

10 Q All right. Is he an Army person?

11 A He's an Army employee.

12 Q Anyone else besides Kevin and Steve?

13 A And I know the State of Utah employees have  
14 reviewed it.

15 Q Okay. You didn't review those yourself, I  
16 take it?

17 A I did not.

18 Q Now, to your knowledge, have any of these  
19 containers that had GB placed into them when the  
20 containers were new subsequent to that time had their  
21 contents changed in any way?

22 A Not to my knowledge.

23 Q Has Mr. O'Neil or Mr. Dolan investigated  
24 that question for you?

25 A No, they have not.

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1 Q Is that because it hadn't occurred to them?

2 A Because the data cards that they are  
3 reviewing do not indicate any change in use of these  
4 tons.

5 Q Should the data card indicate a change had a  
6 change occurred?

7 A I would imagine it would have.

8 Q Is that required that the data card would  
9 reflect such a change?

10 A It has -- my understanding is it would.

11 Q You don't know if it's a requirement or  
12 not?

13 A I do not know.

14 Q So I take it if Mr. O'Neil or Mr. Dolan  
15 hasn't made an inquiry into this based on review of  
16 the data cards, that you would have no other basis for  
17 believing that the contents of any of these containers  
18 has changed?

19 A That's correct.

20 Q Does the Army have any results back from any  
21 of the sampling of the ton containers that has  
22 occurred so far?

A Not yet.

Q Are any of these containers being sampled  
and analyzed for dioxins or PCBs?

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1 A Possibly.

2 Q Do you know whether or not they are?

3 A I do not.

4 Q Who would know that?

5 A Ray Davis.

6 Q Is Mr. Davis in charge of the sampling or  
7 analytical procedures?

8 A Yes.

9 Q Do you have any reason to believe that  
10 dioxins or PCBs would be present or would not be  
11 present in the tons?

12 A I have no reason to believe that they would  
13 be present.

14 Q Has anyone ever discussed the topic of  
15 whether dioxins or PCBs would be present in the ton  
16 containers?

17 A No.

18 Q Do you know whether the -- let me just ask  
19 you first, what is the most recent date at TOCDF  
20 during which brine from the pollution abatement system  
21 has been created? I am talking about brine to be  
22 disposed of.

23 A From the pollution abatement system, you are  
24 saying?

25 Q Yes, sir.

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IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF UTAH, CENTRAL DIVISION

\* \* \*

CHEMICAL WEAPONS WORKING  
GROUP (CWWG), INC., SIERRA  
CLUB and VIETNAM VETERANS  
OF AMERICA FOUNDATION,

Plaintiffs,

vs.

UNITED STATES DEPARTMENT  
OF THE ARMY, UNITED STATES  
DEPARTMENT OF DEFENSE and  
EG&G DEFENSE MATERIAL,  
INC.,

Defendants.

**CERTIFIED COPY**

Civil No. 2:96CV 425 C

Deposition of:

TIMOTHY W. THOMAS

\* \* \*

BE IT REMEMBERED that on the 5th day of  
February, 1998, the deposition of TIMOTHY W. THOMAS  
was taken before Sharon R. Morgan, Registered  
Professional Reporter and Notary Public in and for the  
State of Utah, at the hour of 9:00 a.m. at the offices  
of Jones, Waldo, Holbrook & McDonough, 170 South Main  
Street, Suite 1500, Salt Lake City, Utah.

\* \* \*

Sharon R. Morgan  
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EOC Meeting May 18, 2000  
Attachment U, Page U-39

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\* \* \*

I N D E X

EXAMINATION

PAGE

By Mr. Harrison

3

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1 A I think it was part of the NOV. It was  
2 discussed in that and then it was related to method 23  
3 versus 0023A or something like that. But I don't have  
4 the details on that.

5 Q This is an EPA method for analyzing or  
6 sampling contaminants?

7 A It could be. I don't recall exactly what it  
8 was for.

9 Q You don't recall any particular contaminants  
10 it may have been regarding?

11 A No.

12 Q But you are aware that is one issue the  
13 state has raised regarding departure of the trial burn  
14 plans?

15 A That's correct.

16 Q Have there been any others the state has  
17 raised?

18 A Not that I recall offhand.

19 Q Has the state approved any of the trial  
20 burns for the metal parts furnace, the deactivation  
21 furnace, either LIC 1 or LIC 2 at this point?

22 A No, they have not. **START OF DUN ↓**

23 Q Have you operated the dunnage incinerator at  
TOCDF?

A Yes.

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1 Q During what time period?

2 A During systemization.

3 Q Have you ever operated the dunnage  
4 incinerator with agent waste?

5 A No, we have not.

6 Q Do you ever intend to?

7 A I am not sure.

8 Q There are written communications from Army  
9 personnel at this point indicating a plan to move to  
10 alternative methods for dunnage disposal and to  
11 abandon use of the dunnage incinerator, correct?

12 A That's probably correct, yes.

13 Q Do you know who created these documents?

14 MAJOR ZOLPER: Objection. If you are  
15 referring to documents, the documents need to be  
16 identified.

17 MR. HARRISON: I don't need to identify  
18 them.

19 MAJOR ZOLPER: Well, you're questioning on  
20 documents and you haven't identified what documents  
21 you are talking about.

22 MR. HARRISON: I don't need to identify  
23 them.

24 Q Mr. Thomas, you are aware that such written  
25 communications exist. You have already testified to

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1 that. I am asking you who created the written  
2 communications. I don't need to tell you the name of  
3 the documents to ask you that question.

4 A No, I am not sure who the specific authors  
5 were.

6 Q I take it you were not one of them?

7 A I may have been. I don't know. I am one of  
8 the ones that's working to evaluate the use of the  
9 dunnage furnace in the future.

10 Q I understand. So I take it whether you  
11 authored the documents or not, you certainly are aware  
12 that they were written with your approval?

13 A Yes.

14 Q Do you know the basis for your decision or  
15 the Army's decision to move to alternative methods for  
16 dunnage disposal?

17 A Do I know the rationale behind that?

18 Q The basis, the rationale, yes.

19 MR. OWENS: Objection to the  
20 characterization of his testimony that there has been  
21 a decision to change the disposal method.

22 Q BY MR. HARRISON: Well, basically I am  
talking to Mr. Thomas about the documents we  
referenced where that decision was communicated. You  
may or may not be considering it still. But there was

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1 some basis for writing these documents. I just want  
2 to know what it was.

3 A The basis for writing the documents was  
4 whether or not there was alternative methods to  
5 disposing of the waste that was planned to be  
6 processed in the dunnage incinerator.

7 Q All right. Has there been a determination  
8 made that such alternatives exist?

9 A We are still looking at that issue. It has  
10 not been finalized.

11 Q Okay. Has there been a tentative  
12 determination that alternatives exist?

13 A Yes. We are still looking at that issue,  
14 however.

15 Q Okay. What alternatives have you identified  
16 at this point?

17 A There's options. Carbon micronization in  
18 the deactivation furnace is one option. Commercial  
19 disposition is another option.

20 Q Does that mean disposal at a licensed  
21 hazardous waste facility?

22 A That's correct.

23 Q Would you have considered landfill  
24 incinerators or some other category?

25 A Only as long as it meets the destruction

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1 requirements imposed by RCRA permit.

2 Q Well, destruction suggests a treatment  
3 technology rather than landfilling.

4 A Right. Well, if it requires any kind of  
5 treatment, we would go and meet the regulatory  
6 requirements imposed by our permit.

7 Q Have you ruled out landfilling of the  
8 dunnage?

9 A Again, it's dependent on the type of waste  
10 that we are talking about. If it requires treatment,  
11 we would provide it. There were a variety of wastes  
12 that were scheduled for the dunnage incinerator.

13 Q I understand that. So I am trying to  
14 determine in your tentative inclusion so far, have you  
15 identified landfilling as one option for some aspects  
16 of dunnage disposal?

17 A Yes.

18 Q And have you identified incineration off  
19 site as another option?

20 A That's correct.

21 Q Have you identified any methods other than  
22 those two for some aspects of dunnage disposal?

23 A Let me think. No, I think that's generally  
24 what we would be looking at.

25 Q All right. And what categories of waste

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1 would fall into your term dunnage as it was intended  
2 for the dunnage incinerator?

3 A Contaminated charcoal, contaminated wood  
4 products, hepa and prefilter elements, and other  
5 miscellaneous wastes in lower quantities.

6 Q All right. Would it also include protective  
7 suits of one kind or another?

8 A Yes, as one time early on that was scheduled  
9 for the dunnage incinerator.

10 Q In your current plans for alternative  
11 dunnage disposal, are you contemplating methods for  
12 the disposal of protection suits?

13 A Yes.

14 Q Is there any reason you are aware of why you  
15 would not want to continue to dispose or plan to  
16 dispose of these items in the dunnage incinerator at  
17 this point?

18 A We haven't ruled that out yet.

19 Q I understand, but obviously you are looking  
20 at other options. What has motivated looking at other  
21 options?

22 A Safety and environmental compliance and cost  
23 effectiveness.

24 Q In terms of the safety issue, what  
25 specifically were you considering that was involved in

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1 this decision?

2 A Generally the fact that our furnace does  
3 require additional resources and attention to operate  
4 that in light of the operations of the facility.

5 Q We are talking about safety now.

6 A Yeah, I understand. And it's another  
7 furnace that we would have to monitor and control,  
8 that we would have to feed, so it would require  
9 additional resources. We want to minimize the amount  
10 of complexity in the plant operations.

11 Q You are saying that operation of the dunnage  
12 incinerator might increase the complexity of  
13 operations to the extent of posing a safety problem?

14 A No, I don't think it would extend to a  
15 safety problem, but we feel it would probably be  
16 better to in some cases process this off site. It  
17 would add less complexity.

18 Q Right. But I asked you about the safety  
19 component, which you yourself had identified as part  
20 of your decision. I wasn't talking about operational  
21 complexity or convenience or cost, because you had  
22 mentioned the word safety. I am just asking you what  
you were referring to when you said safety.

MAJOR ZOLPER: Mr. Harrison, I would like to  
make an objection in terms of the vagueness of your

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1 question.

2 MR. HARRISON: Give me a break.

3 MAJOR ZOLPER: What type of break would you  
4 like?

5 MR. HARRISON: I would like you to not  
6 object when you don't have a basis.

7 MAJOR ZOLPER: I will tell you the basis.  
8 My basis is you are characterizing his testimony as  
9 you have decided on safety. I think his testimony has  
10 consistently been that there are a number of people  
11 that are involved in the decision making process,  
12 including PMCD and others. So for a point of  
13 clarification, that is my objection. If you are  
14 speaking of you meaning Mr. Thomas making that  
15 decision, that's an inaccurate characterization of his  
16 testimony. So you'll receive no break.

17 MR. HARRISON: Thanks. I really don't  
18 understand the logic to your objection, but we'll note  
19 it.

20 Q Mr. Thomas, am I mistaken that you yourself  
21 moments ago used the word safety?

22 A Yes, I did.

23 Q And do you find it ambiguous for me to ask  
24 you what you were referring to in the word safety?

25 A In every decision we make out there --

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1 Q Mr. Thomas --  
2 A I am trying -- yes?  
3 Q Do you remember my question now?  
4 A Yes. I am trying to answer your question.  
5 Q You are answering a prior question. I am  
6 asking you a new question now.  
7 A Okay.  
8 Q Please listen. I am asking you if you  
9 consider my asking what you were referring to when you  
10 used the word safety to be an ambiguous question.  
11 A Would you repeat that, please?  
12 Q I asked you what you were referring to when  
13 you used the word safety. Do you find that to be an  
14 ambiguous question?  
15 A No. Let me --  
16 Q Go ahead and answer.  
17 A If I can answer. We go through a risk  
18 management process to identify all risks associated  
19 with that of concern relative to the operations of the  
20 facility. We consider safety, environmental  
21 compliance as part of that risk decision making  
22 process. So safety is always a consideration in  
making decisions like that. I don't have a specific  
because we haven't reached the decision as to whether  
or not to abandon the dunnage incinerator or to

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1 continue to operate it.  
2 Q Was there a safety concern identified by you  
3 or your staff during these deliberations regarding the  
4 dunnage incinerator?  
5 A Not specifically, but, again, we haven't  
6 gone through the total process of evaluating all risks  
7 associated with it and the benefits associated with  
8 the use of the dunnage incinerator.  
9 Q All right. Now, have you or your staff or  
10 your contractors identified a concern with the risk  
11 posed by emissions from the dunnage incinerator? Has  
12 that been one factor in your deliberations?  
13 A That's a consideration that will be taken  
14 into -- we will consider when we go through that  
15 process.  
16 Q You are saying that has not been completed  
17 yet?  
18 A It has not.  
19 Q You identified compliance as one of your  
20 bases for considering alternatives for dunnage along  
21 with safety and cost, I believe. What specific  
22 compliance issues have you identified?  
23 A None in particular. Again, that's part of  
24 our risk evaluation process that we go through when we  
25 make a final determination.

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1 Q All right. Have you had communications with  
2 the State of Utah that suggest to you that there would  
3 be compliance or safety issues if you operated the  
4 dunnage incinerator as you had initially planned?

5 A Not that I recall.

6 Q So as far as you know, the state would have  
7 no concerns about full-scale operation of the dunnage  
8 incinerator at this time?

9 A Not to my knowledge.

10 Q So this really is an Army issue?

11 A Yes.

12 Q Do you know who in the Army has taken the  
13 lead in initiating this analysis of alternatives for  
14 dunnage, or was that somebody else?

15 A I have been one of the primaries on it.  
16 Maybe I am not the only one, but I think -- I may be,  
17 as I said, one of the primaries.

18 Q Would Mr. Rick Holmes be another?

19 A He may be involved, yes. We have had  
20 discussions with Rick on this.

21 Q Do you know who made the first initiative in  
22 this direction? Was it you, Mr. Holmes or someone  
else?

A No, I don't.

Q The charcoal you were referring to as being

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1 part of the dunnage disposal issue, what would be the  
2 source of that charcoal?

3 A From the agent filters.

4 Q The HVAC agent filters?

5 A That's correct.

6 Q What is the current status of any charcoal  
7 that's been removed from those filters at this point?

8 A It's in storage.

9 Q And where is it being stored at the moment?

10 A In permitted storage on the installation.

11 Q Which installation might that be?

12 A Deseret Chemical Depot.

13 Q Is it in area 10?

14 A I don't recall where precisely it's stored.

15 Q You don't know whether it's in area 10 in  
16 CAMDS or TOCDF?

17 A It's not at TOCDF. I think CAMDS has a  
18 permitted storage area that we are storing it in  
19 there, but I couldn't tell you precisely.

20 Q All right. Do you know whether it's  
21 consistent with CAMDS's permit to store TOCDF spent  
22 carbon on charcoal?

23 A Yes.

24 Q Yes, you do know that?

25 A Yes.

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1 Q Has the state told you that?  
2 A I am depending on the information that's  
3 provided by my subordinates on the storage of that.  
4 Q So I take it that means no, the state has  
5 not told you that?  
6 A Has not told me that, no.  
7 Q Have there been any malfunctions of the HVAC  
8 system during your tenure at TOCDF?  
9 A Yes.  
10 Q All right. Do you know how many?  
11 A I do not.  
12 Q Do you recall any specific instances?  
13 A One was related to a power failure test.  
14 Q All right. And when did that occur?  
15 A I don't recall. It's been a little bit, a  
16 little while.  
17 Q I take it it was not 1998?  
18 A No.  
19 Q Do you know whether it was 1997?  
20 A I believe it was.  
21 Q And was there some malfunction of the HVAC  
22 system related to a power failure?  
23 A I am not aware of failure of the HVAC  
24 related to the power.  
25 Q The HVAC incident you were referring to,

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July 15, 1996

## DECLARATION - James J. Cudahy

1. My name is James J. Cudahy. I am the president of Focus Environmental, Inc. We have offices in Knoxville Tennessee and La Porte Texas. Focus Environmental is an environmental engineering firm with 23 employees which specializes in the design, permitting and technical evaluation of hazardous waste incineration and other thermal treatment systems. The total environmental and incineration related experience of our technical staff is close to 200 years. We have consulted on over 450 projects for 175 clients in the United States, Canada, Croatia, Saudi Arabia and Ukraine. These projects have included 95 test programs for hazardous waste incineration, boiler and industrial furnace certification of compliance and contaminated soil incineration projects. Our clients have included industry, hazardous waste services companies, the U.S. Environmental Protection Agency, the Department of Energy, the Department of Defense, and the Agency for Toxic Substances and Disease Registry.

## 2 GENERAL BACKGROUND AND EXPERTISE

3 My educational background includes a Bachelor of Science in Chemical Engineering from Newark College of Engineering, a Masters of Science in Chemical Engineering from the University of Delaware and a Masters in Business Administration from Michigan State University. I am a registered professional engineer in Michigan, Louisiana and Delaware.

4 My background and expertise includes 30 years of experience in the chemical industry and in environmental engineering consulting. My chemical industry experience includes 5 years in research and manufacturing. My environmental engineering experience includes almost 25 years specializing in the technical evaluation, design and permitting of incineration and thermal treatment systems for hazardous wastes, contaminated soils and contaminated air from industrial process vents. I have been involved in the preparation or consulting on over 25 trial burn programs for hazardous wastes, polychlorinated biphenyls and contaminated soils. One of the Trial Burn Plans that I prepared was for a Rotary Deactivation Furnace designed to thermally treat military munitions at the Hawthorne Army Ammunition Depot in Hawthorne Nevada.

5. During my professional career I have written numerous papers and book chapters and made many presentations at technical conferences and seminars in the areas of incineration, thermal treatment and alternative technologies. I contributed a chapter to the Thermal Destruction volume of the American Academy of Environmental Engineers series on Innovative Site Remediation Technology.

published in 1994 and have written another chapter for the next Thermal Destruction volume to be published in 1997.

6. I have served on national committees involved with incineration and thermal treatment. I was a member of the American Society of Mechanical Engineers committee which peer reviewed the Environmental Protection Agency Guidance on setting permit conditions and reporting trial burn results (Volume II of the Hazardous Waste Guidance Series). I also have been involved recently on technical review panels for the Department of Defense on Alternative Technologies for Chemical Demilitarization and the Department of Energy for Alternative Thermal Technologies for Mixed Waste.
7. I have chaired seven technical sessions at national meetings which involved hazardous waste incineration and test burns, alternative thermal treatment technologies, boilers and industrial furnaces, thermal treatment of contaminated soils and Mixed Waste permitting for Department of Energy radioactive and hazardous wastes. On June 26, 1996, I chaired a session on polychlorinated dibenzodioxin and furan (dioxin) emissions from hazardous waste incineration systems at the annual meeting of the Air and Waste Management meeting. A copy of my resume is included as Attachment 1 to my Declaration.
8. As part of my activities for the preparation of this Declaration, I have reviewed various documents which are generally used by experts in the areas of incinerator design and permitting. I have also based the conclusions in this Declaration on the experience that I have obtained over my career. I have visited the Tooele Chemical Demilitarization Facility at the Tooele Army Ammunition Depot in Tooele Utah. As part of this visit I talked with site personnel who are specialists in the demilitarization and incineration of agent and had an in-depth tour of the demilitarization equipment and incineration equipment. I have reviewed the Part B permit application for the Tooele Chemical Demilitarization Facility, Trial Burn test results for the incinerators and other documents that are relevant to the permitting, testing and operation of the facility.

## 9 GENERAL INCINERATION

10. Incineration is a mature and thoroughly proven technology which has been successfully used for the treatment of chemical wastes since the 1930's (Dow, no date).
11. There are 190 permitted hazardous waste incinerators in the U.S. at 162 locations. These units are incinerating approximately 1.5 million tons per year of hazardous waste (EPA, 1996).

## 12. PERMITTING

13. All of the 190 hazardous waste incinerators have been through a rigorous permitting process administered by the U.S. EPA and the states. The same

rigorous permitting process that the five incinerators at the Tooele Chemical Demilitarization Facility have undergone.

14. Hazardous waste incinerators are permitted by state agencies and the Environmental Protection Agency under the Resource Conservation and Recovery Act regulations for the treatment, storage and disposal of hazardous wastes.
15. One of the important ways to measure incinerator performance is the Destruction and Removal Efficiency. The Destruction and Removal Efficiency is a measure of the amount of a specific organic that exits an incinerator stack relative to the amount of that organic in the feed to the incinerator. For example, a Destruction and Removal Efficiency of 99.9999% for trichlorobenzene means that one pound of trichlorobenzene will exit the incinerator stack for every 1,000,000 pounds of trichlorobenzene fed to the incinerator.
16. An important incinerator operational consideration is the Automatic Waste Feed Cutoff system. The state regulatory agency and the operator of the incinerator develop a set of operating permit conditions which are limits on the operation of the incinerator. These operating permit conditions are parameters such as a minimum combustion chamber temperature or a maximum waste feed rate, which are developed based on operation during the Trial Burn. When these permit conditions are exceeded, the waste feeds to the incinerator are automatically shut off. This is important because operation of an incinerator for example, at too low a temperature, can result in increased emissions.
17. Another important incinerator operational consideration is the use of a continuous emission monitoring system on the stack of the incinerator. The most common continuous emission monitoring system on the nation's 190 hazardous waste incinerators is a carbon monoxide monitor. The carbon monoxide concentration is used by the Environmental Protection Agency as a surrogate for good combustion and therefore low organic emissions in the incinerator's stack gas. Because the technology is not available, none of the nation's 190 incinerators have a continuous emission monitoring system for specific organic emissions. The automatic continuous air monitoring system that is used by the Tooele Chemical Demilitarization Facility for low concentration agent monitoring is the only continuous emission monitoring system in the country that is being used for continuous monitoring of incinerator stack specific organic emissions. The automatic continuous air monitoring system in use at the Johnston Atoll Chemical Agent Disposal System and the Tooele Chemical Demilitarization Facility, has the capability for continuous incinerator stack analysis of specific agents in the parts per trillion concentration range. This results in a significant level of safety to the public and the operators of the Tooele Chemical Demilitarization Facility.
18. The Utah Department of Environmental Quality has significant previous experience in permitting hazardous waste incinerators. Two of the biggest

commercial hazardous waste incinerators in the nation are located in Utah. The Rollins-Aptus facility in Aragonite is permitted and the Laidlaw facility in Clive is in the final stages of obtaining a final permit.

#### 19. DOD CHEMICAL DEMILITARIZATION AND INCINERATION EXPERIENCE

20. The Tooele Chemical Demilitarization Facility will be used to incinerate three chemical warfare agents, agent HD (Mustard), agent GB (Sarin) and agent VX, and various energetics contained in the munitions, bombs and rockets. Energetics are explosive materials such as trinitrotoluene and rocket propellants which, if ignited, can cause fires and the generation of large volumes of hot gases.
21. The Department of Defense has been using incineration to dispose of chemical agent and energetics since 1972. Over 6 million pounds of Mustard was destroyed in a Liquid Incinerator at the Rocky Mountain Arsenal in Denver, Colorado. In addition, over 86,000 Mustard and GB ton containers were also thermally decontaminated in Hearth Furnaces at the Rocky Mountain Arsenal. This incineration occurred between August 1972 and October 1976. From May 1981 through December 1982, 36,600 pounds of HD, GB, Chloropicrin, Lewisite, Phosgene, and Cyanogen Chloride were incinerated at Rocky Mountain Arsenal using a rotary kiln and the Hearth Furnaces (Flamm, 1989).
22. Following the incineration work at the Rocky Mountain Arsenal, the Army continued the development of its program to ensure maximum protection of the environment and the safety of the general public and the workers involved in the Chemical Demilitarization program. This program involved the development of a test facility to verify the equipment, processes and procedures which were being considered for use in future chemical agent and munition disposal facilities (Onuveros, 1993). This test facility is a first generation design called the Chemical Agent Munitions Disposal System.
23. The types of incinerators at the Chemical Agent Munitions Disposal System are identical to the types of incinerators at Johnston Atoll Chemical Agent Disposal System and the Tooele Chemical Demilitarization Facility.
24. Because the Chemical Agent Munitions Disposal System is a pilot test facility however, the size of the incinerators is smaller. The Liquid Incinerator for example, is a one-third scale pilot unit of the full size Liquid Incinerator at the Johnston Atoll Chemical Agent Disposal System and the Tooele Chemical Demilitarization Facility (Flamm, 1990).
25. Through 1992, the Chemical Agent Munitions Disposal System facility had successfully incinerated over 300,000 pounds of agent (Ali, 1993).
26. Based on the design and operational data generated at the Chemical Agent Munitions Disposal System facility, the second generation of Chemical

Demilitarization incinerators were designed, constructed and operated at the Johnston Atoll Chemical Agent Disposal System facility.

27. This second generation design is operational and located on Johnston Atoll in the Pacific about 700 miles from Honolulu, Hawaii (Rife, 1989). This facility has four types of incinerators which except for design improvements, are essentially identical in design and size to the Tooele Chemical Demilitarization Facility incinerators.
28. The Johnston Atoll Chemical Agent Disposal System facility has operated since July 1990 and through June of 1996 had successfully incinerated over 1,850,000 pounds of GB, over 141,000 pounds of VX, almost 250,000 pounds of HD, over 6,000,000 pounds of agent decontamination solutions, almost 1,700,000 pounds of energetics and has incinerated or thermally treated over 9,000,000 pounds of drained rocket bodies and rocket firing tubes, metal munition bodies, drained ton containers, drained bombs, and contaminated and non-contaminated dunnage.
29. Over the last 24 years, at Rocky Mountain Arsenal, the Chemical Agent Munitions Disposal System, and the Johnston Atoll Chemical Agent Disposal System, the Army has safely and effectively incinerated over 1,900,000 pounds of GB, almost 150,000 pounds of VX, over 6,300,000 pounds of distilled and Levinstein mustard and almost 37,000 pounds of other agent. Over 8,500,000 total pounds of agents have been successfully incinerated at these Army facilities.

### 30. TOOELE CHEMICAL DEMILITARIZATION FACILITY INCINERATOR TYPES

31. The third generation design is called the Tooele Chemical Demilitarization Facility and is located at the Tooele Army Ammunition Depot. The Tooele Chemical Demilitarization Facility includes the following types of incinerators. A Liquid Incinerator will be used to incinerate liquid agent which will be drained from ton containers, rockets, other agent containing items and agent decontamination solutions. There are two identical Liquid Incinerators. A Deactivation Furnace System will be used for materials containing explosives and propellants such as rockets which have been drained, but are still wet with agent. A Metal Parts Furnace will be used to decontaminate metal parts such as ton containers, which have been drained of agent. A Dunnage Incinerator will be used to burn non-contaminated and agent contaminated dunnage (wood, plastic protective equipment, etc.) as well as contaminated carbon from the carbon filters. A more detailed description of the Tooele Chemical Demilitarization Facility incinerators can be found in Attachment 2 to my Declaration.
32. All of the Tooele Chemical Demilitarization Facility incinerators include two combustion chambers. The first or primary combustion chamber, destroys most of the agent present in the incinerator feed. The combustion gas from the primary chamber, which may contain small amounts of unburned agent, is sent to a

secondary combustion chamber, which is used to complete the agent destruction process.

33. The combustion gas from the secondary combustion chambers of the Tooele Chemical Demilitarization Facility incinerators contains particulates and hydrogen chloride which are regulated by the Resource Conservation and Recovery Act regulations and must be controlled. Control of these is achieved by the Pollution Abatement Systems. The two Liquid Incinerators, the Deactivation Furnace System and the Metal Parts Furnace all have identical Pollution Abatement Systems for control of dioxin, particulate, metals and hydrogen chloride (Ali, 1993). Because the Dunnage Incinerator is expected to have very low uncontrolled hydrogen chloride emissions, it has a different dry Pollution Abatement System which is specifically designed for particulate and metals removal (Ali, 1993). Diagrams of the four types of incinerators and the two types of Pollution Abatement Systems are shown in Attachment 2 to my Declaration.
34. In my opinion, the Tooele Chemical Demilitarization Facility incinerators have a state of the art design. In general, the instrumentation, computer controls, materials of construction, fugitive emission control, emergency diesel generator electrical back-up, uninterruptible power supply and the quality of construction are above industry standards.
35. Relative to state of the art design, the Tooele Liquid Incinerators each have two combustion chambers. The industry standard for liquid incineration is only one combustion chamber. The Tooele Liquid Incinerator primary combustion chamber operates at a temperature of 2700°F. The industry standard is 1800 to 2000°F. The Pollution Abatement System is state of the art for dioxin control because of the rapid quench system and for wet particulate and metals control because of the candle mist eliminators. A rapid quench system cools a hot combustion gas below 350°F in a fraction of a second, thereby minimizing the formation of dioxin which can occur if the combustion gas is cooled too slowly between the temperatures of 450°F and 750°F (EPA, 1991). The candle mist eliminators are excellent at removing very small (submicron) particulate and metals. The Automatic Continuous Air Monitoring System, which is used for continuous incinerator stack monitoring of agent at the parts per trillion level, is state of the art. There is no industry standard for continuous stack monitoring of specific organics. None of the other hazardous waste incinerators in the nation have this capability.
36. The basic Deactivation Furnace System design has been used safely and effectively by the Department of Defense for almost 45 years (U.S. Army, 1981). The Tooele Deactivation Furnace System is state of the art because it has 2 inch thick steel walls instead of the 0.5 inch thick walls in the Johnston Atoll Chemical Agent Disposal System design. The Tooele Deactivation Furnace System also has a state of the art secondary combustion chamber design which allows the unit to obtain



Destruction and Removal Efficiency's greater than 99.9999% for polychlorinated biphenyls as required by the Toxic Substances Control Act regulations (Ontiveros, 1993) The Pollution Abatement System is state of the art for dioxin control because of the rapid quench system and for wet particulate and metals control because of the candle mist eliminators. The Automatic Continuous Air Monitoring System, which is used for continuous incinerator stack monitoring of agent at the parts per trillion level, is state of the art. There is no industry standard for continuous stack monitoring of specific organics. None of the other hazardous waste incinerators in the nation have this capability.

37. The Metal Parts Furnace is state of the art because it has a secondary combustion chamber specially designed to Resource Conservation and Recovery Act hazardous waste destruction standards. The Pollution Abatement System is state of the art for dioxin control because of the rapid quench system and for wet particulate and metals control because of the candle mist eliminators. The Automatic Continuous Air Monitoring System, which is used for continuous incinerator stack monitoring of agent at the parts per trillion level, is state of the art. There is no industry standard for continuous stack monitoring of specific organics. None of the other hazardous waste incinerators in the nation have this capability.
38. Relative to industrial incinerators of contaminated trash, the Dunnage Incinerator is state of the art because it has a secondary combustion chamber specially designed to Resource Conservation and Recovery Act hazardous waste destruction standards. The Pollution Abatement System is state of the art for dry particulate and metals control because of the fabric filter. The Automatic Continuous Air Monitoring System, which is used for continuous incinerator stack monitoring of agent at the parts per trillion level, is state of the art. There is no trash incinerator industry standard for continuous stack monitoring of specific organics. None of the other industrial trash incinerators in the nation have this capability.
39. The Department of Defense received a Resource Conservation and Recovery Act permit from the state of Utah on June 26, 1996. Besides the Resource Conservation and Recovery Act permit, the Department of Defense has also obtained an air permit for the five incinerators and a wastewater permit and a storm water permit for the entire facility. A TSCA permit for the incineration of polychlorinated biphenyls was obtained for the Deactivation Furnace System.
40. Through July 7, 1996, the five Tooele Chemical Demilitarization Facility incinerators have been operated for a total period of 5 years and eight months in a hot shakedown period using either natural gas, non-hazardous ethylene glycol as an agent surrogate or hazardous constituents during the Resource Conservation and Recovery Act and Toxic Substances Control Act Trial Burns. Therefore, many of the equipment related operational problems that commonly occur during

the start-up of any mechanical system have all ready been discovered and corrected prior to the feeding of agent.

41. The five Tooele Chemical Demilitarization Facility incinerators are equipped with all instrumentation, controls, continuous emission monitors and automatic waste feed cutoffs that are required by the Utah Department of Environmental Quality for the state hazardous waste regulations and by Region VIII of the Environmental Protection Agency for the Toxic Substances Control Act regulations.

#### 42. INCINERATION REGULATORY TESTING

43. Since December 1990, the Johnston Atoll Chemical Agent Disposal System agent incinerators and the Tooele Chemical Demilitarization Facility agent incineration facilities have undergone 10 test burn programs which included 35 stack tests for agent and/or other Resource Conservation and Recovery Act and Toxic Substances Control Act related emissions.

44. The most recent tests at Johnston Atoll Chemical Agent Disposal System and the Tooele Chemical Demilitarization Facility have shown the ability of these incinerators to perform at levels significantly better than required by the regulatory standards. These tests are summarized in Tables 1 through 3, which are attached to this Declaration.

45. A summary of the Destruction and Removal Efficiency testing for agent at the Johnston Atoll Chemical Agent Disposal System is shown in Table 1. As can be seen from Table 1, the Destruction and Removal Efficiencies for agent are significantly better than required by the Utah Department of Environmental Quality. No agent was detected above the analytical reporting level in any of the tests shown in Table 1. This means that during the testing shown in Table 1, that the concentration of GB in the incinerator stack before dispersion, was below 10 parts per trillion. The concentration of VX in the incinerator stack before dispersion, was below 5 parts per trillion, and that the concentration of HD in the incinerator stack before dispersion, was below 900 parts per trillion. One part per trillion is equivalent to one second in 32,000 years.

46. A summary of the most recent dioxin tests at Johnston Atoll Chemical Agent Disposal System and the Tooele Chemical Demilitarization Facility is shown in Table 2. Dioxin is the term commonly used to represent 210 polychlorinated dibenzodioxins and dibenzofurans. These compounds are typically found at very low levels in the combustion gas from incinerators, automobiles, diesel trucks, and various industrial processes. Dioxin has been found in animal studies to be extremely toxic to certain animals and dioxin emission control is considered by the Environmental Protection Agency to be a serious issue. There are currently no Environmental Protection Agency dioxin emission control regulations. On April 19, 1996 however, the Environmental Protection Agency published a proposed dioxin emission standard in the proposed Hazardous Waste Combustor Maximum

Achievable Control Technology regulations (EPA, 1996). The proposed national dioxin emission standard is 0.2 nanograms of dioxin Toxic Equivalents per dry standard cubic meter of stack gas, corrected to 7% oxygen. A nanogram is a billionth of a gram. When finalized, this proposed dioxin emission standard will likely apply to the 190 Resource Conservation and Recovery Act permitted hazardous waste incinerators in the country as well as the five incinerators at the Tooele Chemical Demilitarization Facility.

47. All of the dioxin tests summarized in Table 2 were below the Environmental Protection Agency's proposed standard. The Durrage Incinerator dioxin emissions were about 1.3 times lower than the proposed standard. The Metal Parts Furnace dioxin emissions were about 7 times lower than the proposed standard. The Deactivation Furnace System dioxin emissions were almost 20 times lower than the proposed standard. The two Liquid Incinerator tests were 83 and 154 times lower than the proposed standard.
48. A summary of the Resource Conservation and Recovery Act and Toxic Substances Control Act testing which was done at the Tooele Chemical Demilitarization Facility is shown in Table 3. As can be seen in Table 3, the performance of the two Liquid Incinerators and the Deactivation Furnace is significantly better than required by the Utah Department of Environmental Quality and Region VIII of the Environmental Protection Agency. The Destruction and Removal Efficiencies for the hazardous organic chemicals and polychlorinated biphenyls ranged from 4 to almost 60 times better than required by the permits and by the Toxic Substances Control Act regulations. The Combustion Efficiency required by the Toxic Substances Control Act regulations was 7 times better. The particulate emissions were from 12 to 25 times lower than required by the permit. The hydrogen chloride emissions ranged from 160 to over 1300 times lower than required by the permit. The Metal Parts Furnace has also had a Resource Conservation and Recovery Act trial burn, but the trial burn report is not yet completed.
49. The concentrations of typical products of incomplete combustion from the incinerators at the Johnston Atoll Chemical Agent Disposal System facility are similar in type and concentration to products of incomplete combustion found in the stack gas of other hazardous waste incinerators.
50. I have reviewed the Tooele Chemical Demilitarization Facility Resource Conservation and Recovery Act Trial Burn plans for incinerating GB in the Liquid Incinerator and the Deactivation Furnace System. It is my opinion that these trial burn plans are complete and have been developed in sufficient detail so that the process operations, sampling analytical, and QA/QC activities are appropriate to demonstrate the stated objectives of the tests.

#### 51. RESPONSES TO SPECIFIC CLAIMS

52. In this section of my Declaration, I will discuss issues raised by the Plaintiffs' in the Memorandum in support of Plaintiffs' motion.

### 53. ALTERNATIVE TECHNOLOGIES

54. The Memorandum in support of Plaintiffs' motion discusses five alternative technologies as possible candidates to replace incineration for the treatment of chemical agent and munitions at the Tooele Chemical Demilitarization Facility and other Army facilities where agents are stored. Two of these technologies involve neutralization and three of the Alternative Technologies are being developed by private companies. The three Alternative Technologies were selected in October 1996 by a panel of eight engineers and scientists from over twenty proposals.

55. I was a member of the panel which selected the three Alternative Technologies, mentioned in the plaintiffs' Memorandum, as candidates for additional evaluation by the National Research Council.

56. The three Alternative Technologies were selected as being potentially able to treat blister agent HD from ton containers at Aberdeen Proving Ground in Aberdeen MD and nerve agent VX from ton containers at the Newport Chemical Activity storage site in Newport, IN. The scope of the selection process only included processes which could potentially treat HD and VX drained from ton containers and the possible decontamination of the ton containers. Energetic materials were excluded from the scope of the selection process.

57. The panel concluded that the three Alternative Technologies were the most advanced of the candidates submitted, but were still in the early stages of development. We concluded that these Alternative Technologies had the potential to be able to treat agent according to Army and Environmental Protection Agency requirements, but that further process development work would be required for all three to confirm this potential. Only one of these three processes (Eco-Logic), has been operated on a full scale basis on concentrated organic feed streams. To my knowledge, this full scale work has included chlorinated organics, but not high concentrations of fluorine, phosphorus and sulfur containing organics such as are found in GB, VX and HD.

58. Recently, the Government Accounting Office published a report evaluating the use of Innovative Technologies for the treatment of polychlorinated biphenyl and dioxin contaminated Superfund sites (GAO, 1995). Environmental Protection Agency officials interviewed by the Government Accounting Office for this report said that incineration is selected for these wastes because it meets Environmental Protection Agency existing regulatory standards, can perform under a variety of conditions and has been successfully demonstrated in full-scale applications. They added that using a demonstrated technology becomes particularly important

because polychlorinated biphenyls and dioxins are highly toxic and difficult to treat.

59. In my opinion, while these three Alternative Technologies have the potential to adequately treat agent, a high degree of development work would be necessary to bring each technology to the point where safe and effective full scale treatment of agent would be possible. In addition, based on what I learned during the panel review, I believe that these three Alternative Technologies are not good candidates for the treatment of the explosive and propellant containing munitions, rockets and bombs associated with the agent weapons.

#### 60. DESTRUCTION AND REMOVAL EFFICIENCY AT LOW ORGANIC CONCENTRATION

61. The Memorandum in support of Plaintiffs' motion, Ms. Costner's and Dr. Miller's Declarations all allege that Destruction and Removal Efficiencies of organic chemicals decrease as the concentration of the organic decreases in the incinerator feed. According to the plaintiffs', this contention is based on a 1989 Environmental Protection Agency research study by John Kramlich. The plaintiffs' interpret the Kramlich report as proof that the Tooele Chemical Demilitarization Facility and any other incinerators will not be able to obtain appropriate Destruction and Removal Efficiencies at low organic feed concentrations. On pages 25 and 26 of the Memorandum, Dr. John Miller is quoted as saying that even at 1,000 parts per million, a waste will not be destroyed at 99.99%. Ms. Costner is also quoted as saying that a Destruction and Removal Efficiency of 99.9999% could only be achieved when the waste was at a concentration of greater than 10,000 parts per million. I have read the Kramlich report and I do not agree with the Plaintiffs' allegation that the Metal Parts Furnace, Deactivation Furnace System, and Dunnage Incinerator will be unable to obtain high Destruction and Removal Efficiencies on low concentration agent or polychlorinated biphenyls. I base my conclusion on my experience with numerous Destruction and Removal Efficiency tests done on incinerators treating soils contaminated with low concentrations of organic contaminants in the Superfund program. Some examples of where Destruction and Removal Efficiencies greater than 99.9999% at low organic feed concentrations occurred are the Denney Farm site, the Times Beach site and the Swanson River site.

62. At Denney Farm in Missouri, the Environmental Protection Agency used an incinerator to remediate a site contaminated with dioxin. During four tests, the incinerator achieved an average Destruction and Removal Efficiency of 99.999986% at an average 2,3,7,8-tetrachlorodibenzo-p-dioxin concentration in the feed of 40 parts per million. The concentration range was 28 to 53 parts per million. The test with 28 parts per million had a Destruction and Removal Efficiency of 99.999995%. (Miller, 1993 and EPA, 1985)

63. At the Times Beach site in Missouri, six incinerator Trial Burn tests were run, three with trichlorobenzene and three with hexachloroethane at concentrations in the soil feed averaging about 180 parts per million. The average Destruction and Removal Efficiencies for these six tests was 99.999984%. (Foster, 1996)
64. At the Swanson River site in Alaska, six Trial Burn tests were run with polychlorinated biphenyls at concentrations in the soil feed averaging about 595 parts per million. The average Destruction and Removal Efficiencies for these six tests was 99.99994%. The concentration range was 289 to 801 parts per million. The test with 289 parts per million had a Destruction and Removal Efficiency of 99.99996%. (Ogden Environmental, 1988)
65. Contrary to the plaintiffs' allegations, as can be seen by these three examples, incineration data is available that clearly shows the achievement of Destruction and Removal Efficiencies greater than 99.9999% for organics at concentrations below 1,000 or even 100 parts per million and for polychlorinated biphenyls at concentrations below 1,000 parts per million.
66. In addition, based on my experience and thermal stability research that I have done, the HD, GB and VX that will be incinerated at the Tooele Chemical Demilitarization Facility have very low thermal stabilities and should therefore be relatively easy to destroy at high Destruction and Removal Efficiencies and low concentrations.

#### 67 DIOXIN EMISSIONS FROM THE INCINERATORS

68. The Memorandum in support of Plaintiffs' motion and Ms. Costner's Declaration both allege that dioxin emissions from the Tooele Chemical Demilitarization Facility incinerators will be significant. Neither the Memorandum nor Ms. Costner's Declaration however, mentions the proposed dioxin emission standard in the proposed Hazardous Waste Combustor Maximum Achievable Control Technology regulations (EPA, 1996).
69. As can be seen in Table 2 of my Declaration, all the dioxin emission data from the Johnston Atoll Chemical Agent Disposal System and the Tooele Chemical Demilitarization Facility are below the proposed dioxin emission standard in the proposed Hazardous Waste Combustor Maximum Achievable Control Technology regulations. After a thorough evaluation, the U.S. Environmental Protection Agency has determined that the proposed dioxin emission standard is protective of the environment and the public. When finalized, this proposed dioxin emission standard will apply to the 190 Resource Conservation and Recovery Act permitted hazardous waste incinerators in the country as well as the five incinerators at the Tooele Chemical Demilitarization Facility.
70. The reason that the dioxin emissions from the Johnston Atoll Chemical Agent Disposal System and the Tooele Chemical Demilitarization Facility are below the

Environmental Protection Agency's proposed dioxin emission standard is because the incinerators use a rapid quench system in the Pollution Abatement Systems.

71. Rapid quench is a process in which the hot combustion gas from an incinerator enters a quench chamber where water is sprayed on the hot gas. The water spray quickly cools the hot gas (1800°F to 2200°F), in a fraction of a second, to a temperature of 350°F or lower. This rapid cooling of the hot gas essentially eliminates significant formation of dioxin (EPA, 1994). This occurs because significant amounts of dioxin can be formed in a combustion gas if the hot gas is slowly cooled and passes through a temperature window of about 450°F to 750°F in one or more seconds (EPA, 1991). Based on evaluations of dioxin emissions from many incinerators, the Environmental Protection Agency has concluded that rapid quench in the presence of good combustion conditions is the most important factor in minimizing the formation of dioxins (EPA, 1994).

#### 72. INCINERATOR STACK EMISSIONS OF DIOXIN LIKE COMPOUNDS

73. The Memorandum in support of Plaintiffs' motion, Ms. Costner's and Dr. Miller's Declarations all allege that emissions of dioxin like compounds from the Tooele Chemical Demilitarization Facility incinerators are of particular concern. There are no Utah Department of Environmental Quality, Environmental Protection Agency regulations, Environmental Protection Agency Guidance Documents or proposed regulations to control dioxin like compounds. If these compounds are formed in the Tooele Chemical Demilitarization Facility incinerators, I would expect the concentrations to be as low or lower than the dioxin emission concentrations shown in Table 2. If present, these low concentrations would result because of the previously discussed rapid quench systems being used in the Tooele Chemical Demilitarization Facility incinerator Pollution Abatement Systems. This rapid cooling of the hot combustion gas will essentially eliminate significant formation of these dioxin like compounds just as it does for dioxins.

#### 74. INCINERATOR STACK EMISSIONS OF PRODUCTS OF INCOMPLETE COMBUSTION

75. The Memorandum in support of Plaintiffs' motion, Ms. Costner's and Dr. Miller's Declarations all allege that emissions of Products of Incomplete Combustion from the Tooele Chemical Demilitarization Facility incinerators will be present in the combustion gases from the incinerators. The Memorandum calls these Products of Incomplete Combustion "chemical poisons". According to the Environmental Protection Agency, Products of Incomplete Combustion can be unburned organics that were present in the incinerator feed, thermal decomposition products resulting from organic constituents in the feed, or compounds formed during or immediately after combustion (EPA, 1996). Based on an extensive test program to determine total organic mass emissions at a full-scale hazardous waste incinerator, most Products of Incomplete Combustion are non toxic hydrocarbons such as methane

and ethane (Dempsey, 1993). Products of Incomplete Combustion are typically present in a combustion gas at levels from about 10 parts per billion by volume down to the part per trillion or lower concentrations.

76. The Environmental Protection Agency and the Utah Department of Environmental Quality regulate Products of Incomplete Combustion emissions from hazardous waste incinerators by requiring control of combustion with a maximum carbon monoxide concentration in the incinerator stack gas. This maximum carbon monoxide limit is set at 100 parts per million by volume on a dry gas basis, corrected to 7% oxygen (EPA, 1991). In the preamble to the Boiler and Industrial Furnace regulations, the Environmental Protection Agency states that the 100 parts per million carbon monoxide limit will ensure that combustion devices operate continuously at high combustion efficiency and emit Products of Incomplete Combustion at levels that will not pose adverse effects on public health and the environment (EPA, 1991)

77. This maximum carbon monoxide limit must be continuously monitored and is used as an Automatic Waste Feed Cutoff under the Utah Department of Environmental Quality and Environmental Protection Agency regulations.

78. The concentrations of typical products of incomplete combustion from the incinerators at the Johnston Atoll Chemical Agent Disposal System facility are similar in type and concentration to products of incomplete combustion found in the stack gas of other hazardous waste incinerators (EPA, 1989). These products of incomplete combustion are formed in all combustion processes at concentrations in the part per billion level or lower. Automobiles, buses, diesel trucks, coal power plants, steel mills, etc., all generate and emit products of incomplete combustion, including dioxins (Lee, 1991).

#### 79 UPSET EMISSIONS OF PRODUCTS OF INCOMPLETE COMBUSTION

80. The Memorandum in support of Plaintiffs' motion, Ms. Costner's and Dr. Miller's Declarations all allege that Products of Incomplete Combustion emissions from the Tooele Chemical Demilitarization Facility incinerators will increase substantially during upset conditions. I do not agree with this allegation. This allegation is based on early Environmental Protection Agency guidance that used worst case assumptions to estimate upset emissions because there was no data. Recently, however, a series of tests were conducted at the Environmental Protection Agency's Incineration Research Facility in Arkansas. These tests evaluated the impact of repeated upsets, caused by waste feed cutoffs, on the emissions of specific organics, metals, particulate and hydrogen chloride. Test program results showed that none of these emissions increased significantly over emissions during baseline tests without repeated upsets (Waterland, 1993).

81. At the Waste Technologies, Inc. commercial hazardous waste incinerator in East Liverpool, Ohio, the Environmental Protection Agency recently allowed stack



sampling for dioxins to continue during an upset condition to determine the impact on emissions. The results of the sampling showed that there was no increase in dioxin emissions during the test conducted with the upset condition.

## 82. INCINERATOR FAILURE EMISSIONS

83. Ms. Costner's Declaration also alleges that the four Johnston Atoll Chemical Agent Disposal System incinerators operated in near-constant upset conditions during the 500 hour GB and VX burn campaign. Ms. Costner included a table (JACADS Performance During GB and VX Campaigns) in her Declaration which she says summarizes these upsets. The information in this table does not clearly identify the type of upsets that she alleges occurred. Many of the upsets in the table appear to be Automatic Waste Feed Cutoffs (burner lockouts, high carbon monoxide and RCRA exceedences) which are required by a Resource Conservation and Recovery Act incinerator permit to protect against possible higher emissions when an operating permit condition such as low combustion temperature or high carbon monoxide stack concentration is exceeded. In my opinion, it appears that many of the "upsets" that Ms. Costner refers to in her Declaration, are in fact Automatic Waste Feed Cutoffs that are required by the Resource Conservation and Recovery Act permits at the Johnston Atoll Chemical Agent Disposal System, the Tooele Chemical Demilitarization Facility and every one of the 190 hazardous waste incinerators in the nation. A summary of the Automatic Waste Feed Cutoffs which are required by the Utah Department of Environmental Quality and Region VIII of the Environmental Protection Agency for the incinerators at the Tooele Chemical Demilitarization Facility's permit application is included in Attachment 3 to my Declaration.

84. Ms. Costner also contends that because of the alleged upsets, that Products of Incomplete Combustion emissions from the incinerators will increase substantially. I do not agree with this allegation. The previously described test program at the Environmental Protection Agency's Incineration Research Facility and the full-scale testing at the Waste Technologies, Inc. commercial hazardous waste incinerator have shown, with actual stack sampling data, that emissions of Products of Incomplete Combustion do not increase during Automatic Waste Feed Cutoff situations.

## 85. AUTOMATIC CONTINUOUS AIR MONITORING SYSTEM

86. Ms. Costner's Declaration alleges that the Army's continuous agent emission monitor, which is called a Automatic Continuous Air Monitoring System, is susceptible to interferences and rates of malfunction which raise serious questions as to its usefulness in signaling potentially dangerous agent releases to workers and the general public.

87. I do not agree with this allegation. The continuous emission monitoring standard for the nation's hazardous waste incinerators is a carbon monoxide monitor which

is used as a control for good combustion and low Products of Incomplete Combustion emissions. The Tooele Chemical Demilitarization Facility incinerators have carbon monoxide continuous emission monitors and the Automatic Continuous Air Monitoring System which is used for detection of specific agents in the parts per trillion concentration range. None of the nation's hazardous waste incinerators, except the Army's agent incinerators, have a continuous emission monitor for specific organic chemical emissions.

88. All of the nation's incinerators have at least one carbon monoxide continuous emission monitor, some incinerators have two carbon monoxide continuous emission monitors with the second unit being used as a redundant back-up system. The Tooele Chemical Demilitarization Facility however, has three Automatic Continuous Air Monitoring Systems which directly monitor for agent in the common stack for all the incinerators except the Dunnage Incinerator. Two of the Automatic Continuous Air Monitoring Systems are in continuous use. The third Automatic Continuous Air Monitoring System is a back-up in case either of the operating Automatic Continuous Air Monitoring Systems malfunction. Feed of agent to the incinerators at the Tooele Chemical Demilitarization Facility will not be allowed by the Utah Department of Environmental Quality without a functioning Automatic Continuous Air Monitoring System in the stack.

89. In my opinion, contrary to Ms Costner's allegations, the Tooele Chemical Demilitarization Facility continuous stack monitoring program is above the industry standard because: (1) the Automatic Continuous Air Monitoring System has the capability for continuous incinerator stack analysis of specific agents in the parts per trillion concentration range, (2) there are three Automatic Continuous Air Monitoring Systems in the common incinerator stack instead of one or two, and (3) carbon monoxide continuous emission monitors are also used to monitor good combustion and control non-agent Products of Incomplete Combustion. This stack monitoring program results in a significant level of safety to the public and the operators of the Tooele Chemical Demilitarization Facility.

#### 90 FUGITIVE EMISSIONS OF AGENT

91 Ms Costner's Declaration alleges that at incineration facilities, fugitive emissions and accidental spills may equal or exceed stack emissions, as potential hazards to public health and the environment.

92. Fugitive emissions are defined as emissions which enter the atmosphere without first passing through a stack or a duct designed to direct their flow. In general, this applies to organic liquid or solid emissions which come from sources such as pump seals, valves, piping flanges, pressure relief valves and sampling connections. Ms. Costner appears to assume that fugitive emissions from these types of processing equipment will occur to the atmosphere at the Tooele Chemical Demilitarization Facility. This assumption however, is incorrect. As shown in

Attachment 4 to my Declaration, the agent processing facilities are designed so that any agent processing that could result in fugitive emissions or accidental releases of agent is done in a completely sealed area called the Toxic Area. Agent is only processed in the Toxic Areas which are vented to the Tooele Chemical Demilitarization Facility carbon filter system. The carbon filter system is specially designed to capture agent contamination present in the air from any fugitive emissions and accidental releases such as spills that could occur in the Toxic Areas.

### 93. SHAKEDOWN PERIOD

94. The Memorandum in support of Plaintiffs' motion alleges that the shakedown period of the Tooele Chemical Demilitarization Facility incinerators on agent is expected to result in harmful emissions of agent and dioxin-like compounds and is a period in which there is a high likelihood of a serious accident.

95. I do not agree. As discussed previously in my Declaration, the Tooele Chemical Demilitarization Facility incinerators are a third generation, state of the art design, and have all ready been through a very thorough shakedown period.

96. The hot shakedown period at the Tooele Chemical Demilitarization Facility began in 1993 and has continued up to the current period. Through July 7, 1996, Liquid Incinerator number 1 has had 18 months of hot operation, Liquid Incinerator number 2 has had 14 months of hot operation, the Deactivation Furnace System has had 20 months of hot operation, the Metal Parts Furnace has had 11 months of hot operation and the Dunnage Incinerator has had 6 months of hot operation. During this hot shakedown period, either natural gas, non-hazardous ethylene glycol as an agent surrogate or hazardous constituents during the Resource Conservation and Recovery Act and Toxic Substances Control Act Trial Burns were used as fuels and feeds for the incinerators. During this hot shakedown, the incinerators have been operated as if incinerating agent. This hot operation has allowed mechanical equipment, electrical, computers, control systems, instrumentation, the Automatic Waste Feed Cutoff system, pumps, piping, the Pollution Abatement Systems, operating procedures, operator training and operator capabilities to all be thoroughly checked out. Because of this long hot shakedown period, many of the equipment related operational problems that commonly occur during the start-up of any complex mechanical system have all ready been discovered and corrected prior to the feeding of agent.

97. In my opinion, because of the state of the art design of the Tooele Chemical Demilitarization Facility incinerators and the long hot shakedown period, the allegations about harmful emission problems and the high likelihood of a serious accident are incorrect.

### 98. OVERALL EVALUATION OF THE TOCDF

99. Based on my site visit, the documents and test results that I have reviewed and my experience and background in incineration, it is my professional opinion that the Tooele Chemical Demilitarization Facility is a state of the art facility which is properly installed and will be safely and effectively maintained and operated. I also believe that incineration is the best demonstrated, safest and most effective technology that can be used to destroy the agent and munitions stored at the Tooele Chemical Demilitarization Facility.

I declare under penalty of perjury that the foregoing is true and correct.

Date 7/15/96

James J. Cudaly  
James J. Cudaly

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TABLE 1. JACADS AGENT DRE RESULTS

Type Incinerator	Location	Test Date	Type Agent or Feed	Agent DRE (%)	
				Utah DEQ Standard	Incinerator Performance
Liquid Incinerator	JACADS	Dec 1990	GB	>99.99%	>99.999998%
Liquid Incinerator	JACADS	Mar 1992	VX	>99.99%	>99.9999997
Liquid Incinerator	JACADS	Aug 1992	HD	>99.99%	>99.999995%
Metal Parts Furnace	JACADS	Aug 1992	HD	>99.99%	>99.9989%
Dunnage Incinerator	JACADS	Dec 1994	GB	>99.99%	>99.999987%

JACADS - Johnston Atoll Chemical Agent Disposal System

DRE - Destruction and Removal Efficiency

*Handwritten mark*

TABLE 2. JACADS AND TOCDF DIOXIN EMISSION RESULTS

Type Incinerator	Location	Test Date	Type Agent or Feed	Dioxin Toxic Equivalents (a,b)	
				Proposed EPA Standard	Incinerator Emissions
Liquid Incinerator	JACADS	Mar 1992	VX	0.2	0.0024
Liquid Incinerator	JACADS	Aug 1992	HD	0.2	0.0013
Metal Parts Furnace	JACADS	Aug 1992	HD	0.2	0.0278
Deactivation Furnace	JACADS	Mar 1992	VX	0.2	0.0104
Dunnage Incinerator	JACADS	Dec 1994	GB	0.2	0.1505
Deactivation Furnace	TOCDF	Nov 1995	PCBs	0.2	0.0044

JACADS - Johnston Atoll Chemical Agent Disposal System

TOCDF - Tooele Chemical Demilitarization Facility

(a) - Dioxin standard and emissions are expressed in nanograms of 2,3,7,8-tetrachlorinated dibenzo-p-dioxin Toxic Equivalents per dry standard cubic meter of stack gas corrected to 7% oxygen. All JACADS dioxin emissions are the average of 4 runs. The TOCDF dioxin emission is the average of 3 runs. One nanogram is a billionth of a gram.

(b) - Dioxin and Furan congener concentrations which were below the analytical detection limit are assumed to have a zero concentration.

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TABLE 3. TOCDF RCRA AND TSCA TRIAL BURN DATA

Test Activity	Liquid Incin No. 1	Liquid Incin No. 2	Deactivation Furnace	Deactivation Furnace
Date	Jul 1995	Jan 1996	Oct 1995	Nov 1995
Type Test	RCRA	RCRA	RCRA	TSCA
<b>Destruction &amp; Removal Efficiency</b>				
Required Permit Minimum	99.9999%	99.9999%	99.9999%	99.9999%
Trial burn Value				
Tetrachloroethylene	99.9999953%	>99.999986%		
Trichlorobenzene	99.9999983%	>99.999973%		
Chlorobenzene			99.999985%	
Hexachloroethane			99.999989%	
Polychlorinated biphenyls				99.999982%
<b>Combustion Efficiency (a)</b>				
Required Permit Minimum				>99.9%
Trial burn Value				99.986%
<b>Particulate Matter (b)</b>				
Required Permit Minimum	0.08	0.08	0.08	0.08
Trial burn Value	0.0055	0.0032	0.0047	0.0046
<b>Hydrogen Chloride (pounds per hour)</b>				
Required Permit Minimum	<4	<4	<4	<4
Trial burn Value	0.005	< 0.03	0.025	<.000002

TOCDF - Tooele Chemical Demilitarization Facility

RCRA - Resource Conservation and Recovery Act

TSCA - Toxic Substances Control Act

(a) - Combustion efficiency is a TSCA parameter only

(b) - Particulate matter concentration expressed as grains per dry standard cubic foot of stack gas corrected to 7% oxygen. There are 7,000 grains in a pound.

October 24, 1996

DECLARATION - James J. Cudahy

1. My name is James J. Cudahy. I am the president of Focus Environmental, Inc. Focus Environmental is an environmental engineering firm which specializes in the design, permitting and technical evaluation of hazardous waste incineration and other thermal treatment systems. Our clients have included industry, hazardous waste services companies, the U.S. Environmental Protection Agency, the Department of Energy and the Department of Defense.
2. My educational background includes a B.S. in Chemical Engineering from Newark College of Engineering and an M.S. in Chemical Engineering from the University of Delaware. I am a registered professional engineer in Michigan, Louisiana and Delaware.
3. My background and expertise includes 25 years specializing in the technical evaluation, design and permitting of incineration and thermal treatment systems for hazardous wastes, contaminated soils and contaminated air from industrial process vents. I have served on national committees involved with incineration and thermal treatment. I have served on technical review panels for the Department of Defense and the Department of Energy. I have chaired technical sessions at national meetings which involved hazardous waste incineration and test burns and polychlorinated dibenzodioxin and furan (dioxin) emissions from hazardous waste incineration systems. A copy of my resume is included as Attachment I to my Declaration.
4. As part of my activities for the preparation of this Declaration, I have reviewed the Motion for Stay Pending Appeal (Appeal) and have discussed the incidents mentioned in the Appeal with Tooele Chemical Agent Disposal Facility personnel. I have also based the conclusions in this Declaration on the experience that I have obtained over my career. As part of an earlier declaration, I visited the Tooele Chemical Agent Disposal Facility and had an in-depth tour of the demilitarization equipment and incineration equipment. I have reviewed the facility Part B permit application for the and other documents that are relevant to the permitting, testing and operation of the facility.
5. In their Appeal, the Plaintiffs describe situations at the Tooele facility and Johnston Atoll that they claim support their contention that continued operation of the facility will cause irreparable harm to the Plaintiffs. The Plaintiffs made specific claims about potential irreparable harm because of polychlorinated dibenzodioxin and furan emissions, the carbon filter vestibule agent leak, an alleged release at the Johnston Atoll facility, the decontamination solution leak and the slag removal burner in the Liquid Incinerator. A brief discussion of these claims follows:

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6. The Plaintiffs claim dioxin emissions from the facility will cause irreparable harm. Nothing however, in the Appeal has changed my opinion about this issue. On April 19, 1996 the Environmental Protection Agency published a proposed dioxin emission standard in the proposed Hazardous Waste Combustor Maximum Achievable Control Technology regulations (61 FR 17358). When finalized, this proposed dioxin emission standard will apply to the 190 Resource Conservation and Recovery Act permitted hazardous waste incinerators in the country including the incinerators at the Tooele Chemical Agent Disposal Facility. All the dioxin emission data from Johnston Atoll and the Tooele facility are well below this proposed dioxin emission standard.
7. The Plaintiffs claim that an agent release in carbon filter containment vestibules at the facility demonstrates that they will be irreparably harmed. What is important about this situation is that the facility engineering controls and operational procedures worked as intended. Neither a facility worker, member of the public, nor the environment was harmed in this incident.
8. The Plaintiffs claim that an alleged agent release during a planned power shutdown at the Johnston Atoll facility on August 16, 1996, demonstrates that they will be irreparably harmed. The Appeal states that the Groups are unaware of any action that has been taken by the Utah Department of Environmental Quality or the Army to ensure that the same agent release problem, caused by a power shut down or power loss, will not occur at the Tooele Chemical Agent Disposal Facility. Aside from being inconsistent with the theme of the Appeal, this allegation is also unfounded. An unplanned power outage occurred at the Tooele Chemical Agent Disposal Facility on September 16, 1996 without any agent being released.
9. The Plaintiffs claim that a small leak of used decontamination fluid that was found dripping from the ceiling of an electrical room demonstrates that they will be irreparably harmed. The decontamination fluid contained no detectable agent, and no agent was found in the room to which the solution leaked. What is important about this situation is that the facility operational procedures worked as intended and there was no release of agent.
10. The Plaintiffs stated that on September 18, 1966, the Slag Removal System on the Liquid Incinerator malfunctioned, causing a shutdown of the system. What is important about this situation is that the facility operational procedures worked as intended. The system continued to operate normally. There was no release of agent caused by this situation.
11. The plaintiffs conclude that considering all the incidents noted in the Appeal, it is clear that the Tooele Chemical Agent Disposal Facility is ill-prepared to begin hazardous waste or nerve agent operations. Based on my 25 years of experience with the design, permitting and operation of incineration systems, I do not agree with this conclusion. In a previous declaration filed in the United States District

Court for the District of Utah (Civil No. 2:96-CV-425C). I made the following statement:

12. Through July 7, 1996, the five Tooele Chemical Agent Disposal Facility incinerators have been operated for a total period of 5 years and eight months in a hot shakedown period using either natural gas, non-hazardous ethylene glycol as an agent surrogate or hazardous constituents during the Resource Conservation and Recovery Act and Toxic Substances Control Act Trial Burns. Therefore, many of the equipment related operational problems that commonly occur during the start-up of any mechanical system have all ready been discovered and corrected prior to the feeding of agent. (Emphasis added)
13. I still stand by this statement. While the Tooele Chemical Agent Disposal Facility incinerators have been thoroughly tested out, it is not uncommon in the operation of complex systems, to have these kinds of situations occur. What is most important about the situations that occurred is that the facility engineering controls and operational procedures worked as intended.
14. None of these claims have changed my opinion, as stated in my previous Declaration, that the Tooele Chemical Agent Disposal Facility is a state of the art facility which is properly installed and will be safely and effectively maintained and operated.
15. I declare under penalty of perjury that the foregoing is true and correct.

Date 1-1-01

James J. Cudahy  
-James J. Cudahy

October 28, 1996

AFFIDAVIT - James J. Cudahy

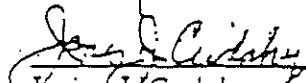
1. My name is James J. Cudahy. I am the president of Focus Environmental, Inc. Focus Environmental is an environmental engineering firm which specializes in the design, permitting and technical evaluation of hazardous waste incineration and other thermal treatment systems. Our clients have included industry, hazardous waste services companies, the U.S. Environmental Protection Agency, the Department of Energy and the Department of Defense.
2. My educational background includes a B.S. in Chemical Engineering from Newark College of Engineering and an M.S. in Chemical Engineering from the University of Delaware. I am a registered professional engineer in Michigan, Louisiana and Delaware.
3. My background and expertise includes 25 years specializing in the technical evaluation, design and permitting of incineration and thermal treatment systems for hazardous wastes, contaminated soils and contaminated air from industrial process vents. I have served on national committees involved with incineration and thermal treatment. I have served on technical review panels for the Department of Defense and the Department of Energy. I have chaired technical sessions at national meetings which involved hazardous waste incineration and test burns and polychlorinated dibenzodioxin and furan (dioxin) emissions from hazardous waste incineration systems. A copy of my resume is included as Attachment 1 to my Affidavit.
4. As part of my activities for the preparation of this Affidavit, I have reviewed the Petitioner's Second Motion for a Stay (Stay) and have discussed the incidents mentioned in the Stay with Tooele Chemical Agent Disposal Facility personnel. I have also based the conclusions in this Affidavit on the experience that I have obtained over my career. As part of a previous Declaration, I visited the Tooele Chemical Agent Disposal Facility and had an in-depth tour of the demilitarization equipment and incineration equipment. I have reviewed the facility Part B permit application for the and other documents that are relevant to the permitting, testing and operation of the facility
5. In their Stay, the Plaintiffs describe situations at the Tooele facility and Johnston Atoll that they claim support their contention that continued operation of the facility will cause irreparable harm to the Plaintiffs. The Plaintiffs made specific claims about potential irreparable harm because of polychlorinated dibenzodioxin and furan emissions, the carbon filter vestibule agent leak, an alleged release at the Johnston Atoll facility, the decontamination solution leak and the slag removal burner in the Liquid Incinerator. A brief discussion of these claims follows:

6. The Plaintiffs claim dioxin emissions from the facility will cause irreparable harm. Nothing however, in the Stay has changed my opinion about this issue. On April 19, 1996 the Environmental Protection Agency published a proposed dioxin emission standard in the proposed Hazardous Waste Combustor Maximum Achievable Control Technology regulations (61 FR 17358). When finalized, this proposed dioxin emission standard will apply to the 190 Resource Conservation and Recovery Act permitted hazardous waste incinerators in the country including the incinerators at the Tooele Chemical Agent Disposal Facility. All the dioxin emission data from Johnston Atoll and the Tooele facility are well below this proposed dioxin emission standard.
7. The Plaintiffs claim that an agent release in carbon filter containment vestibules at the facility demonstrates that they will be irreparably harmed. What is important about this situation is that the facility engineering controls and operational procedures worked as intended. Neither a facility worker, member of the public, nor the environment was harmed in this incident.
8. The Plaintiffs claim that an alleged agent release during a planned power shutdown at the Johnston Atoll facility on August 16, 1996, demonstrates that they will be irreparably harmed. The Stay states that the Groups are unaware of any action that has been taken by the Utah Department of Environmental Quality or the Army to ensure that the same agent release problem, caused by a power shut down or power loss, will not occur at the Tooele Chemical Agent Disposal Facility. Aside from being inconsistent with the theme of the Stay, this allegation is also unfounded. An unplanned power outage occurred at the Tooele Chemical Agent Disposal Facility on September 16, 1996 without any agent being released.
9. The Plaintiffs claim that a small leak of used decontamination fluid that was found dripping from the ceiling of an electrical room demonstrates that they will be irreparably harmed. The decontamination fluid contained no detectable agent, and no agent was found in the room to which the solution leaked. What is important about this situation is that the facility operational procedures worked as intended and there was no release of agent.
10. The Plaintiffs stated that on September 18, 1966, the Slag Removal System on the Liquid Incinerator malfunctioned, causing a shutdown of the system. What is important about this situation is that the facility operational procedures worked as intended. The system continued to operate normally. There was no release of agent caused by this situation.
11. The plaintiffs conclude that considering all the incidents noted in the Stay, it is clear that the Tooele Chemical Agent Disposal Facility is ill-prepared to begin hazardous waste or nerve agent operations. Based on my 25 years of experience


with the design, permitting and operation of incineration systems, I do not agree with this conclusion. In a previous Declaration filed in the United States District Court for the District of Utah (Civil No. 2:96-CV-425C), I made the following statement:

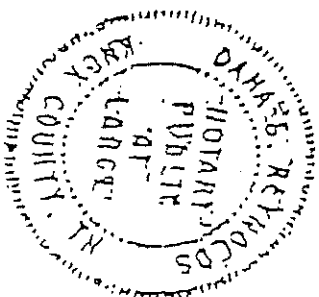
12. Through July 7, 1996, the five Tooele Chemical Agent Disposal Facility incinerators have been operated for a total period of 5 years and eight months in a hot shakedown period using either natural gas, non-hazardous ethylene glycol as an agent surrogate or hazardous constituents during the Resource Conservation and Recovery Act and Toxic Substances Control Act Trial Burns. Therefore, many of the equipment-related operational problems that commonly occur during the start-up of any mechanical system have all ready been discovered and corrected prior to the feeding of agent. (Emphasis added)
13. I still stand by this statement. While the Tooele Chemical Agent Disposal Facility incinerators have been thoroughly tested out, it is not uncommon in the operation of complex systems, to have these kinds of situations occur. What is most important about the situations that occurred is that the facility engineering controls and operational procedures worked as intended.
14. None of these claims have changed my opinion, as stated in my previous Declaration, that the Tooele Chemical Agent Disposal Facility is a state of the art facility which is properly installed and will be safely and effectively maintained and operated.

Further affiant sayeth not.

  
James G. Cudahy

Subscribed and sworn to before me this 30th day of October, 1996

  
Dana S. Reynolds, Notary Public in and  
for the State of Tennessee



8/30/09  
Notary Commission Expires

February 4, 1997

DECLARATION - JAMES J. CUDAHY

1. My name is James J. Cudahy. I am the president of Focus Environmental, Inc. Focus Environmental is an environmental engineering firm which specializes in the design, permitting and technical evaluation of hazardous waste incineration and other thermal treatment systems. Our clients have included industry, hazardous waste services companies, the U.S. Environmental Protection Agency, the Department of Energy and the Department of Defense.
2. My educational background includes a B.S. in Chemical Engineering from Newark College of Engineering and an M.S. in Chemical Engineering from the University of Delaware. I am a registered professional engineer in Michigan, Louisiana and Delaware.
3. My background and expertise includes over 25 years specializing in the technical evaluation, design, operation and permitting of incineration and thermal treatment systems for hazardous wastes, contaminated soils and contaminated air from industrial process vents. I have served on national committees involved with incineration and thermal treatment. I have served on technical review panels for the Department of Defense and the Department of Energy. I have chaired technical sessions at national meetings which involved hazardous waste incineration, test burns and polychlorinated dibenzodioxin and furan (dioxin) emissions from hazardous waste incineration systems. A copy of my resume is included with this Declaration as Exhibit 1.
4. I have been retained by the United States Department of Justice to give my opinion on the significance, from an operations point of view, of the concerns raised by the Plaintiffs in their Consolidated Memorandum. I was specifically asked to give my opinion on whether the information supplied by the Plaintiffs indicated to me that the operation of the Tooele Chemical Demilitarization Facility was unsafe.
5. As part of my activities for the preparation of this Declaration, I have reviewed the Plaintiffs' Consolidated Memorandum in Support of Plaintiffs' Motion for an Injunction Pending Appeal and Plaintiffs' Second Motion for Preliminary Injunction (Consolidated Memorandum). I have based the conclusions in this Declaration on the experience that I have obtained over my career, two visits to the Tooele Chemical Demilitarization Facility and various facility related documents that I have reviewed. A list of documents that I reviewed and people that I contacted is included as Exhibit 2. During my first visit, I had an in-depth tour of the demilitarization equipment and incineration equipment. During my second visit, I discussed allegations in the Consolidated Memorandum with facility personnel. The allegations that I discussed were those for which I have appropriate experience. Based on my first visit, I prepared a Declaration which



was used in the 1996 court case involving the Chemical Weapons Working Group and the Department of the Army. I also appeared before the court as an expert witness in the 1996 case.

6. In their Consolidated Memorandum, the Plaintiffs claim that newly discovered documents and witness testimony demonstrate that the risk of an agent accident as well as routine stack emissions of toxic chemicals will cause irreparable harm to Plaintiffs and the public. A brief discussion of these claims follows:

7. CHARCOAL FILTERS (Consolidated Memorandum - pgs 8 and 26)

8. The Plaintiffs claim that the agent filters experienced a serious malfunction in August 1996 that resulted in agent release to the environment and employee exposure to agent. While there was a release of agent into the vestibules of the stand-by and back-up filters, the facility engineering controls and operational procedures worked as intended. Neither a facility worker, member of the public, nor the environment was harmed in this incident. There are nine carbon (charcoal) filters in nine buildings in the agent filter system. Seven of the nine are always filtering air from the Munitions Demilitarization Building, while one filter is designated as back-up and one as a stand-by. The agent release into the vestibule occurred because the inlet and outlet valves of the stand-by and back-up filters were both closed and solar heating of the filter buildings caused agent to be desorbed off the carbon into the filter buildings and vestibules. The corrective action for this situation has been implemented. The corrective action involves continuous venting of the stand-by and back-up filters into the on-line filters. This is done by slightly opening the inlet valve of the stand-by and back-up filters and keeping the outlet valve closed. Any agent contained within the stand-by and back-up filters is thereby drawn into the on-line filters and adsorbed by these filters (U.S. Army, Aug 29, 1996).

9. FIRE SUPPRESSION MALFUNCTION (Consolidated Memorandum - pg 8)

10. The Plaintiffs claim that a fire suppression system problem in September 1996 caused a near total loss of negative pressure in the facility which threatened to cause agent to migrate through the facility. While it is correct that the Munitions Demilitarization Building negative pressure did drop during this incident, pressure did not go positive in any area. The corrective action for this situation involves the development of detailed fire system maintenance and operating procedures (Dawson, 1996).

11. AIR FILTER FAILURE (Consolidated Memorandum - pg 9)

12. The Plaintiffs claim on page 9 of the Consolidated Memorandum that total failure of the facility's entire air filtering system occurred in September 1996. In Exhibit C of the Consolidated Memorandum (From the Journals of Gary Millar), Plaintiffs also allege that this "total failure of the facility's entire air filtering system",

involved a filter blower motor failure. These statements are incorrect. There are nine carbon (charcoal) filters in nine buildings in the facility air filtering system. Each of these nine carbon filter systems has a dedicated filter blower and filter blower motor associated with it. Only seven of the nine are on-line at any one time filtering air from the Munitions Demilitarization Building, while one filter is designated as a stand-by and one as a back-up. When the filter blower motor failed, the stand-by filter and filter blower were immediately brought on-line. This event involved the failure of one filter blower motor, not the failure of the entire seven air filtering systems as alleged by the Plaintiffs.

13. AGENT QUANTIFICATION SYSTEM (Consolidated Memorandum - pgs 10 and 11)

14. The plaintiffs allege that the Agent Quantification System does not work and that because it does not work, that neither EG&G nor the Army would know if some agent was missing. This is a production issue, not a safety nor surety issue. While the Agent Quantification System did have operational problems, those problems have been fixed and it is now operating satisfactorily. Relative to surety, the Agent Quantification System is located in a remote room which is constantly being televised and requires special permission and procedures for entry.

15. GB-PARTICULATE EMISSIONS (Consolidated Memorandum - pg 12)

16. The Plaintiffs allege that they will be irreparably harmed as a result of on-going toxic chemical emissions from the facility incinerators. They claim that stack sampling done in November and December of 1996 shows that agent is being emitted into the environment on an on-going basis from the facility incinerators and dispersed into the surrounding communities. This statement is misleading. The stack sampling data shows two particulate filters out of the five tested with positive results for GB agent (Siddoway, 1996). The two positive results however, were both below the Level of Quantification. Values below the Level of Quantification have a lower confidence that the quantity of GB detected is accurate. For these particulate tests, the Level of Quantification was approximately equivalent to a GB stack concentration which is over 5,500 times less than the maximum allowable regulatory based stack concentration of GB.

17. EQUIPMENT RELATED OPERATIONAL PROBLEMS (Consolidated Memorandum- pgs 16, 20 and 21)

18. The Plaintiffs allege that the incidents that have occurred at the Tooele Chemical Demilitarization Facility and the Johnston Atoll Chemical Agent Disposal System over the last four to five months demonstrate that the evidence and opinions offered by the defendants during the first hearing "are simply no longer worthy of belief". Based on my 25 years of experience with the design, permitting and operation of incineration systems, I do not agree with this conclusion. In my previous Declaration, filed in the United States District Court for the District of

Utah (Civil No. 2:96-CV-425C), I made the following statement: "Through July 7, 1996, the five Tooele Chemical Agent Disposal Facility incinerators have been operated for a total period of 5 years and eight months in a hot shakedown period using either natural gas, non-hazardous ethylene glycol as an agent surrogate or hazardous constituents during the Resource Conservation and Recovery Act and Toxic Substances Control Act Trial Burns. Therefore, many of the equipment related operational problems that commonly occur during the start-up of any mechanical system, have all ready been discovered and corrected prior to the feeding of agent." (Emphasis added) I still stand by this statement. While the Tooele Chemical Agent Disposal Facility incinerators have been thoroughly tested out, it is not uncommon in the operation of complex systems, to have these kinds of situations occur. What is most important about the situations that have occurred is that the facility engineering controls and operational procedures have worked as intended.

19. DIOXIN EMISSIONS (Consolidated Memorandum - pgs 23 to 26)

20. The Plaintiffs allege that dioxin emissions from the facility will cause irreparable harm to them. Nothing however, in the Consolidated Memorandum has changed my opinion about this issue. On April 19, 1996 the Environmental Protection Agency published a proposed dioxin emission standard in the proposed Hazardous Waste Combustor Maximum Achievable Control Technology regulations (EPA, 1996). When finalized, this proposed dioxin emission standard will apply to the 190 Resource Conservation and Recovery Act permitted hazardous waste incinerators in the country including the incinerators at the Tooele Chemical Agent Disposal Facility. All the dioxin emission data from Johnston Atoll and the Tooele facility are well below this proposed dioxin emission standard.

21. WTI and Arkansas Peace Center (Consolidated Memorandum - pgs 24 to 26)

22. The Plaintiffs claim that other courts, when faced with examining the issue of irreparable harm from finite periods of dioxin emissions from hazardous waste incinerators, have found such emissions to constitute irreparable harm. The plaintiffs use two court cases to illustrate their allegation; Greenpeace v. Waste Technologies, Inc. and Arkansas Peace Center v. the Department of Pollution Control. The first case involved the Waste Technologies, Inc. (WTI) commercial hazardous waste incinerator in East Liverpool, Ohio and the second case involved a mobile incinerator at the Vertac superfund site in Jacksonville, Arkansas. The use of these two cases by the Plaintiffs is misleading because the dioxin emissions from the WTI and Vertac incinerators were significantly higher than the dioxin emissions from the Johnston Atoll and Tooele incinerators. The WTI emissions were about 500 times higher than the Johnston Atoll and Tooele Army incinerators (ENSR, 1993). The Vertac incinerator dioxin emissions were about 1,000 times higher than the Johnston Atoll and Tooele Army incinerators (EPA, 1995). These comparisons are based on dioxin emissions from the Liquid Incinerators and the

Deactivation Furnace System at Johnston Atoll and the Deactivation Furnace System from the Tooele facility. The WTI incinerator has since installed a carbon injection system for dioxin control and is now operating with dioxin emissions which are well below the proposed Hazardous Waste Combustor Maximum Achievable Control Technology dioxin standard. The mobile incinerator at the Vertac site remediated over 9,000 tons of dioxin contaminated wastes and has been moved to another location.

23. **MIGRATION OF AGENT AT JACADS** (Consolidated Memorandum - pgs 28, 29)

24. An agent migration occurred during a planned power shutdown at the Johnston Atoll facility on August 16, 1996 (U.S. Army, Aug 24, 1996). The Consolidated Memorandum states that the Plaintiffs are unaware of any action that has been taken by the Utah Department of Environmental Quality or the Army to ensure that the same agent release problem, caused by a power shut down or power loss, will not occur at the Tooele Chemical Agent Disposal Facility. An extensive program however, exists at the Tooele facility for minimizing agent releases during both planned power shutdowns and unplanned power outages. The Tooele facility has two emergency power generator systems. Every two weeks, one of the emergency power generator systems is tested during a planned power shutdown. Before these planned power shutdowns, any operations involving agent are stopped to minimize the likelihood of agent migration during the generator tests. A recent program involved a significant level of emergency power generator system testing to improve the response of the electrical system to unplanned outages and to test different power outage scenarios. The Uninterruptible Power Systems are also tested during the planned power shutdowns. An unplanned power outage occurred at the Tooele Chemical Agent Disposal Facility on December 16, 1996. During this unplanned outage, the emergency generators and the ventilation system worked very well and there was no release of agent.

25. **LEAK OF DECONTAMINATION FLUID THROUGH FLOOR CRACK** (Consolidated Memorandum - pg 29)

26. The Plaintiffs claim that a small leak of used decontamination fluid that was found dripping from cracks in the floor down into an electrical room demonstrates shoddy construction and inadequate design of the facility. I have visited the Tooele Chemical Demilitarization Facility and based on visits to many other facilities incinerating hazardous wastes, I do not believe the facility has shoddy construction or has been inadequately designed. The decontamination fluid contained no detectable agent, and no agent was found in the room to which the solution leaked. To prevent future problems of this nature, the facility is being examined for floor cracks at least once a week and generally on a more frequent basis.

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27. SLAG HEATERS (Consolidated Memorandum - pg 30)

28. The Plaintiffs stated that the slag removal system on the Liquid Incinerator malfunctioned, causing a shutdown of the system. This is a production problem, not a safety problem. There was no release of agent caused by this situation. The design of the slag removal system heaters on the second Liquid Incinerator has been modified and the heaters are now working.

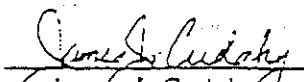
29. SUMMARY

30. None of these claims have changed my opinion, as stated in my previous Declaration, that the Tooele Chemical Agent Disposal facility is a state of the art facility which is properly installed and will be safely and effectively maintained and operated.

31. In my opinion, based on the documents that I have reviewed and my experience with hazardous waste incineration systems, the Tooele Chemical Demilitarization Facility is not unsafe or being operated in an unsafe manner. The number of safety related incidents described by the Plaintiffs, when compared to typical start-ups of modern complex systems for the incineration of hazardous liquids and solids, are not unusually high. What is most important about the incidents that have occurred is that the facility engineering controls and operational procedures have worked as intended.

I declare under penalty of perjury that the foregoing is true and correct.

Date: 2/5/97

  
James J. Cudany

## REFERENCES

Dawson, Eric, "2 Sep 96 CHB/UPA Fire Suppression System Incident Investigation", Interoffice Memorandum to S. Guello, September 6, 1996

ENSR Consulting and Engineering, "Waste Technologies Industries, East Liverpool Ohio, Final Trial Burn Report for the Rotary Kiln Incinerator", May, 1993

Environmental Protection Agency, Office of Solid Waste, "Draft Technical Support Document for HWC MACT Standards, Appendix C: Emissions Database: Incinerator Report", November 20, 1995

Environmental Protection Agency, "Revised Standards for Hazardous Waste Combustors", Federal Register, Volume 61, page 17358, April 19, 1996

Siddoway, Kerla, "12/10/96 Miniburn Sample Results", Letter to R. Sisson, December 12, 1996

U.S. Army, "Report of Investigation into Indications of GB Agent in Observation Corridors on 16 August 1996", August 24, 1996

U.S. Army, "Carbon Filter Vestibule Chemical Agent Event Report", August 29, 1996

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December 1, 1997

DECLARATION - JAMES J. CUDAHY

1. My name is James J. Cudahy. I am the president of Focus Environmental, Inc. Focus Environmental is an environmental engineering firm which specializes in the design, permitting and technical evaluation of hazardous waste incineration and other thermal treatment systems. Our clients have included industry, hazardous waste services companies, the U.S. Environmental Protection Agency, the Department of Energy and the Department of Defense.
2. My educational background includes a B.S. in Chemical Engineering from Newark College of Engineering and an M.S. in Chemical Engineering from the University of Delaware. I am a registered professional engineer in Michigan, Tennessee, Louisiana and Delaware.
3. My background and expertise includes over 26 years specializing in the technical evaluation, design, operation and permitting of incineration and thermal treatment systems for hazardous wastes, contaminated soils and contaminated air from industrial process vents. I have served on national committees involved with incineration and thermal treatment. I have served on technical review panels for the Department of Defense and the Department of Energy involved with the evaluation of Alternative Technologies. I have chaired technical sessions at national meetings which involved hazardous waste incineration, test burns and polychlorinated dibenzodioxin and furan (dioxin) emissions from hazardous waste incineration systems. A copy of my resume is included with this Declaration as Exhibit 1.
4. I have been asked by counsel to prepare this Declaration in response to Plaintiffs' Second Amended Complaint. I have previously prepared and submitted five other Declarations and Affidavits for this and other related cases, dated July 15, 1996, October 24, 1996, October 28, 1996, February 4, 1997 and February 28, 1997. All of these are included in Exhibit 2 of this Declaration. I have also given testimony on July 29, 1996 and March 7, 1997 in the U.S. District Court for the State of Utah and on March 20, 1997 before the Utah Solid and Hazardous waste Control Board.
5. As part of my activities for the preparation of this Declaration, I have reviewed Plaintiffs' Second Amended Complaint, Plaintiffs' Responses to Defendant Army's First Set of Interrogatories and Document Requests, various other documents and had telephone conversations with TOCDF and Army personnel. A list of documents that I reviewed and people that I contacted is included in Exhibit 3.

6. I have based the conclusions in this Declaration on the experience that I have obtained over my career, two visits to the Tooele Chemical Agent Disposal Facility (TOCDF), various facility related documents and other documents that I have reviewed, my previous Declarations and Affidavits, and literature which I have referenced in this Declaration or my previous Declarations.
7. Since my last Declaration, dated February 28, 1997, the following important events have occurred.
8. The Metal Parts Furnace Agent trail burn testing was successfully implemented on April 4, 15 and 17 of 1997. During the Metal Parts Furnace testing, emissions of Agent GB, particulate matter, hydrogen chloride and carbon monoxide were all within the State of Utah permit limits established for the Metal Parts Furnace (1). The average Agent GB Destruction Removal Efficiency (DRE) was greater than 99.9999975% or greater than eight-9s. This means that the Agent GB emissions from the Metal Parts Furnace during the April 1997 testing, averaged over 40,000 times lower than the amount allowed by the State of Utah permit which is based on a DRE of 99.99% or four-9s.
9. The dioxin emissions from the Metal Parts Furnace, expressed as 2,3,7,8-tetrachlorodibenzo-p-dioxin Toxic Equivalents (TEQ), averaged 0.025 nanograms per dry standard cubic meter corrected to 7% oxygen. This emission is 8 times lower than the Environmental Protection Agency's proposed Hazardous Waste Combustor Maximum Achievable Control Technology standard of 0.2 nanograms of dioxin TEQ per dry standard cubic meter corrected to 7% oxygen (2)
10. The Liquid Incinerator System #2 Agent trail burn testing was successfully implemented on August 20, 22 and 23, of 1997. During the Liquid Incinerator System #2 testing, emissions of Agent GB, particulate matter, hydrogen chloride and carbon monoxide were all within the State of Utah permit limits established for the Liquid Incinerator System #2 (3). The average Agent GB Destruction Removal Efficiency was greater than 99.99999977% or greater than nine-9s. This means that the Agent GB emissions from the Liquid Incinerator System #2 during the August 1997 testing, averaged over 4,347 times lower than the amount allowed by the State of Utah permit which is based on a DRE of 99.9999% or six-9s.
11. The dioxin emissions for the Liquid Incinerator System #2, expressed as 2,3,7,8-tetrachlorodibenzo-p-dioxin Toxic Equivalents (TEQ), averaged less than 0.00048 nanograms per dry standard cubic meter corrected to 7% oxygen. This emission is more than 416 times lower than the Environmental Protection Agency's proposed Hazardous Waste Combustor Maximum Achievable Control



Technology standard of 0.2 nanograms of dioxin TEQ per dry standard cubic meter corrected to 7% oxygen.

12. All of the major TOCDF incinerators, except for the dunnage incinerator which may never be operated, have now successfully completed Agent trial burns. The emissions during these trial burns were all within the State of Utah permit limits established for the Liquid Incinerator System #1, Liquid Incinerator System #2, Deactivation Furnace System and Metal Parts Furnace.
13. Dioxin emissions for these incinerators during the Agent trial burns were all significantly below the Environmental Protection Agency's proposed Hazardous Waste Combustor Maximum Achievable Control Technology standard of 0.2 nanograms of dioxin TEQ per dry standard cubic meter corrected to 7% oxygen. The actual measured dioxin emissions for these incinerators during the Agent trial burns ranged from more than eight times to more than 588 times lower than the Environmental Protection Agency's proposed dioxin emission standard. The actual dioxin emissions for these incinerators are summarized in Table 1.
14. In this Declaration I will address three incineration related allegations from the Plaintiffs' Second Amended Complaint, two of which I believe are new allegations since the March 1997 Federal court proceedings.

#### 15. DREs AT LOW WASTE FEED CONCENTRATIONS

16. The Plaintiffs' allege in paragraph 74 of the Second Amended Complaint, that "chemicals present in the waste feed to an incinerator at concentrations of less than 1,000 parts per million (ppm) will not be incinerated at a 99.9999% DRE and chemicals in the incinerator waste feed at concentrations of less than 100 ppm will not achieve a 99.99% DRE."
17. I still do not agree with this allegation. I base my conclusion on my experience with numerous Destruction and Removal Efficiency tests done on incinerators treating soils contaminated with low concentrations of organic contaminants in the Superfund program.
18. I am aware of 19 incinerator tests during five trial burns performed as part of the nationwide Superfund contaminated soil remediation program, in which the incinerators achieved greater than 99.9999% DREs with chemicals present at less than 1,000 ppm. During seven of these 19 tests, at three trial burns, the incinerators achieved greater than 99.9999% DREs with chemicals present at less than 100 ppm. During two of these 19 tests, during one trial burn, the incinerator achieved greater than 99.9999% DREs with chemicals present at concentrations in the low parts per billion range.

19. Some examples of where Destruction and Removal Efficiencies greater than 99.9999% at low organic feed concentrations occurred are the Denney Farm site, the Times Beach site and the Swanson River site.
20. At Denney Farm in Missouri, the Environmental Protection Agency used an incinerator to remediate a site contaminated with dioxin. During four tests, the incinerator achieved an average Destruction and Removal Efficiency of 99.999986% at an average 2,3,7,8-tetrachlorodibenzo-p-dioxin concentration in the feed of 40 parts per million. The concentration range was 28 to 53 parts per million. The test with 28 parts per million had a Destruction and Removal Efficiency of 99.999995% (4,5).
21. At the Times Beach site in Missouri, six incinerator Trial Burn tests were run, three with trichlorobenzene and three with hexachloroethane at concentrations in the soil feed averaging about 180 parts per million. The average Destruction and Removal Efficiencies for these six tests was 99.999984% (6).
22. At the Swanson River site in Alaska, six Trial Burn tests were run with polychlorinated biphenyls at concentrations in the soil feed averaging about 595 parts per million. The average Destruction and Removal Efficiencies for these six tests was 99.99994%. The concentration range was 289 to 801 parts per million. The test with 289 parts per million had a Destruction and Removal Efficiency of 99.99996% (7). The polychlorinated biphenyl concentrations in the soils were the actual concentrations. No spiking with polychlorinated biphenyls was done for the six Trial Burn tests (8).
23. Contrary to the Plaintiffs' allegations, as can be seen by paragraph 18 and these three examples, incineration data is available that clearly shows the achievement of Destruction and Removal Efficiencies greater than 99.9999% for organics at concentrations below both 1,000 and 100 parts per million.

#### 24. SHAKEDOWN PERIOD

25. In paragraph 154 of the Second Amended Complaint, the Plaintiffs' allege that the "Defendants have improperly utilized the shakedown period beyond what was needed to prepare for trial burn in order to process hazardous waste. This is an incorrect allegation. As per 40 CFR 264.344, the Army's permits allowed it to operate the Liquid Incinerator System #1, Liquid Incinerator System #2 and Metal Parts Furnace, each for a total of 720 operating hours. Because of Utah state requirements, the Deactivation Furnace System was allowed to operate for a total of 500 hours during a shakedown period prior to the trial burns. This 720 or 500 hours is operating time and not calendar time. None of the TOCDF incinerators exceeded the 720 or 500 hours prior to the trial burns.

#### 26. ACAMS ALARMS

27. In paragraph 160 of the Second Amended Complaint, the Plaintiffs' allege that the Defendants have confirmed at least six ACAMS alarms. This allegation is incorrect. There have not been any ACAMS alarms for the incinerator stacks which have been confirmed by the DAAMS tubes.

28. SUMMARY

29. None of the allegations in the Plaintiffs' Second Amended Complaint have changed my professional opinion, as stated in my previous Declarations, that the Tooele Chemical Agent Disposal Facility is a state of the art facility which is properly installed and will be safely and effectively maintained and operated. I also believe that incineration is the best demonstrated, safest and most effective technology that can be used to destroy the agent and munitions stored at the Tooele Chemical Agent Disposal Facility.

I declare under penalty of perjury that the foregoing is true and correct.

Date: 12/11/97

James J. Cudahy  
(James J. Cudahy)

TABLE 1. DIOXIN EMISSIONS FROM TOCDF INCINERATORS DURING AGENT TRIAL BURNS

Type Incinerator	LIC-1 (a)	LIC-2 (b)	DFS (c)	MPF (d)
Test Dates	Feb 26,27,28-97	Aug 20,22,23-97	Jan 7,10,11-97	Apr 4,15,17-97
Agent	GB	GB	GB	GB
Dioxin Emissions (e)	0.00034	0.00048	0.00059	0.025
Proposed HWC MACT (e,f)	0.2	0.2	0.2	0.2
Ratio MACT/Emissions (g)	>588.2	>416.7	>339.0	>8.0

NOTES:

- a - LIC-1 is the Liquid Incinerator no. 1
- b - LIC-2 is the Liquid Incinerator no. 2
- c - DFS is the Deactivation Furnace System
- d - MPF is the Metal Parts Furnace
- e - Dioxin emissions are expressed in nanograms of toxic equivalents per dry standard cubic meter corrected to 7% oxygen.
- f - HWC MACT is the proposed EPA Hazardous Waste Combustor Maximum Achievable Control Technology dioxin emission standard.
- g - This ratio is the 0.2 proposed HWC MACT dioxin standard divided by actual measured dioxin emissions. This ratio indicates how many times lower the actual dioxin emissions are than the proposed EPA standard.

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EXHIBIT 1

RESUME

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## JAMES J. CUDAHY

### Professional Qualifications

Mr. Cudahy is a chemical engineer with 31 years of experience in the chemical industry and as an environmental engineering consultant. His chemical industry experience includes research, marketing, and production work, with over 5 years spent in technical and supervisory chemical production positions. As an environmental engineering consultant, he has specialized for 26 years in the evaluation, design and permitting of incineration, thermal and alternative technologies for the treatment of solid and hazardous wastes and contaminated soils. He has over 90 publications and presentations in these areas, has served as an expert witness, and has chaired sessions on incineration and soil cleanup at international conferences. He has served on national and local committees involved with technology evaluation and the environmental aspects of industrial and hazardous wastes, incinerator metals emissions, the development of EPA incineration guidance documents, energy recovery from waste incineration, and environmental quality.

### Education

M.B.A., Michigan State University, East Lansing, Michigan; 1968

M.S., Chemical Engineering, University of Delaware, Newark, Delaware; 1966

B.S., Chemical Engineering, Newark College of Engineering, Newark, New Jersey; 1963

### Experience and Background

1989-Present President, Focus Environmental Inc. Knoxville, Tennessee. Develops business market strategies for Focus. Functions as senior consultant on project work. Specific experience includes.

- Innovative thermal technology evaluation for the DOE and DOD
- Expert witness on incineration design, permitting, operation, and stack emissions.
- Consultant on incineration and mobile thermal treatment public education issues for industry, PRPs and the EPA.
- Evaluation of commercially available mobile systems for contaminated soil thermal remediation on technical and economic bases.
- Evaluation of fixed incineration alternatives for specific waste profiles on technical, economic, and regulatory bases.
- Prepared and consulted on about 25 RCRA and TSCA trial burn plans for all major incinerator types.
- Waste characterizations for many different industry waste types, including chemical, pharmaceutical, plastics, petroleum refinery, explosives, radioactive, and biomedical.

- 1985-1988 Director, Business Development, Thermal Treatment Systems, IT Corporation, Knoxville, Tennessee. Defined market needs and potential winning strategies in the areas of fixed and transportable hazardous waste incineration systems. Required staying current on latest developments in thermal treatment and appropriate regulations.
- 1980-1985 Process Consultant in Hazardous Waste Incineration, IT Corporation, Knoxville, Tennessee. Was responsible for RCRA incineration regulations, incineration, and hazardous waste management technologies. Duties included administrative assistance for the thermal group in labor planning and scheduling and supervising and training group employees in incineration system technology, the RCRA regulatory program, safety, and hazardous waste management.
- 1975-1980 Environmental Specialist in Solids, Thermal, Air Pollution Control, Hydrosience, Inc., Knoxville, Tennessee. Was responsible for hazardous and solid waste technology in the areas of incineration, air pollution control, recycle water systems, resource recovery, and energy recovery. Tracked and interpreted RCRA regulations relative to permitting and operation of client facilities.
- 1971-1975 Senior Environmental Engineer, Environmental Systems Division, Technology Resource Center, Dow Chemical Company, Midland, Michigan. Responsible for application of best technology to waste disposal projects for Dow and outside industrial clients.
- 1969-1971 Assistant Superintendent of an organic production plant. Technical and supervisory duties for a \$6MM capital production facility for Dow.
- 1968-1969 Production Development Engineer. Responsible for quality, yields, safety, process improvements, and capital installation at various Dow Chemical production facilities.
- 1967-1968 Leave of absence from Dow to obtain MBA.
- 1965-1967 Special Assignments Engineer Project work in sales, research, and production for Dow Chemical in Midland, MI

#### Registration/Certification

Registered Professional Engineer: Michigan, Tennessee, Louisiana and Delaware.

#### National Committee, Expert Panel and Peer Review Participation

Department of Energy, Peer Review Panel for DC Arc Melter and Plasma Hearth Vitrification Processes for Mixed Wastes, Regulatory Science Institute, Idaho Falls, ID, August 25-28, 1997

Department of Energy, Peer Review Panel for Integrated Non-Thermal Treatment Systems Study for Mixed Waste, Idaho Falls, ID, August 6-9, 1996

Department of Defense, Technical Review Panel for Alternative Technologies for Chemical Demilitarization, Aberdeen, MD, October 16-27, 1995



Department of Energy, Internal Review Panel for Integrated Thermal Treatment Systems Study for Mixed Waste, Gaithersburg, MD, November 15-18, 1994

Department of Energy, Technical Review Panel for Molten Salt Oxidation, Gaithersburg, MD, October 25-27, 1993

Agency for Toxic Substances and Disease Registry, Non-Incineration Remedial Technologies Panel, Bloomington IN, September 13-15, 1993

Journal of Air and Waste Management Association, Peer Review of Waste Treatment Papers, 1991 to 1994

American Academy of Environmental Engineers, Wastech '92, Innovative Technology, Thermal Destruction Task Group, 1994

USEPA, Peer Review of Vitrification Handbook, September 1991

ASME and USEPA, Workshop on the Control of Metal Emissions from Waste Combustion Devices, Workshop Organizing Committee, November 7-8, 1991

ASME, Research Committee on Industrial and Municipal Waste, Review Committee for Volume II of the Hazardous Waste Incinerator Guidance Document, 1988

ASME, Research Committee on Industrial and Municipal Wastes, Author of one section in Hazardous Waste Incineration - A Resource Document, 1987 ASME Research Committee on Industrial and Municipal Waste, Combustion Energy Recovery Sub-Committee, 1974-1976

#### Conference Chairs or Co-chairs

90th Annual Air & Waste Management Meeting, Co-chair, Thermal Treatment of Mixed Wastes and Military Wastes, Toronto, Ontario, Canada, June 11, 1997

90th Annual Air & Waste Management Meeting, Co-chair, Dioxin Emissions and Controls for Hazardous Waste Incinerators, Toronto, Ontario, Canada, June 9, 1997

89th Annual Air & Waste Management Meeting, Co-chair, Dioxin, Metals, and Particulate Emissions and Controls for Hazardous Waste Incinerators, Nashville, TN, June 26, 1996

1994 Incineration Conference, University of California, Co-chair, Emerging Thermal Treatment Technologies, Houston, TX, May 1994

1993 Incineration Conference, University of California, Co-chair, Boilers and Industrial Furnaces, Knoxville, TN, May 1993

1992 Incineration Conference, University of California, Chair, Thermal Treatment of Petroleum Contaminated Soils and Sludges, Albuquerque, NM, May 1992

1991 Incineration Conference, University of California, Co-chair, Trial Burns, Knoxville, TN, May 1991

1991 Incineration Conference, University of California, Co-chair, Mixed Waste Permitting, Knoxville, TN, May, 1991

Haztech International '88, Co-chair, Incineration, Cleveland, OH, September 1988

#### Publications and Presentations

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Rigo, H. G. and J. J. Cudahy, "National Annual Dioxin Emissions Estimates from Waste Combustors", Proceedings of the 1997 International Incineration Conference, University of California, Oakland, CA, May 14, 1997. (Paper and Presentation)

Cudahy, J.J. and William J. Quapp, "Innovative Thermal Treatment Technologies", Advanced Tutorials Workshop, 1997 International Incineration and Thermal Treatment Conference, University of California, Oakland, CA, May 15, 1997. (Presentation)

Cudahy, J.J. and Paul A. Sadler, "Mobile Incineration of Contaminated Soils", Chapter 20 in Bioremediation : A Comparison with Other Technologies , to be published by Technomic in 1997. (Book Chapter)

Holcomb D. H and J. J. Cudahy, "Thermal Treatment of Coal Tar and Coal Tar Contaminated Soils", 89th Meeting of the Air and Waste Management Association, Nashville, TN, June 26, 1996. (Paper)

Cudahy, J. J., et al, "Incineration of Rocket Propellant and Oxidizer from Ukrainian Missiles", Proceedings of the 1996 International Incineration Conference, University of California, Savannah, GA, May 9, 1996. (Paper and Presentation)

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Cudahy, J.J., "Mobile Incineration and Thermal Desorption of Superfund Sites", World Environmental Congress, London, Ontario, September 20, 1995. (Presentation)

Cudahy, J.J., "Hazardous Waste Management and Incineration in the United States", Presentation to the Philippine Islands Technology Matching Mission/Chemical Sector, sponsored by the World Bank at the University of Tennessee, Knoxville, TN, August 23, 1995. (Presentation)

Cudahy, J.J., Seminar on Proven and Innovative Site Remediation Thermal Technologies, American Society of Civil Engineers Continuing Education Program, Presented in Pittsburgh, PA, July 23, 1995. (Presentation)

Cudahy, J.J., "Comparison of Hazardous Waste Incinerator Emissions with Common Non-Hazardous Combustion Devices", 88th Meeting of the Air and Waste Management Association, San Antonio, TX, June 18-23, 1995 (Paper and Presentation)

Cudahy, J.J., "Dioxin Emission Database", Combustion Strategy Workshop, Focus Environmental, Inc., Knoxville, TN, September 19, 1994 (Presentation)

Cudahy, J.J., "Innovations in Thermal Destruction Technologies", Seminar on Innovative Site Remediation Technologies, American Academy of Environmental Engineers, Presentations in New York, San Francisco, Dallas, and Atlanta, May, August, September, and December, 1994. (Presentations)

Magee, R.S., J. J. Cudahy, et al, Thermal Destruction, Wastech Monograph Series on Innovative Site Remediation Technology, Volume 7, American Academy of Environmental Engineers, 1994. (Book Chapter)

Cudahy, J.J., and W.L. Troxler, "Thermal Remediation Technologies for Hydrocarbon Contaminated Soils", Remediation workshop presented to the Louisiana Department of Environmental Quality, Association for the Environmental Health of Soils, Baton Rouge, LA, April 18, 1994. (Presentation)

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Cudahy, J.J., W.L. Troxler, R.P. Zink, J.J. Yezzi, and S.I. Rosenthal, "Regulatory Considerations: State and Federal Requirements with Trends Affecting the Industry", Remediation America '91 Seminar, Orlando, Florida, January 16-17, 1991. (Presentation)

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Cudahy, J.J., and A.R. Eicher, "Thermal Remediation Industry: Markets, Technologies, and Companies", Pollution Engineering, November 1989:76-80. (Paper)

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Koenig, R.A., and J.J. Cudahy, "RCRA Trial Burn Planning and Implementation with the LANL's Transuranic Incinerator", Incineration of Low Level Radioactive and Mixed Wastes Conference, April 23, 1987 St. Charles, Illinois. (Paper and Presentation)

Cudahy, J.J., "Hazardous and Industrial Waste Characterization", Incineration of Industrial Wastes Conference, March 12, 1987, San Diego, California. (Presentation)

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Cudahy, J.J., "Industrial Waste Characterization", First National Industrial and Institutional Waste-To-Energy Conference, Philadelphia, Pennsylvania, November 14, 1986. (Paper)

Cudahy, J.J., "Thermal Technologies For Hazardous Wastes", 19th Annual Conference, Arkansas Federation of Air and Water Users, Hot Springs, Arkansas, October 3, 1986. (Presentation)

Cudahy, J.J., "Hazardous Waste Incineration Course", Rutgers University, New Brunswick, New Jersey, May 5, 1986 (Presentation)

Cudahy, J.J., A.R. Eicher, and W.L. Troxler, "Thermodynamic Equilibrium of Halogen and Hydrogen Halide During the Combustion of Halogenated Organics", Sixth National Conference on the Management of Uncontrolled Waste Sites, Washington, D.C., November 1985 (Paper)

Cudahy, J.J., "Practical RCRA Trial Burn Considerations", AIChE National Meeting, Chicago, Illinois, November 10-15, 1985. (Presentation)

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White, R.E., J.J. Cudahy, T. Busmann, M. Foster, and S. Meckstroth, "New Jersey Industrial Waste Survey", Industrial Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, 1984. (Report)

Cudahy, J.J. and D.M. Pitts, "Hazardous Waste Incinerator Design Considerations", in Solid, Hazardous, and Radioactive Wastes; Volume II, Hazardous and Toxic Wastes; Management, Emergency Response, and Health Effects, Pennsylvania Academy of Science, May 1984. (Book Chapter)

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Cudahy, J.J., and J.N. Clark, "The Impact of the Resource Conservation and Recovery Act on the Design of Hazardous Waste Incinerators", in *Detoxication of Hazardous Wastes*, Ann Arbor Science, 1982. (Book Chapter)

Cudahy, J.J., W.L. Troxler, and L.M. Sroka, "Incineration Characteristics of RCRA Listed Hazardous Wastes", EPA Contract No. 68-03-2568, July 1981. (Report)

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Cudahy, J.J., "Plan For Developing Hazardous Waste Management Program Procedures", 85th National AIChE Meeting, Philadelphia, Pennsylvania, June 5, 1978 (Paper and Presentation)

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A P P E A R A N C E S

FILE

FOR THE PLAINTIFFS:

MICK HARRISON, ESQUIRE  
P.O. Box 467  
Bera, KY 40403

FOR THE DEFENDANTS:

ROBERT H. FOSTER, ESQUIRE  
U.S. Dept. of Justice  
999 18th Street, Suite 945  
Denver, CO 80202

ALSO PRESENT:

Maj. Peter C. Zolper  
U.S. Dept. of the Army

\* \* \* \* \*

EXAMINATION BY COUNSEL FOR THE  
PLAINTIFF                      DEFENDANT

WITNESS:

Richard Holmes

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E X H I B I T S

EXHIBIT NUMBER:

MARKED FOR IDENTIFICATION

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REPRODUCED FROM ORIGINAL FILE

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF UTAH, CENTRAL DIVISION

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CHEMICAL WEAPONS WORKING :  
GROUP (CWWG), INC., :  
SIERRA CLUB, AND VIETNAM :  
VETERANS FOUNDATION, :

Plaintiffs,

Case No. 2i96CV 425C

UNITED STATES DEPARTMENT :  
OF THE ARMY :  
UNITED STATES DEPARTMENT :  
OF DEFENSE AND :  
EG&G DEFENSE MATERIAL INC., :

Defendants.

-----X

Tuesday, April 14, 1998  
- Arlington, Virginia

Telephonic Deposition of

RICHARD HOLMES

witness, called for examination by counsel for the  
plaintiff, pursuant to notice, at the offices of Army  
Environmental Lit. Office, 901 N. Stuart Street, Arlington,  
Virginia, beginning at 11:06 a.m., before Timothy Clark, a  
notary public in and for the State of Virginia, when were  
present on behalf of the respective parties:

EQC Meeting May 18, 2000  
Attachment U, Page U-102

1 that could be used for this purpose?

2 A Yes, there is.

3 Q And where would that be?

4 A The toxic maintenance area is RCRA permanent  
5 storage.

6 Q Okay. Does that mean anything you want to store  
7 in there is okay?

8 A Subject to what is defined in the permit that  
9 authorizes that storage area.

10 Q All right. Do you know whether it was  
11 contemplated to store charcoal?

12 A I don't know for certain that charcoal is included  
13 in the permanent storage in the TMA.

14 Q All right. Now, some waste generated at TOCDF has  
15 been sent to CAMDS for storage, has it not?

16 A I don't know if we have sent waste to CAMDS for  
17 storage or not.

18 Q Okay. Now, apart from the charcoal waste stream  
19 we've talked about, why is it that you have drawn the  
20 conclusion that the dunnage incinerator is not required for  
21 the other waste streams for which it was intended?

22 A There is not a need to incinerate the wood that is  
23 the packing material around the munitions that has not been  
24 exposed to chemical agent.

25 Q Okay.

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1 A Which was by poundage the largest quantity of  
2 material that was going to be fed into the dunnage  
3 incinerator.

4 Q All right. Now, some of that wood would have  
5 actually been exposed on occasion, is that correct?

6 A A very small amount would have been exposed.

7 Q All right. And there are other waste streams, I  
8 take it, that were intended for the dunnage incinerator  
9 besides the wood?

10 A The other one was DPE suits. That's the suits you  
11 wear to perform work in the contaminated spaces in the  
12 facility.

13 Q Right. And is there a reason you don't need the  
14 dunnage incinerator for that?

15 A Years ago we decided that we would not incinerate  
16 the DPE suits.

17 Q All right. Is that a decision that applies to  
18 both Tooele and JACADS?

19 A Yes, it does.

20 Q All right. Do you recall when that decision was  
21 made?

22 A I don't, I don't remember the, the timing of it.

23 Q All right. Do you recall who made the decision?

24 A Yes, I do.

25 Q And who made the decision?

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1 A It was the then program manager for chemical  
2 demilitarization.

3 Q All right. And do you recall who that was at that  
4 time?

5 A Yes. His last name was Baronian -- B-a-r-o-n-i-a-  
6 name.

7 Q Do you know the basis for making that decision at  
8 that time?

9 A Yes, I do.

10 Q What was that?

11 A The, the DPE suit is made out of a chlorinated  
12 plastic.

13 Q Right.

14 A And the pollution abatement system that's attached  
15 to the dunnage incinerator we felt would not be an effective  
16 scrubber for the likely dioxins that would be produced from  
17 the incineration of those suits.

18 Q All right. Is there any intent at this moment to  
19 use the dunnage incinerator at the JACADS facility in the  
20 future?

21 A Um, at this point it's subject to the same  
22 evaluation for charcoal disposal as is going on for Tooele.

23 Q All right. Apart from the charcoal is there any  
24 plan to use it at JACADS?

25 A Not that I'm aware of.

1 Q All right. And I take it the answer is the same  
2 for the dunnage incinerator at Tooele?

3 A That's correct. Again, subject to completion of  
4 the evaluation of to determine how we're going to dispose of  
5 the charcoal.

6 Q All right. Now, the wood that we've been  
7 discussing that was originally intended for processing in  
8 the dunnage incinerator, you've identified most of it would  
9 not be contaminated with an agent. What is the current  
10 disposition of that wood in terms of that type of dunnage  
11 created at the Tooele facility? What's being done with it?

12 A I, I think it's going to a landfill.

13 Q Okay. And I take it that this would be sent to a  
14 landfill after doing some sort of testing, or, inspection to  
15 determine whether or not it was exposed to agent?

16 A That's correct.

17 Q Do you know what process is used to make that  
18 determination?

19 A There are multiple layers and they're defined in  
20 the waste analysis plan. It starts with a statistical  
21 sampling of material where we took actual wood samples and  
22 in the laboratory performed an agent analysis of that wood.  
23 It's then based upon the sampling that is done of the vapor  
24 space inside of the on-site container that is used to bring  
25 the munitions and the dunnage to the facility and I believe

1 includes some statistical base, rechecking of the results  
2 utilizing the laboratory procedure on a periodic basis.

3 Q When you say statistical rechecking, what are you  
4 referring to?

5 A I think there's some requirement every so many  
6 days to take another wood sample and take it to the  
7 laboratory as a confirmation that the check of the vapor  
8 space inside of the on-site container is a, is an indicator  
9 that there is no agent present in the wood.

10 Q Okay. So, I take it the vapor space in the  
11 container is checked in every case for wood that is to be  
12 disposed of. It's not a statistical sampling, but, it's  
13 done in every case?

14 A That's correct.

15 Q All right. And the actual analysis of the wood is  
16 done on a statistical sampling basis?

17 A Correct.

18 Q Do you know what quantity of dunnage was  
19 contemplated as being generated and required to be processed  
20 in the dunnage incinerator for Tooele?

21 A I think that there are, that there is  
22 approximately 25 million pounds of wood dunnage associated  
23 with the entire stockpile at Deseret Chemical Depo.

24 Q Okay. And that would not count the non-wood type  
25 of dunnage?

1 A Uh, when I say the 25 million pounds I'm not  
2 trying to be exclusive of -- I --

3 Q I mean that figure was made for the wood, right,  
4 not for the DPE's, or, the charcoal, or, other items of  
5 dunnage?

6 A Correct. I'm talking about the packing material  
7 that is surrounding the current stockpile as dunnage. That  
8 number does not include DPE suits nor charcoal.

9 Q Okay. When you say surrounding what does that  
10 mean exactly?

11 A Um, in some cases that there are pallets. In some  
12 cases those pallets are at the base of the munition and at  
13 the top of the munition. In some cases in rockets there are  
14 the pallet almost totally surrounds with some open space the  
15 packing of rockets.

16 Q Okay. I understand. So, this would be officially  
17 the wood packing in whatever form it takes?

18 A Right. When I say surrounding it's all on the  
19 outside. It's outside of the projectile. It's outside of  
20 the rocket.

21 Q I understand. So, it wouldn't come into contact  
22 with agent if leaking were occurring?

23 A Correct.

24 Q All right. And do you have any idea what the  
25 amount of non-wood dunnage that was anticipated being



ATTACHMENT V

*LISTING OF DOCUMENTS RELATED TO  
THE DUNNAGE INCINERATOR*

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# DUNNAGE INCINERATOR DOCUMENTS CURRENTLY UNDER REVIEW BY THE DEPARTMENT

DEQ Item No	Date Received	Date of Document	Organization From	Organization To	Document Description
653		1/12/95	GAO	Sec. of Army	Funding Miscalculated, Dunnage Purchase
1024		6/1/93	US ARMY		RCRA Permit Application Update UMCDF Volume B-Reference DFS & DUN Vendor Drawings for TOCDF [Response to the 4th NOD]
1409		3/1/95	Raytheon Engineers & Constructors	Aberdeen Proving Ground	RCRA Trial Burn Report for Agent GB/Dunnage
00-0023	1/7/00	1/4/00	UMCDF	DEQ-Hermiston	Permit Condition I.W., Other Information, Dunnage Furnace Retrofit Design Report
00-0024	1/7/00	12/1/94	Maumee Research & Engineering	DEQ-Hermiston	Dunnage Furnace Retrofit Design Report, December 1994 MR&E Report No. 94026 (Prepared for EG&G Defense Materials, Inc.)
00-0109	1/24/00	1/24/00	DEQ-Hermiston	File Category 700	Memo to File: Dunnage Incinerator (DUN) Meeting Notes from the January 13, 2000 Meeting with Raytheon and the Army
00-0111	1/24/00	1/24/00	DEQ-Hermiston	DEQ-Portland	Memo (Confidential) Secondary Waste and Dunnage Incinerator Issues
00-0194	2/3/00	1/13/00	Environmental Quality Commission	Morrow County Court	Dunnage Incinerator and the Management of Secondary Waste Issues
00-0232	2/11/00	2/9/00	UMCDF	DEQ-Hermiston	Permit Condition I.W., Other Information, Thermal Analysis of DUN Furnace System for Continuous Loading, Report No. 94038

## DUNNAGE INCINERATOR DOCUMENTS CURRENTLY UNDER REVIEW BY THE DEPARTMENT

DEQ Item No	Date Received	Date of Document	Organization From	Organization To	Document Description
00-0233	2/11/00	29-Jul-94	Maumee Research and Engineering, Inc.	EG & G Defense Materials, Inc.	Thermal Analysis of DUN Furnace System for Continuous Loading, Report No. 94038
00-0240		1/6/00			UMCDF Configuration Change Concurrence Sheets - ECPS for the Dunnage Incinerator
00-0260	2/15/00	2/11/00	UMCDF	DEQ-Hermiston	Permit Condition I.W., Other Information, Dunnage Incinerator (DUN) Replacement Risk Assessment Report
00-0261	?	1/1/00 & 11/1/98	PMCD-East	DEQ-Hermiston	U.S. Army Program Manager for Chemical Demilitarization DUN Replacement Risk Assessment Report/Carbon Micronization System at Umatilla CDF Feasibility Study
00-0298	2/29/00	2/25/00	Ecology & Environment Inc.	DEQ-Hermiston	Comments on: "Dunnage Incinerator System Improvement Options Feasibility Study"
00-0406	3/22/00	Unknown	PMCD		JACADS Dunnage Incinerator (DUN) Modifications
00-0407	3/22/00	1/16/91 (1/16/91, 9/19/91 and 10/9/91 for attached documents	Surface Combustion, also PMCD for some of the attached stuff	United Engineers and Constructors, Inc.--Stearns Roger Division	Attachment to 00-0406; Your Order No. TE-2003 9338400 Dunnage Incinerator for TOCDF, Our Job No. JC-3091 Document 16 "Equipment Data Sheets" for Ash Discharge Gate Valve
00-0409	3/22/00	9/28/91	United Engineers and Constructors	PMCD-East	Attachment to 00-0408; Restart Requirements for the DUN Furnace System Contract No. DACA87-86-C-

# DUNNAGE INCINERATOR DOCUMENTS CURRENTLY UNDER REVIEW BY THE DEPARTMENT

DEQ Item No	Date Received	Date of Document	Organization From	Organization To	Document Description
00-0411	3/22/00	29-Jan-88	JACOBS Engineering Group, Inc.	PMCD	Incineration Methods (Existing Furnaces) for Chemical Agent Contaminated Charcoal-Final
00-0412	3/22/00	28-Jun-88	JACOBS Engineering Group, Inc.	PMCD-East	Non-Agent Charcoal Testing in CAMDS Toxic Dunnage Incinerator Contract No. DACA87-86-D-0085
00-0413	3/22/00	5/23/89	Maumee Research and Engineering, Inc.	Stearns Roger Division	Final DUN Grate Design Report for Burning Granular Activate Carbon JACADS DUN Furnace Project 7094
00-0414	3/22/00	Unknown	Midland-Ross Corporation	Stearns Catalytic Corp	DUN Design Proposal per RFP No. C03X-02
00-0415	3/22/00	8/19/91		Deputy Program Manager & Technical Director	Comparison between JACADS Dunnage Incinerator (DUN) and CAMDS Toxic Dunnage Incinerator
00-0416	3/22/00	6/6/91	PMCD-East	JACADS Project Officer	Attachment to 00-0415; Incineration of Filter Carbon in the JACADS DUN
00-0417	3/22/00	10/25/90	United Engineers and Constructors	PMCD-East	Transmittal Page: DUN Furnace RCRA Parameter Problems
00-0418	3/22/00	10/23/90			Attachment to 00-0417; DUN Furnace RCRA Parameter Problems
00-0419	3/22/00	2/9/91	Stearns Roger Division-OMC	PMCD-JACADS	DUN Status
00-0420	3/22/00	2/9/91	Stearns Roger Division-OMC	PMCD-East	Attachment to 00-0419; Status of the current DUN Documentation

## DUNNAGE INCINERATOR DOCUMENTS CURRENTLY UNDER REVIEW BY THE DEPARTMENT

DEQ Item No	Date Received	Date of Document	Organization From	Organization To	Document Description
00-0421	3/22/00	11/17/90	PMCD-East	Stearns Roger Division-OMC	Dunnage Incinerator (DUN) Furnace Acceptance Report
00-0422	3/22/00	11/15/90		PMCD-East	Attachment to 00-0421; DUN Furnace Phase II Acceptance Test Report
00-0423	3/22/00	1/22/91	United Engineers and Constructors	PMCD-East	Attachment to 00-0419; Dunnage Furnace Agent Feed Procedure
00-0424	3/22/00	23-Jan-91	Rader Companies	United Engineers & Contractors	Letter confirming fax transmittal of prior evening
00-0425	3/22/00	23-Jan-91	Rader Companies	United Engineers & Contractors	Quotation for Rader Conveying System
00-0426	3/22/00	1/22/91	Surface Combustion	Stearns Roger Division, OMC	Your Order No. TE-2003 9338400 Dunnage Incinerator for TOCDF, Out Job JC-3091 Study to Review Impact on Diverting Flow from Dun-Blower-102 to Primary Chamber and Also to Increase Flow of Air Through Air Grates
00-0427	3/22/00	2/22/91	Maumee Research and Engineering, Inc.	PMCD-JACADS	Fax Transmission regarding JACADS DUN Questions, MRE File 91004
00-0428	3/22/00	2/22/91	Maumee Research and Engineering, Inc.	PMCD-JACADS	Attachment to 00-0427 and 00-0432; Memorandum regarding the JACADS DUN Questions, MRE File 91004

# DUNNAGE INCINERATOR DOCUMENTS CURRENTLY UNDER REVIEW BY THE DEPARTMENT

DEQ Item No	Date Received	Date of Document	Organization From	Organization To	Document Description
00-0429	3/22/00	2/13/91	Maumee Research and Engineering, Inc.	PMCD-JACADS	Attachment to 00-0427; Facsimile Transmission Sheet regarding DUN Furnace Blow-102 Air Diversion Need Piping Drawings to do our Drawings
00-0430	3/22/00	1-Mar-91	Maumee Research and Engineering, Inc.	PMCD-JACADS	Attachment to 00-0427 and 00-0432; Facsimile Transmission Sheet regarding DUN Furnace Study, MRE 91004 Request for Guidance Transmittal of Advance Drawings
00-0431	3/22/00	11/26/90	PMCD	PMCD	Attachment to 00-0427; Memorandum for record regarding JACADS and TOCDF DUN Recommendations.
00-0432	3/22/00	1/3/91	Mitre Corporation	Record File	DUN Furnace Status to Date
00-0433	3/22/00	8/31/90	Maumee Research and Engineering, Inc.	UEC-Stearns Roger Division	Commentary on Report No. 89030 Operational Status of JACADS Dunnage Incinerator (DUN) Furnace
00-0434	3/23/00	8/1/90	Maumee Research and Engineering, Inc.	Stearns Roger Division, OMC	Attachment to 00-0433; Operational Status Report on JACADS Dunnage Incinerator (DUN) Furnace Project No. 89030
00-0445	3/22/00	3/8/91	PMCD-East	PMCD-East	Improvements to DUN Lift
00-0446	3/22/00	8-Mar-91	PMCD	PMCD	Attachment to 00-0445; Scope of Work for DUN Lift Vendor
00-0447	3/22/00	3/14/91	Arthur D. Little Inc.	PMCD-East	Attachment to 00-0445; Preliminary Investigation of the DUN Ram Malfunction

## DUNNAGE INCINERATOR DOCUMENTS CURRENTLY UNDER REVIEW BY THE DEPARTMENT

DEQ Item No	Date Received	Date of Document	Organization From	Organization To	Document Description
00-0448	3/22/00	3/26/91	Arthur D. Little Inc.	PMCD-East	Historical Survey of Problems Associated with the DUN Feed System
00-0449	3/22/00	3/26/91	Stearns Roger Division-OMC	Arthur D. Little and PMCD	Attachment to 00-0448; DUN Furnace Feed System, Enclosure: DUN Furnace Feed System Problems DUN Log Book Excerpts
00-0450	3/22/00	3/27/91	Authur D. Little Inc	PMCD-East	Attachment to 00-0448; Summary of DUN Operations from 1700 hrs 21 Mar 91 to 1700 hrs 22 Mar 91
00-0451	3/22/00	1/11/99	PMCD-East		DUN History at JACADS, Comments from Cheryl Maggio (1/11/99)
00-0452	3/22/00	6/28/99	TOCDF		Attachment to 00-0451; DUN History at TOCDF-Comments from Tom Valente (DUN System Engineer at TOCDF)
00-0453	3/22/00	2-Aug-91	Maumee Reseach and Engineering, Inc.	PMCD	Analysis of CSDP Incinerator Shutdown Alternatives, MR&E Report, Project No. 9-SC-6712-0061B
00-0454	3/22/00	1-Apr-89	Maumee Research and Engineering, Inc.	Ralph M. Parsons Co.	Attachment to 00-0453; Analysis of CSDP Incinerator Shutdown Alternatives, First Draft
98-0584	8/20/98	8/18/98	UMCDF	DEQ-Hermiston	Decision Being Pursued to Remove the Dunnage Incinerator (DUN) from the UMCDF Scope
98-0606	8/27/98	8/27/98	DEQ-Hermiston	Dept of Army	Letter RE: Dunnage Incinerator



# DUNNAGE INCINERATOR DOCUMENTS CURRENTLY UNDER REVIEW BY THE DEPARTMENT

DEQ Item No	Date Received	Date of Document	Organization From	Organization To	Document Description
98-0861	11/2/98	11/2/98	DEQ-Hermiston	Ecology & Environment Inc.	Memorandum Re: Transmittal of dunnage Incinerator, and HRA documents
98-0866	10/27/98	10/27/98	DEQ-Hermiston	Interested Parties	UMCDF DUN REPLACEMENT AND ALTERNATIVE WASTE MANAGEMENT PRESENTATION FOR ODEQ OCT 27, 1998
98-0867	10/27/98	10/27/98	DEQ-Hermiston	Interested Parties	Attachment to 98-0866 Risk Assessment for UMCDF Dun Replacement
98-0868	10/27/98	10/27/98	DEQ-Hermiston	Interested Parties	Attachment to 98-0866 UMCDF Facility Operations and Emission Rate Estimates After Dun Replacement
98-0869	11/3/98	11/3/98	DEQ-Hermiston	EPA	Memorandum Re: Materials from DUN meeting with the Army
98-0943	11/18/98	11/12/98	UMCDF	DEQ-Hermiston	Transmittal Letter Re: Dunnage Incinerator (DUN) Replacement and Alternative Waste Management for the Umatilla Chemical Agent Disposal Facility
98-0944	11/18/98	10/27/98	UMCDF	DEQ-Hermiston	Attachment to 98-0943 SAIC Meeting Minutes: DUN Replacement Presentation for ODEQ
98-1031	12/3/98	12/3/98	DEQ-Hermiston	Dept of Army	Letter Re: Dunnage Incinerator Umatilla Chemical Agent Disposal Facility
99-1031	7/2/99	6/25/99	UMCDF	DEQ-Hermiston	Letter Re: Summary of June 15, 1999, Exploratory Meeting regarding the Dunnage Incinerator
99-1032	7/2/99	6/25/99	UMCDF	DEQ-Hermiston	Attachment to 99-1031 Summary of June 15, 1999, Meeting with the DEQ on the Dunnage Incinerator (DUN)

# DUNNAGE INCINERATOR DOCUMENTS CURRENTLY UNDER REVIEW BY THE DEPARTMENT

DEQ Item No	Date Received	Date of Document	Organization From	Organization To	Document Description
99-1245	7/23/99	8/18/99	DEQ-Hermiston		EQC Agenda Re: Special Meeting Dunnage Incinerator August 18, 1999 held in Portland, Oregon
99-1273	7/26/99	7/26/99	DEQ-Hermiston	UMCDF	DEQ Letter Re: Dunnage Incinerator Feasibility Study Permit Condition I.W.
99-1350	8/9/99	8/6/99	UMCDF	DEQ-Hermiston	Letter Re: Dunnage Incinerator (Dun) Feasibility Study
99-1367	8/13/99	8/13/99	DEQ-Hermiston	EQC	DEQ Memorandum Re: August 18, 1999 EQC Work Session: Dunnage Incinerator and Carbon Filters at Umatilla
99-1416	8/26/99	14-Jun-99		DEQ-Hermiston	Agenda for June 15, 1999 Meeting on the Dunnage Incinerator
99-1647	10/4/99	9/28/99	UMCDF	DEQ-Hermiston	Letter Re: Transmittal of the Army Report Dunnage Incinerator System Improvement Options Feasibility Study, Final
99-1648	10/4/99	9/28/99	UMCDF	DEQ-Hermiston	Attachment to 99-1647 Army Report-Dunnage Incinerator System Improvement Options Feasibility Study

ATTACHMENT W

**"A Report on the September 15, 1999 Industrial Accident at the  
Umatilla Chemical Agent Disposal Facility,"**

by

Oregon Department of Environmental Quality  
Oregon Emergency Management  
Oregon Occupational Safety and Health Administration  
Oregon Health Division

April 20, 2000  
(DEQ Item No. 00-0582)

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A Report on the  
September 15, 1999  
Industrial Accident at the  
Umatilla Chemical Agent  
Disposal Facility

Prepared by:

Wayne C. Thomas, Department of Environmental Quality

Chris Brown, Oregon Emergency Management

Rodney Boast, Oregon OSHA

Bryan Hopkins, Oregon Health Division

April 20, 2000

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## *Executive Summary*

On September 15, 1999, at approximately 11:10 a.m., workers in the Munitions Demilitarization Building (MDB) at the Umatilla Chemical Agent Disposal Facility (UMCDF) experienced the sudden onslaught of breathing difficulties. The workers evacuated the building through whatever egress was available.

After waiting approximately two hours at the site, thirty-four employees were transported via van and ambulance to Good Shepherd Community Hospital in Hermiston. The employees reported the following symptoms: difficulty in breathing, tightness in the chest, irritated throat, nausea and some indicated a metallic taste. Five employees were admitted to the hospital for further observation. The source and nature of the contamination remains unknown.

Under the leadership of the Governor's Office, a Four Agency Team (Team) was established to investigate response actions conducted by the Umatilla Chemical Depot (UMCD), Raytheon Demilitarization Company (RDC) and Off-Post Communities as a result of the September 15, 1999 incident. The purpose of the investigation was to evaluate worker safety, emergency response and public awareness to identify any lessons that should be learned for any future incidents and make recommendations based on the findings. The Agency Team concurs with the Army and Raytheon findings that there is sufficient evidence to indicate that this was not a chemical event (for reasons so stated in their reports).

However, the Team has identified failures in the following areas:

- > Site Evacuation and Medical Evacuation
- > Communication between the On-Post and Off-Post Emergency Response Communities, medical facilities and the public
- > Communication between the Army, Raytheon and the employees

The Agency Team has determined that the response actions by RDC were inadequate and seriously jeopardized the health and welfare of employees. An area of particular concern is how and when the decision was reached and by whom, that this incident was not caused by a

chemical agent release. The timing and accuracy of this decision was crucial for all subsequent response actions. We remain unclear how the decision was reached. It is problematic that the UMCD and RDC did not implement the Chemical Accident/Incident Response Action (CAIRA) Plan until such time that monitoring of the storage igloos confirmed that a release of chemical agent did not occur. The results of chemical agent monitoring were not available for three hours following the incident.

RDC's decision to reject medical aid offered by the UMCD medical clinic is inconceivable. This multi-casualty event overwhelmed RDC's resources and the off-post medical facilities. Providing the best medical services for the injured workers should have been RDC's first priority.

The failure to communicate the scope of the event to the off-post emergency operation centers and the public is a significant issue. The evacuation or so-called "early release" of workers caused a major impact and concern for the surrounding communities. The first press release for the event was not issued until several hours after the incident by which time rumors were rife throughout the community. The first press conference was not held until five days after the incident. It is not difficult for the Agency Team to understand questions and concerns from the community that UMCD and RDC were trying to conceal information.

Comments from site workers during the November 1, 1999, public meeting demonstrate that there is a communication problem between RDC and the construction workers. Several commenters stated that they were confused about what happened at the site and that as of November 1, 1999, they had not been provided sufficient information. The Agency Team did not find any evidence that this communication challenge has been addressed.

We do note that in reviewing the responses provided by the UMCD Commander (LTC Tom Woloszyn) that UMCD has conducted a thorough assessment of the issues resulting from the incident. The Commander has expressed and demonstrated intent to learn lessons from the incident and implement appropriate corrective measures. RDC responded to the Agency Team's questions citing Raytheon procedures, which have not been provided to the Team, even though



they were requested. If appropriate procedures were in place and correctly implemented, then workers should have been adequately protected, treated and the public notified in a timely manner. Clearly, the events that transpired on September 15, 1999 illustrate that appropriate procedures were not being used.

The cause of the incident remains unknown. Analyses of the clothing samples by RDC have reported the presence of pepper spray and associated compounds. The Federal OSHA has analyzed for the pepper spray compounds, but the results did not show the presence of the compounds. Without independent confirmation of the pepper spray results from a different sample set and using a different laboratory, the presence of the pepper spray is questionable. The Agency Team recognizes that the cause of the incident may never be known, but we believe that lessons must be learned and corrective actions implemented to prevent another incident.

### *Recommendations*

Based on the Agency Team's review of the available information the following recommendations should be implemented by the end of calendar year 2000:

1. A Memorandum of Agreement between UMCD and the Off-Post Emergency Response Communities for initial notification of all incidents at the UMCD. UMCD and the Off-Post Emergency Response Communities must define an "incident" as part of the MOA;
2. RDC establish a communication program for all workers at the construction project and provide regular updates on activities;
3. UMCD implement an enhanced chemical agent monitoring program for the storage igloos in "K" Block, with emphasis on the igloos storing the M-55 rockets and leaking munitions;
4. UMCD and RDC establish clear lines of communication and decision-making authority to ensure that appropriate response actions are implemented as soon as possible for any incident;
5. A communication agreement/plan be developed and implemented by the on-post and off-post jurisdictions concerned with public outreach for the UMCD activities;
6. RDC have a Memorandum of Agreement with UMCD stating that the UMCD medical clinic becomes involved in any incident involving casualties in excess of two. UMCD involvement

should remain until a chemical agent release has been ruled out and patients have been stabilized and transferred to a local hospital or released;

7. RDC establish a Memorandum of Agreement with Good Shepherd Community Hospital for patient care;
8. RDC establish a Memorandum of Agreement with the Hermiston Fire Department for patient transportation;
9. UMCD must communicate the procedures used by the facility to notify the off-post community so that the communities can understand the information they will be receiving; and
10. The Army must implement an active Public Awareness program for all activities on-going at the UMCD.

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## Background and Scope of the Investigation

### *Introduction*

Under the leadership of the Governor's Office, a Four Agency Team was established to investigate worker safety, emergency response and public awareness actions conducted by the UMCD, RDC and Off-Post Communities as a result of the September 15, 1999 incident.

### *Purpose of the Investigation and Report*

The purpose of the investigation was to evaluate worker safety, emergency response and public awareness in order to identify lessons to be learned for any future incidents. The scope of the investigation was limited to interviews and reviewing information provided by the various jurisdictions and companies involved. No environmental or medical data was collected during this investigation. Medical records of affected workers were not reviewed during the investigation. This report documents the actions of the Team, provides a record of meetings and public involvement, and makes recommendations to ensure future incidents are managed in an effective manner.

### *A Summary Description of the Incident*

On September 15, 1999, at approximately 11:10 a.m., workers in the Munitions Demilitarization Building (MDB) at the Umatilla Chemical Agent Disposal Facility (UMCDF) experienced the sudden onslaught of breathing difficulties. The workers, who primarily worked in or near the munitions corridor on the first floor, evacuated the building through whatever egress was available.

After waiting approximately two hours at the site, thirty-four employees were transported via van and ambulance to Good Shepherd Community Hospital in Hermiston. The employees reported the following symptoms: difficulty in breathing, tightness in the chest, irritated throat, nausea and some indicated a metallic taste. Five employees were admitted to the hospital for further observation. The source and nature of the contamination remains unknown.

## *Investigation*

The Agency Team members held a scoping meeting on September 24, 1999, and developed a comprehensive list of questions (Attachment 1) to capture the concerns expressed by the communities around the UMCD.

On September 29, 1999, the Agency Team convened a meeting with the Army and Raytheon at the UMCD to receive a preliminary report on the incident. Representatives from Umatilla County, Morrow County and the Hermiston Fire Department were also present. Following a briefing by the Army and Raytheon, the Team presented the list of questions and required a response by November 1, 1999. The Army provided a timeline of events that occurred on September 15, 1999 (Attachment 2).

The Umatilla Chemical Depot Commander held a Town Hall meeting in Irrigon on October 19, 1999. The purpose of the meeting was to provide assurances to the community that appropriate actions were being taken following the incident and lessons had been learned.

On November 1, 1999, a public meeting of the Agency Team was held at the National Guard Armory in Hermiston. Approximately sixty people were in attendance. The Army and Raytheon made presentations in response to the Agency questions provided on September 29, 1999 (Attachment 3). In addition, members of the public were invited to make statements and ask questions of the Agency Team, the Army and Raytheon.

The Agency Team held two additional meetings to review the information provided by the Army, Raytheon, Hermiston Fire Department and Good Shepherd Community Hospital to develop findings. The intent of the review was to complete a thorough examination of the September 15, 1999, incident, identify failures, identify lessons learned and assure those lessons are applied in a consistent and robust manner for any potential future incident.

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## Findings

### *1. On-Off Post Notification*

For the On-Post notification, we concur with the Army and Raytheon findings that there is sufficient evidence to indicate that this was not a chemical event (for reasons so stated in their reports). However, it is also clear that at the time of the incident, Raytheon notification was limited to word of mouth and a plant radio system via supervisors (message was "evacuate the MDB"). Although requested, copies of Raytheon's actual emergency plan have not been provided for examination of details.

Raytheon management personnel have indicated that as a result of this event, a new public address system has been installed in the Munitions Demilitarization Building (MDB), additional cell phones were issued, additional marking of evacuation routes was done and placement of industrial air monitors accomplished within the MDB. Other measures to increase worker awareness have been instituted, including the release of periodic information papers and strengthening the education program about the UMCD mission.

Off-Post notification procedures are in place at UMCD to notify the off-post community in a non-surety accident (one which poses no chemical agent hazard). It is important to note; the Army's policy is that there is no formal requirement to make notifications for a non-surety event. However, the UMCD Commander (LTC Wolosyzn) acknowledged on numerous occasions the importance of early communications to the off-post communities to avoid confusion or misconception. The issue for this incident was timeliness, accuracy and verification of the off-post notification. This is one area requiring improvement from UMCD (90 minutes after the incident and patients already transported to the local hospital before notification to the counties is not acceptable.) A mitigating communications factor that occurred on September 15 was the Central Oregon accidental severance of a T-1 communication line, which impaired the community's long distance and cellular phone coverage, as well as fax and e-mail capabilities. However, it did not interfere with the state microwave "all call" communications line which allowed for communications with off-post communities and the State Emergency Communication Center (ECC).

The UMCD Commander made several public presentations with a commitment to immediately notify the off-post community--even in the case of a non-surety type event (state/counties will acknowledge there has been a significant improvement in this area since September 15). He instituted immediate action drills and procedural review for his Emergency Operations Center (EOC) to strengthen the off-post notification process and has examined additional means of backup or redundant communications systems (For example--microwave blast fax and additional daily communications checks to EOC county dispatch centers).

## *2. Emergency Evacuation and Initial Response*

UMCD has a Chemical Accident/Incident Response and Assistance (CAIRA) Plan for chemical incidents. If the magnitude is such that evacuation occurs, staff and workers are directed to a pre-designated assembly area where they are accounted for prior to release from the installation. In this case, since there was no evidence of a chemical agent release, no official evacuation occurred. For Raytheon personnel, their Emergency Response Plan and Accident Prevention Plan require employees to be made aware of proper reporting procedures (actual plans were not made available, although requested).

On September 15, when several breakdowns of existing procedures occurred, craft workers at the MDB reported difficulty breathing due to noxious fumes and the Hermiston ambulance was called by Raytheon staff to transport patients to Good Shepherd Community Hospital. Although evidence suggests that the UMCD clinic went beyond the formal request channel and called Raytheon employees to ensure no help was required (they even sent a UMCD fire and rescue team to the site), Raytheon stated that assistance was not required. Therefore, UMCD did not provide any resources to help, and per existing Memorandum of Agreement (MOA) in place, did not have any part in the notification of medical facilities or communication of relevant medical information. One worker was transported to Good Shepherd Community Hospital with no notification from Raytheon, and within two hours another thirty employees arrived in company vans. There is no justification on Raytheon's part as to why it took so long to transport these remaining injured employees to a medical facility in Hermiston. Additionally, RDC failed to provide advance notification to the receiving hospital that a mass casualty event had occurred and at least thirty victims were en route.

The UMCD Commander and the Raytheon project manager have agreed to "tighten up" procedures for accident notification and to follow existing agreements and protocols for emergency evacuation. Other corrective actions include a review of UMCD plans to ensure they are coordinated with community response plans. Since this incident, there have been two meetings between UMCD staff, Raytheon emergency planners and state/county emergency managers to synchronize on/off-site plans, to include evacuation.

### 3. *Public Awareness*

The actions undertaken by the Army, RDC and the Army Corps of Engineers were seriously inadequate to inform the public in a timely manner about the September 15, 1999 incident. The evacuation of 800 workers from the site released "800 press releases" into the surrounding communities and rumors spread quickly. Recovering from the rumors has been a significant challenge for all involved with the activities at the UMCD.

A significant failure was the delay in issuing a press release. The UMCD has reported in a chronological timeline of events that the first press release was issued at 14:30 on September 15; however, there were delays in issuing the press release. As an example, the press release was not received by DEQ Hermiston office until 16:54, approximately 5 hours after the incident.

UMCD and RDC did not undertake adequate measures to provide immediate assurances to the public that the incident was not related to chemical agent. The failure to promptly inform the public raised concerns that the Army and Raytheon were hiding the "facts" and that chemical agent may have been involved. The Army has enjoyed considerable support from the surrounding communities for the activities on-going at the UMCD, but they have failed to recognize that the support can only be maintained by thorough and timely disclosure of information.

### 4. *Hazard Assessment*

It appears that RDC does have procedures in place to handle workplace/employee issues and safety. These procedures were referenced in many of the sections listed in the response to Agency questions (Attachment 3). However, a copy of all of their procedures was requested but has not been provided. Therefore, we cannot confirm that all of the procedures quoted in the

responses to Agency Team questions are in their entirety, actually exist and have not been borrowed at random from existing regulations.

RDC stated many times in their documentation that a chemical release was ruled out due to Federal Emergency Management Information System (FEMIS) information and Real Time Analytical Platforms (RTAP) monitoring. The FEMIS argument is valid, if it shows that the wind direction never blew in the direction of the construction site.

The limitations of the chemical agent monitoring program conducted at "K" Block do not allow UMCD to immediately determine whether a release of chemical agent has occurred. The Agency Team believes that UMCD should have the ability to immediately determine if a chemical agent has been released from a storage igloo as this is crucial for the protection of both the on-post and offpost communities.

RDC also states in their documentation that the RTAPs were utilized to monitor the air in the MDB to rule out chemical agent. However, this monitoring did not take place immediately—it was not conducted until about three hours after the incident occurred. A rapid response from the RTAPs in any situation where there are large numbers of employees suffering from inhalation exposures from an unknown source could give conclusive data and help ease employees' concerns, thus minimizing any potential for hysteria.

### *5. Medical Management*

Since RDC utilizes paramedics as Emergency Medical Technician (EMT)-1's on site at all times, we believe that their medical treatment program is adequate. RDC again quoted procedures but failed to produce them. However, due to the testimonies of exposed workers, the Agency Team questions how effectively RDC executes the listed procedures. It is one thing to have a procedure, but another to follow the protocols.

RDC does not have any procedure on when to contact Good Shepherd Community Hospital (GSCH). They purchased another van to take patients to the hospital if needed, but they have not



worked out a system with GSCH to accept the workers. RDC needs to establish a MOA with Good Shepherd Community Hospital for patient care.

## 6. *Worker safety*

In reviewing Raytheon's responses as they relate to employee safety and health for both on-post and off-post personnel, many inconsistencies were noted. The written responses by Raytheon, the verbal responses by Raytheon, employees of Raytheon, Raytheon sub-contractors and off-post emergency services, all seem to be inconsistent with one another. Some of the responses to the Agency Team questions are presented below and illustrate the inconsistencies between the responses from Raytheon and the workers.

1. The Agency Team asked the question "When employees started experiencing symptoms of exposure, what steps were taken to ensure the employees were evacuated and received timely medical attention? If there was a delay-what was the cause?"
  - a. Responses from Raytheon indicated that employees were evaluated by EMT/Paramedics. Employees displaying the most acute symptoms were transported to the hospital immediately and other affected personnel were assessed, then sent to the hospital depending on symptoms displayed. There was as much as a two hour delay between transporting the most symptomatic employees and other employees to the hospital. Delays in transportation were created by limited availability of vehicles used to transport the employees.
  - b. Responses from the employees of Raytheon sub-contractors were that the employees that displayed the most acute symptoms of exposure indicated that they were told to sit out in the fresh air and that it took two hours to be transported to the hospital.
2. The Agency team asked the question "Once detected, what measures were taken to protect workers while investigating?"

- a. Written responses from Raytheon indicated that after the event, all entries were made by personnel using self-contained breathing apparatus (SCBA). Raytheon indicated that a three-person team comprised of personnel from the safety department, environmental department and the site's industrial hygienist made a sweep of all areas of the building using an organic vapor analyzer. Raytheon also indicated that all subsequent investigation entries into the area were made in accordance with job hazard analysis (JHA) documents, specifically prepared to cover each aspect of the continuing incident investigation. Verbal responses from Raytheon indicated that a JHA was accomplished on each type of work activity for Raytheon and Raytheon sub-contractor employees.
  - b. Employees for Raytheon and Raytheon sub-contractor employees noted that they were not aware of any JHA that was accomplished for their work activities, but rather they were told to return to work because it was safe. No additional information was given to the employees at that time. There was continuous monitoring being accomplished by whoever was tasked for the day. Employees indicated that this was an additional task and that the employees may or may not have been trained.
3. The Agency Team asked the question "When were the off-post medical staff members advised of the situation at the Depot? Was full disclosure given?"
- a. Raytheon's written response was that they called 911 to request ambulance service from Hermiston Fire and Emergency Services and notified the Umatilla Chemical Depot Emergency Operations Center of the in-coming ambulance. Good Shepherd Community Hospital was not called by Raytheon. Full disclosure was given to the extent of the information available at the time of notification.
  - b. It was brought to the attention of the Agency Team that when the off-post medical representatives asked the Army Depot about the potential exposure to the ill employees, the Depot replied by saying, "We are not authorized to release that information at this time." Procedures need to be in place to ensure the timely

transport of injured workers to the hospital in event of an industrial accident. If medical attention is not available from Raytheon for its employees and sub-contracted employees, medical attention should be obtained from the medical staff of the Army Depot until off-post EMT services can respond. There is no reasonable explanation as to why it took two hours to start the patient transport process. Federal OSHA has issued citations to Raytheon for the excessive amount of time it took to get the injured employees medical attention.

Raytheon must ensure that all work activities have a job hazard analysis (JHA) accomplished prior to future work activities. If multiple trades are going to work in the same area, Raytheon and its sub-contractors must ensure that a joint JHA is accomplished for the combined hazards of the different trades. If monitoring is going to be conducted, monitoring must be conducted by staff who have been appropriately trained in the function of the monitoring equipment. In accordance with 29 CFR 1910.1200 Hazard Communication, all employees must be trained and informed of the hazards they are exposed to.

Notifications to the off-post medical community must occur immediately if patients will be transferred to an off-post medical location. This communication must occur whether it is a surety or non-surety event. Without this valuable information, the response and medical community cannot effectively protect their employees. If the material is unknown, as it was in this accident, then that information must be conveyed as well.

The Army Depot and Raytheon should ensure that they have all of the necessary resources to address any industrial accident they may encounter at the Depot. It is apparent that the Depot is prepared for surety type accidents, but there seems to be some gaps to bridge when it comes to industrial accidents. As the MDB moves from the construction phase to the operational phase, there will always be a potential for industrial accidents.

The off-post response and medical services need to ensure that their employees are properly protected in the event of an accident. No matter if the accident is a surety event or if it is not, they must ensure a proper protective level for their employees.

## Recommendations

Based on the Agency Team's review of the available information the following recommendations should be implemented by the end of calendar year 2000:

1. A Memorandum of Agreement between UMCD and the Off-Post Emergency Response Communities for initial notification of all incidents at the UMCD. UMCD and the Off-Post Emergency Response Communities must define an "incident" as part of the MOA;
2. RDC establish a communication program for all workers at the construction project and provide regular updates on activities;
3. UMCD implement an enhanced chemical agent monitoring program for the storage igloos in "K" Block, with emphasis on the igloos storing the M-55 rockets and leaking munitions;
4. UMCD and RDC establish clear lines of communication and decision-making authority to ensure that appropriate response actions are implemented as soon as possible for any incident;
5. A communication agreement/plan be developed and implemented by the on-post and off-post jurisdictions concerned with public outreach for the UMCD activities;
6. RDC have a Memorandum of Agreement with UMCD stating that the UMCD medical clinic becomes involved in any incident involving casualties in excess of two. UMCD involvement should remain until a chemical agent release has been ruled out;
7. RDC establish a Memorandum of Agreement with Good Shepherd Community Hospital for patient care;
8. RDC establish a Memorandum of Agreement with the Hermiston Fire Department for patient transportation;
9. UMCD must communicate the procedures used by the facility to notify the off-post community so that the communities can understand the information they will be receiving; and

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10. The Army must implement an active Public Awareness program for all activities on-going at the UMCD.

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Attachment 1  
Four Agency Team Questions

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## ON-POST/OFF-POST NOTIFICATION

### Warning to the on-post population at risk.

1. How was it decided who was at risk?
2. How would all personnel expected to be at risk be notified?
3. How long did it take for that warning to reach all affected workers?
4. What procedures have been provided to the workers for actions to take in case of an industrial accident?
5. What was the exact warning provided to the workers--did they understand?

### Initial Notification of the off-post community.

1. What are the procedures in place at UMCD to notify the off-post community in case of a non-surety accident?
2. Were those procedures followed?
3. Were there problems encountered in timely, accurate and verified notification of the off-post community?
4. In terms of this accident, what communication means was used to provide initial notification-recognizing that this situation was made more difficult due to the fiber optic cable cut in Oregon?
5. Was UMCD aware of the loss of telecommunications from the cable cut?
6. If so, what method was used to circumvent this communications link to provide essential information?

## EMERGENCY EVACUATION AND INITIAL RESPONSE

### Mobilization and Evacuation.

1. What evacuation procedures are in place for UMCD/RDC personnel?
2. Are such procedures coordinated with the off-post community?
3. What procedures have been provided to the workers for actions to take in case of an industrial accident?
4. What was the exact warning message that was provided to the workers--did they understand?
5. How long did it take for the RDC workers to be mobilized to evacuate?
6. How long did it take for them to leave the depot?

### Initial Emergency Response.

1. What are the procedures in place at UMCD for transportation of casualties off-post and were they followed?
2. Is there a MOA/MOU in place for provision of such services?
3. Was Good Shepherd Community Hospital notified on incoming casualties and by whom?
4. What essential elements of information were transferred from RDC/UMCD to the hospital?
5. Was this information also shared with all potential receiving hospitals?
6. In this particular case, did Good Shepherd Community Hospital convey any information back to UMCD or to County Emergency Operation Centers (i. e. the hospital may have determined the nature of exposure from the manner in which casualties responded to treatment)?



## PUBLIC AWARENESS

1. How did RDC provide information to the public and the media? Perception is that information was released too slow and that something was being hidden (i. e. Was it chemical agent)?
2. What is the relationship between RDC and UMCD for distribution of information to the media and the public? Raytheon was not seen as being up front and the perception is that information was filtered by the Army.
3. When was the first press conference held?
4. How did the UMCD EOC ensure that sufficient information was provided to people that the incident was not related to chemical agents?
5. Were FEMIS Shared Reports used to share information on the incident between UMCD EOC and the counties?
6. Has a log been kept of all messages sent out?
7. Are there pre-prepared fact sheets that were used?
8. Was a telephone number provided for media inquiries?
9. How were information needs of UMCD and RDC personnel handled?
10. Did more people than normal visit the PMCD Public Outreach Office as a result of the incident?
11. Were there information requests from the community hospitals? Which ones? When did they call? Who did they call? What did they ask? What information was provided to them? When? By whom?
12. Were there information requests from the community hospitals? Which ones? When did they call? Who did they call? What did they ask? What information was provided to them? When? By whom?

## HAZARD ASSESSMENT

### Perception of Hazard:

1. Who noticed the problem and did they follow the proper reporting procedures?
2. Are there procedures in place to immediately notify UMCD to utilize RTAPS if a chemical agent release is suspected?

### Hazard Assessment:

1. What information was collected to make a determination of the threat/incident?
2. Does Raytheon have procedures to direct workers on how to respond in the event the incident was a chemical agent release?
3. How long will it take for UMCD to respond with monitoring equipment if a chemical leak is suspected?
4. Are there protocols to use neutral, third party agencies to conduct air monitoring/sampling immediately following any suspected industrial incident at the worksite?
5. Does Raytheon have a process for screening chemicals, used on site, for toxicity, needed PPE (i. e. respirators), volatility, ventilation needs etc.?
6. Does Raytheon Safety conduct hazard assessments of each job to ensure that the proper PPE and work rules are being followed? Are there procedures documenting the proper PPE use and ventilation requirements?

(Please provide a copy of all relevant procedures and policies.)

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## MEDICAL MANAGEMENT

### 1. Triage:

Does Raytheon have procedures on how to triage? If procedures exist, who is trained and did triage occur during this incident?

### 2. Treatment:

Are there procedures on how to treat employees suffering from any condition: chemical or traumatic? Do the procedures incorporate the UMCD clinic or off-post fire/rescue?

### 3.. Decontamination:

Does Raytheon have procedures for employee decontamination on the job site? If so, were they followed (the concern is how employees got to the hospital without being decontaminated at the site)?

### 4. Medical Transportation:

Does Raytheon have a procedure/protocol on how injured/sick workers are to be transported off of the UMCD grounds? If yes, were they followed?

Do the above procedures take into consideration chemical vs. traumatic injuries?

### 5. Medical Screening of Workers:

Are there procedures in place on how to screen all employees leaving the worksite?

Were all employees assembled and screened before they were allowed to leave the site?

What is the process to ensure that all employees are accounted for during an emergency? Is the process documented and are employees trained?

(Please provide a copy of all relevant procedures and policies)

## WORKER SAFETY

1. When employees started experiencing symptoms of exposure, what steps were taken — to ensure the employees were evacuated and received timely medical attention? If there was a delay - what was the cause?
2. Once detected, what measures were taken to protect workers while investigating?
3. When were the off-post medical staff members advised of the situation at the depot? Was full disclosure given?
4. What information was conveyed to off post response staff and the hospital so they could protect themselves?
5. What safety and health plan or expertise does the Army Depot have to deal with industrial safety – beyond chemical/biological issues?

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Attachment 2

Timeline of Events

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Chronological Record of Events  
Raytheon Incident (Day One: 15 Sep 99)

<u>Time</u>	<u>Event</u>
0600	Routine All call test conducted. Everyone answered except Herrmiston Safety Center. (HSC was called separately via microwave. Problem noted by OEM). (eoc)
0948	Dial Central Office called and informed EOC that U.S. West said 9 lines were out. (eoc)
0955	Email from Morrow County sent to Chief, Chem Prep stated that long distance phone lines were out. The email message was not opened/read until after 6 p.m. due to ongoing Raytheon activity. Spent the afternoon in the EOC. (eoc)
1105	Workers began exiting MDB, complaining of very irritating odor. (rdc)
1107	Construction Safety Supervisor called via radio for medical and safety assistance at east exit from MDB Corridor 143. (rdc)
1110	Construction Safety Manager and Paramedic arrived on scene with construction safety van and rescue equipment. Additional Paramedic responds with site ambulance. Numerous personnel were observed exiting doors of MDB. (rdc)
1115	After briefing Construction Safety Manager and Paramedic donned Scott air packs and entered MDB via Corridors 142 and 143 to affected area to search for disabled personnel. Prior to entry, Construction Safety Supervisor was instructed to have roll taken to identify missing workers. (rdc)
1120	One (1) craftsman reported to site infirmary. Two others in break room complained of chest pains and difficulty breathing; they are dispatched to the infirmary. (rdc)
1120	Civil Superintendent advised search team (Construction Safety Manager and Paramedic) that one Ironworker was not accounted for. The Ironworker's last known work location (roof of south ECR MDB) was searched. He was not found on roof of ECR. Emergency Preparedness Manager notifies RDC Safety Manager of incident in progress (via cellular phone) (rdc).
1125	Emergency Preparedness manager called Depot Fire Department on cellular phone and requested them to standby at the incident scene.
1125 (rdc)	Missing Ironworker was located outside and all personnel accountability was complete.
1125	Safety supervisor called 911 from infirmary. (rdc)

- 1130 Craig Scott, *East Oregonian* reporter, called PAO and asked about a gas leak at the construction site and possibly having to transport individuals to the hospital. He stated he'd heard this on his office scanner. (pao)
- 1130 Fire Department called EOC and said that they were responding to Raytheon.(eoc)
- 1130 CoE notified UMCD liaison officer of incident. Five CoE people in the MDB/PAS evacuated MDB building. (rm)
- 1132 Initial RDC event report: Raytheon Safety called and told the EOC they had an unknown noxious gas and had evacuated the building. (eoc)
- 1135 UMCDF deputy project manager relayed same information as CoE to UMCD liaison officer. (rm)
- 1135 EOC notified Civilian Executive Assistant (CEA), PAO and the clinic of the situation (commander on leave) (eoc)
- 1135 PAO checked with CEA who had just been notified and stated 5 individuals had respiratory problems and 1 was unaccounted for. (pao)
- 1135 Depot Fire Chief and two fire rigs with crews arrive on scene. (rdc)
- 1136 EOC called the Depot Clinic to inform doctor of patients at construction site having breathing problems. (ohc)
- 1136 EOC called RDC emergency manager and asked for an update. RDC told EOC they hadn't identified the noxious gas at this time. A command post had been set up and 32 people had been accounted for; 1 was missing. The safety manager was going in to the building in SCBA gear to look for him. Provided the EOC his cell number. (eoc)
- 1137 Depot Fire Department talked with RDC safety personnel and was informed MDB was evacuated, was asked to continue to stand by. (rm)
- 1140 EOC Coordinator contacted CEA with situation report (SITREP) in Building 1(UMCD Depot HQs). (rm)
- 1140 EOC called PAO from the Opns Center and stated 5 individuals at the construction site had respiratory problems and 1 was unaccounted for. Point of contact, RDC emergency manager, 377-5445. (pao)
- 1140 Depot Clinic contacted RDC to offer assistance. RDC informed clinic that medical support was not required. (ohc)



- 1140 Construction Safety Manager and Paramedic exit MDB building and briefed Depot Fire Chief. (rdc)
- 1141 Fire Department received information to contact the Director of Risk Management on landline. (rm)
- 1142 Fire Chief called and said that Raytheon had them standing by and no medics were requested by RDC. (eoc)
- 1143 Security received call that an off-base ambulance would be coming on post and going to Raytheon. (sec)
- 1144 Depot Clinic doctor called the EOC and said he had contacted Raytheon at the site and that Raytheon did not need their assistance at this time. (eoc)
- 1145 Construction Safety Manager and Paramedic re-entered MDB to try to identify obvious emissions such as smoke, mist, haze, etc. None found. (rdc)
- 1150 UMCD Security received call from EOC regarding an noxious odor at Raytheon. No evacuation called for, but three people were being sent to the hospital via ambulance. (sec)
- 1150 Depot Fire Department talked with craftsman about the odor and craftsman stated it was not epoxy. (rm)
- 1200 EOC Coordinator notified Director of Risk Management. (rm)
- 1200 EOC asked Fire Department if our depot medical personnel were needed. Fire Department relayed to EOC that Raytheon safety stated they were not required. (rm)
- 1200 EOC contacted Director of Risk Management and Chief of Chemical Preparedness with a SITREP. (eoc)
- 1203 Hermiston ambulance departed RDC site for Good Shepherd Hospital in Hermiston, OR. (rdc)
- 1205 Construction Safety Manager and Paramedic exited MDB building. Construction Safety Manager turns over incident command to Raytheon Emergency Preparedness Manager. (rdc)
- 1205 MDB declared off limits, no entry without SCBA (per instructions from RDC Emergency Preparedness Manager). (rdc)
- 1210 RDC establishes its command post. (rm)

- 1215 Confirmed that thirty (30+) people were being sent to Good Shepherd Hospital (GSH) (rdc)
- 1215 Depot Fire Department talked to another craftsman who stated it was more like burned car wiring, a pungent odor and with a metallic taste. (rm)
- 1220 Construction Safety Manager and Paramedic re-entered MDB after determining which areas most employees were in when overcome. (OBS-142, Munitions Corridor #153, BSA Room). No obvious sources of emissions found. (rdc)
- 1220 PAO unsuccessfully attempted to call Raytheon protocol officer for information. (pao)
- 1220 Depot Risk Management Staff received call from southeast gate security about people leaving depot. Security wanted to know if they should stop people from coming in. (rm)
- 1220 EOC called Fire Department for an update; they are still standing by. All personnel were now accounted for. Raytheon safety manager got on the line and said that it could be epoxy or an argon bottle that had been left on. One person was taken by ambulance to Good Shepherd Hospital and 34 personnel would be transported by vans for check up. (Ed note: initiated at 1420.) Raytheon has closed down all construction work for the rest of the day. Left contact phone number. (Ed note: This was the first complete report and scope of the problem given to the EOC by Raytheon). (eoc)
- 1223 RDC protocol officer called PAO with an update – full accounting of people; 1 to Good Shepherd Hospital, condition unknown. Questioned by PAO on how many workers were involved. Raytheon was sending all craft workers home. By 1330 hours there would be a decision on whether the second shift is to report. Noted there was no explosion, that the incident occurred in the Munitions Demilitarization Building's toxic maintenance area and that it happened about 1115 hours. Workers smelled an odor and experienced a physical reaction – throats constricted; cause is not known, but may be epoxy. (pao)
- 1225 EOC contacted the commander (leave/vacation status) at home to update him of the situation. Commander asked to be kept apprised of the situation (eoc)
- 1227 EOC called depot Security and told them that Raytheon had shut down operations and needed the gates open for employees who were released to go home. (eoc)
- 1228 PAO briefed CEA on conversation with RDC protocol. (pao)
- 1230 RDC Construction Senior Waste Technician made required notifications per event notification checklist. (rdc)
- 1230 EOC Controller physically locates to EOC. (rm)

- 1230 PAO briefed Chemical Agent Disposal Outreach Office (ORO) manager on the incident. ORO manager agreed to come to the depot to answer phones while PAO went to the EOC. PAO requested PAO augmentees go to the EOC to assist. (pao)
- 1239 RDC protocol officer called PAO and said 32 workers would be sent to Good Shepherd Hospital; 1 had been taken by ambulance. (pao)
- 1243 RDC safety manager called EOC and asked that depot security be informed that the second shift was cancelled. (eoc)
- 1244 Depot Security called and informed of above information by EOC. (eoc)
- 1244 CEA authorized "All-Call" notification and declares a non-surety event.
- 1244 Depot CSEPP Coordinator contacted off-post EOCs via the "all call" and informed about the incident. The "all call" list includes Umatilla County EOC, Morrow County EOC, Hermiston Safety Center, Benton County EOC, Washington State Patrol, and the Oregon Emergency Response. Roll call of receipt to verify receipt not conducted by EOC. (eoc)
- 1244 - Washington State receives all call notification. *(Ed note: these times were verified by community logs after the event to include these times in this summary)* (eoc)
- 1245 Hermiston Safety Center verifies receipt of notification fax. Prosser Dispatch received all call notification. *(Ed note: these times were verified by community logs after the event to include these times in this summary)* (eoc)
- 1247 Benton County receives all call notification. (eoc) *(Ed note: these times were verified by community logs after the event to include these times in this summary)*
- 1250 RDC Emergency Preparedness Manager requested that Depot conduct chemical agent sweep of area (site). (rdc)
- 1250 EOC called to CEA requesting RTAP; sweep conducted for worker confidence. (eoc)
- 1250 Security received call from EOC that Raytheon would be sending 34 personnel out the gates for medical evaluations. Security dispatched to open E35. (sec)
- 1252 PAO received update from CEA on the incident. (pao)
- 1255 Depot security received call from EOC that Raytheon had shut down operations for the rest of the day including second shift. (sec)
- 1255 EOC faxed information with follow up hard copy of notification of a non-surety event (via group dial fax) to Umatilla County EOC, Morrow County EOC, Hermiston Safety Center, Benton County EOC, Washington State Patrol, and the Oregon Emergency

Response. (eoc)

- 1255 RDC Nightshift notified not to come to work. (rdc)
- 1310 Depot Lab Chief notified by CEA that an incident occurred at Raytheon where 30+ personnel had been evacuated to hospital. CEA instructed Lab Chief to monitor the SE corner of K-Block for GB, VX and HD and to report back to the CEA when lab chief was in position on-site. (lab)
- 1313 Fax confirmation sheet returned; all but one were "incomplete". The fax to RDC surety officer went through. Chief, Chemical Preparedness asked that. Began to re-fax the form to off- post EOCs. (eoc)
- 1315 Chief, Chemical Preparedness began to use FEMIS shared reports to pass information to Morrow County EOC since they could not be reached via "all-call/point-to-point and that long distance phone lines were not working. (eoc)
- 1315 Depot lab chief notified lab technicians to report to the lab to perform monitoring. He also informed them of what he knew about the incident at the Raytheon site. (lab)
- 1320 Depot Fire Department D was notified we were no longer requested by RDC Emergency Preparedness Manager to stand by and returned to quarters in depot admin area. (rm)
- 1325 EOC Updated UMCD Commander of all current data.
- 1325 EOC makes up line reports to SBCCOM EOC; Safety Officer contacted SBCCOM Safety and EOC. All counties and states have been telephonically contacted to ensure they received faxed information. (eoc)
- 1325 Outreach Office manager arrived at the PAO office; PAO moved to the EOC. (pao)
- 1325 OERS called EOC and advised that long distance lines are out due to a cut trunk line in Bend. Washington State advised OERS of the event. Asked depot EOC to provide updates to Washington EOC so they could relay information to OERS (eoc)
- 1325 RDC Industrial Hygienist called to check on status of additional monitoring instruments from Hanford. (rdc)
- 1327 Depot safety officer sends email to SBCCOM safety office with basic information. (SBCCOM Safety officer left work for the day at 1710 EST) (rm)
- 1328 PAO arrived at the EOC and started working on a press release. (pao)
- 1330 Washington State verified receipt of notification fax. (eoc)

- 1330 Depot lab personnel arrive at the lab and start preparing RTAPs. Unknown personnel from Raytheon are calling the laboratory asking if the lab was detecting any chemical agents and if the lab is going to come to RDC to perform monitoring. Lab chief tells them that we will begin monitoring the perimeter of K-Block momentarily for all agents and that the MDB will be monitored afterward. (lab)
- 1330 RDC Emergency Preparedness Manager releases Depot Fire Department to their quarters on standby. (rdc)
- 1332 Morrow County Planning Department (Irrigon) called PAO to relay a call from Morrow County ADP Specialist (Hoepfner). Long distance phone lines are down and they aren't receiving any information. PAO provided them an update. Morrow County Planning Department would pass information on to Morrow County EOC. (Note: There is a direct phone line established between Heppner and Irrigon that allowed local calls.) (pao)
- 1333 Depot Security received an complete update from EOC concerning incident at Raytheon:
- ✓ OC received a call at approximately 1130 from Fire Dept of an noxious odor at RDC.
  - ✓ A count was conducted and one individual was missing. He was later discovered to have been sent to the hospital via ambulance.
  - ✓ Thirty-two personnel were subsequently sent out for medical evaluations.
  - ✓ Odor possibly caused by Argon gas or an epoxy component. Raytheon was currently conducting a search to determine the exact cause.
  - ✓ Raytheon had ceased operations for the day including the second shift.
  - ✓ No UMCD personnel other than Fire Department personnel, were used during the incident. (sec)
- 1335 Fire Department Rescue called EOC and reported that they were returning to fire department. (eoc)
- 1337 EOC called all directorates and security called and brought up to date on situation with Raytheon per CEA's request. All personnel contacted. (eoc)
- 1340 Umatilla County verified receipt of notification fax. (eoc)
- 1340 Depot lab chief called CEA and informed him of the progress at the. CEA directs depot lab chief to monitor the MDB. Lab chief said affirmative if there are personnel in SCBA to carry RTAP lines inside. CEA directed lab chief to have the RTAPs first monitor the SE corner of K-Block. CEA then directed lab chief to go to the Raytheon site and coordinate with RDC personnel (emergency manager and safety manager) about monitoring the MDB. (lab)
- 1345 Depot Safety Officer contacted SBCCOM EOC to update them of the situation. (eoc)
- 1345 RDC Chemical Surety/Security Manager reported on status of chemical agent sweep coordination by Depot personnel. (rdc)

- 1345 Construction Safety Manager and Paramedic completed sweep of 100 elevation MDB and exit building. (rdc)
- 1346 Confirmation sheet showed all EOCs received the notification fax with the exception of Morrow County. (eoc)
- 1347 Umatilla County EOC called the depot EOC to ask that the notification fax be resent. She gave a different number than the one listed and at 1349 the fax was confirmed. (eoc)
- 1352 Construction Safety Manager and Paramedic changed air tanks and re-entered the MDB to check 122 elevation MDB for sources of emissions. Two (2) safety personnel don SCBA as standby. Radio communications made with Construction Safety Manager and Paramedic at 5-minute intervals. (rdc)
- 1400 Due to the calls from OERS and Morrow County, EOC called community EOCs individually to ensure they received the fax. (eoc)
- 1400 PAO faxed draft release to UMCD commander; Raytheon protocol officer; PMCD at UMCDF; ORO for review. (pao)
- 1401 Hermiston Safety Center called and said they got the fax but did not receive the phone call. (Ed note: OEM communications officer is aware of this ongoing telephone problem with Hermiston Safety Center. Since corrected) (eoc)
- 1410 Depot lab chief arrived at the Raytheon site and met with RDC emergency manager and RDC safety manager. Lab chief was taken to the MDB and shown the doorways through which they would like monitoring. He requested that two personnel from Raytheon in SCBA place the sampling lines inside the MDB. (lab)
- 1405 CEA spoke with the Commanding General, SBCCOM and updated him on the situation.
- 1410 Chemical agent monitoring begins. RTAP 15 arrived at SE corner of K-Block and begins monitoring for HD (mustard). (lab)
- 1412 EOC staff called all community EOCs individually follow up on the fax sent. The speed dial phone (direct point-to-point) was used. All answered with the exception of Washington State and Morrow County. All others received the fax.
- 1417 Construction Safety Manager and Paramedic emerged from the MDB building. Nothing found. Building is wrapped with red danger tape, posted with "Keep Out" signs and guarded. (rdc)
- 1417 RTAP 12 arrived at the SE corner of K-Block and began monitoring for GB (nerve agent). (lab)

- 1418 RTAP 14 arrived at the SE corner of K-Block and began monitoring for VX and GB (nerve agents). (lab)
- 1420 RDC Safety team moved to RDC infirmary to assist the patient assessment and triage. Personnel transport to GSH in Hermiston began (less the ambulance sent at 1203). (rdc)
- 1422 RTAP 15 reported negative readings for HD at SE corner of K-Block. (lab)
- 1422 Emergency Preparedness Manager called RDC site manager for additional transport vehicles for ambulatory patients after discussion with infirmary. These patients in non-critical condition were transported via RDC vans. One person was sent by Hermiston Fire Department Ambulance to GSH at 1203. (rdc)
- 1425 RDC Incident Team met at RDC Safety office to plan strategy. (rdc)
- 1426 Depot Lab Manager reported to RDC that Real Time Analytical Platform (RTAP) results for agent sweep of perimeter of K-Block are negative. Testing vans moving to south end of MDB. (rdc)
- 1428 RTAP 12 reported negative readings for GB at SE corner of K-Block. (lab)
- 1429 RTAP 14 reported negative readings for VX and GB at the SE corner of K-Block. (lab)
- 1429 Three RTAPs reported negative readings at the SE perimeter of K-Block. All three agents were monitored. RTAPs sent to MDB to perform building monitoring with RDC coordination. (eoc)
- 1430 RDC protocol officer called; he confirmed release OK with RDC/PMCD. He also provided PAO updated numbers of workers involved. (pao)
- 1430 Initial press release. (pao)
- 1431 PAO had problems getting faxes out with cut cable problems. Started using alternate fax machines at ORO and depot headquarters. (pao)
- 1435 CEA asked Depot Director of Risk Management to contact DEQ (downtown) to inform them of the incident. (eoc)
- 1435 Depot lab chief called the CEA at the EOC and informed him that all RTAPs report negative readings at the SE corner inside K-Block. Lab chief informed CEA that everything is coordinated at the site to bring in the RTAP and begin monitoring at MDB. CEA gave his go ahead. (lab)
- 1435 PAO started returning media calls/preparing second release. (pao)

- 1436 Plan for RTAP sampling in and around MDB established. RDC Emergency Preparedness Manager requested SCBA personnel from RDC Safety assist Depot by carrying sample hoses into the MDB. (rdc)
- 1440 Depot Lab chief called RTAP operators and told them to bring RTAPs to the Raytheon site. (lab)
- 1449 Depot Security was called the second time and informed that RDC second shift was not working today. (eoc)
- 1450 RTAPs 12, 14 and 15 arrive outside MDB at Raytheon construction site. (lab)
- 1452 EOC informed security at E38 gate to refer all delivery personnel to check with RDC before reporting to work. Any RDC personnel reporting for work who may not have heard about work stoppage should also be stopped and directed to the RDC human resource office. (eoc)
- 1500 RTAP vans (3) set up on roadway south of the MDB. (rdc)
- 1502 Morrow County still had no commercial long distance phone or fax. They relied on FEMIS (shared reports function). They were able to communicate with Umatilla County, Washington State and Benton County via the microwave conference bridge but could not communicate with the depot and Oregon State. (They did receive reports via FEMIS shared reports). (eoc)
- 1510 RTAP 12, 14 and 15 began monitoring for GB, VX and HD (inside the south facing first floor east door of the MDB). (lab)
- 1511 DINAH Report (chemical event (non-surety report) sent to UMCD Commander; HQDA; Director of Criminal Investigation Command at Ft. Belvoir; Information Systems Command; Army Materiel Command; U.S. Army Nuclear and Chemical Agency, Soldiers Biological and Chemical Command (now DTRA); and Program Manager for Chemical Demilitarization via email. (rm)
- 1515 SCBA equipped safety personnel carried RTAP sample hoses into MDB building and obtained samples from the following areas: South Liquid Incinerator (LIC) Pit; Airlocks 162,163,164; Monitor Room 160. (rdc)
- 1520 Update with RDC emergency manager regarding the RDC safety manager. When RDC emergency manger made his SCBA entry into the building, empty containers of epoxy were found, but NO bottles of argon were left on. This was reported in the 1220 time frame. Raytheon is working with the RTAPs. They had personnel coming in with air monitoring equipment and planned to make another SCBA entry to see if they could



pinpoint the cause. If all clear, they will form teams and sweep the building. RDC PAO has been in contact with UMCD's PAO throughout the day (eoc)

- 1521 RTAPs 12, 14 and 15 reported negative readings. They began monitoring inside the south-facing first floor east door of the MDB. (lab)
- 1523 Lab reported they were monitoring in MDB. (eoc)
- 1524 Update from CEA via RDC deputy project manager: 30 people were being checked at Good Shepherd Hospital. Two were admitted to the hospital for observation over night. Deputy project manager also said that industrial chemicals were stored on the 2<sup>nd</sup> floor of the MDB. (eoc)
- 1530 Initial results from RTAP are negative. (rdc)
- 1532 RTAPs 12, 14 and 15 reported negative readings from sample #2; they begin monitoring sample #3 (inside the south facing second floor east door of the MDB). (lab)
- 1540 Personnel began to return from GSH hospital. (rdc)
- 1542 Lab reported RTAPs 12, 14 and 15 had negative readings from MDB (sample #3). (lab)
- 1545 UMCD lab reports RTAP monitoring complete. (Note: First reports of injury obtained from all treated employees and their location at the time of the incident was plotted on a floor plan and identified with a unique number assigned to them prior to going home.) (rdc)
- 1547 Completed monitoring inside the MDB southeast corner. All three agents at three separate locations; negative results. (eoc)
- 1550 Phone lines restored. Morrow County reported commercial long distance phone and fax service. FEMIS OK (eoc)
- 1551 PAO notified by UMCD that DEQ sent two individuals to Good Shepherd Hospital for observation just because they were at the construction site. (eoc)
- 1600 RDC Construction Safety Office called Hermiston Fire Department to determine if additional Scott air pack bottles were available and if filling capabilities were available for our spent bottles. Answer was yes. (rdc)
- 1600 RDC Construction Safety Supervisor dispatched to Hermiston Fire Department to pick up eight (8) additional Scott bottles and to get RCI bottles refilled. (rdc)
- 1600 Depot lab chief and all RTAPs left RDC site. Informed EOC that no agent was detected inside the MDB. (lab)

- 1610 RDC reported that the actual cause was unknown. It appeared that the epoxy and argon were not the cause. RDC intended to continue to monitor the MDB area using industrial monitors. (eoc)
- 1618 Press release #99-29 faxed to SBCCOM EOC to forward to Director of Operations and Commanding General. (eoc)
- 1624 Morrow County finally received the 1430 faxed press release at 1605 (per FEMIS shared reports). (eoc)
- 1641 First log (created in FEMIS shared reports) faxed to SBCCOM EOC, Safety, and public affairs. Depot EOC confirmed receipt with SBCCOM Duty Officer. (eoc)
- 1645 RDC reported that no depot support was required for RDC's efforts that night with the exception of the fire department. They remain on standby at the station for backup of SCBA entries. (eoc)
- 1655 Morrow County reported that they disseminated UMCD EOC's FEMIS shared report to Morrow county, staff, and 911 dispatchers. (eoc)
- 1700 RDC advised they would be conducting interviews with employees who were working in the MDB to help narrow the search. RDC also advised they hope to use the data received from hospital reports. After this was complete, RDC will determine whether or not to work on Thursday, 9/16. At this time, RDC reported that 29 people have been sent home and 3 have been kept at the Good Shepherd hospital for observation overnight. (eoc)
- 1715 RDC Construction Safety Supervisor returned with all bottles. (rdc)
- 1719 Updated log faxed to SBCCOM EOC. (eoc)
- 1720 Eight (8) two-man teams formed to do systematic search of MDB to try to identify possible sources (melted containers, residue of fire, etc.). All were radio equipped and 10-minute interval checks made on their status during entry. (rdc)
- 1747 SBCCOM EOC faxed FEMIS shared reports log. (eoc)
- 1802 EOC Updated CSEPP EOCs by fax on the day's events. Faxed a copy of the log created in FEMIS shared reports. (eoc)
- 1806 EOC Completed group dial fax of Press Release #99-29 (release time 2:30 p.m.) to off-post CSEPP entities. (eoc)
- 1814 UMCCDF deputy project manager was notified by EOC that the lab monitored the MDB perimeter and it came up clean. (eoc)

- 1815 EOC was asked by the commander to follow up on specifics of chemical operations for the day: The crew was in Igloo 1897 (northeast corner of K-Block). The wind at the time was from 310 degrees at 3 mph. The igloo was opened at 1003 and the door closed at 1038. The crew didn't return to work due to the Raytheon incident. The igloo was being monitored the entire time it was open and received only negative readings. No depot employee has experienced any signs or symptoms similar to Raytheon employees. (eoc)
- 1830 Second press release sent out; more media calls answered. (pao)
- 1830 EOC Began faxing PR #99-30 to SBCCOM EOC and off-post EOCs. (eoc)
- 1838 UMCD Commander provides situation report to Chief, Stockpile Management/Operation Enterprise at his home in Maryland. (eoc)
- 1920 RDC MDB search team completed its sweep of the MDB building (all levels) with no results. No one detected any odors, containers or other unusual items. Sweep of area with PID was conducted prior to these entries by the RDC Industrial Hygienist. (rdc)
- 2000 RDC checked intake and plenum of building ventilation. The ventilation was restarted and PID monitoring done at all outfalls in the MDB, with negative results. (rdc)
- 2040 Received summary of incident from UMCDF. (eoc)
- 2045 RDC emergency manager called and reported that monitoring of MDB was complete. Portable monitoring will continue throughout the night. Monitoring found no reason for worker symptoms. (eoc)
- 2100 Operations secured until September 16. Note: OSHA Area Director notified by Construction Safety Manager prior to (Construction Safety Manager's) leaving 15 September 1999. (rdc)

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Attachment 3  
Responses to Agency Questions

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Fact Finding Commission  
Umalilla Chemical Agent Disposal Facility (UMCDF)  
Industrial Release (September 15, 1999)

**ON-POST/OFF-POST NOTIFICATION**

**1. Warning to the on-post population at risk.**

**Bullet 1) How was it decided who was at risk?**

JMCD

It was clear from the beginning that it was not a chemical event. There were no weapons surveillance operations ongoing at the time of the incident. At no time did wind direction flow from the storage site over the boundary of the construction site. Likewise, all readings for chemical agent vapors were negative. The winds are monitored and recorded in real-time from meteorological sensors around the Depot and construction site when operations are in progress.

RDC

Based on the symptoms being experienced by the MDB craft personnel, the condition of all other employees on site (office, PMB, PAS, LAB, etc.), the status of K-Block activities and measurements made in the MDB following the incident, the Deputy Project Manager in discussion with Safety and Construction Management, concluded that the incident was not related to chemical agent from K-Block.

**Bullet 2) How would all personnel expected to be at risk be notified?**

JMCD - Chemical Accident/Incident Response and Assistance Plan (CAIRAP)

There are strict procedures in place for alert and notification when hazards exist due to chemical events. On-post personnel are alerted of activities related to the chemical stockpile by outdoor sirens.

- A steady ten-second blast indicates that a test is being conducted.
- A steady three-minute wailing blast means there has been a chemical accident or incident.
- Employees at the Raytheon construction site evacuate and assemble in the southeast corner of the Depot. The Depot evacuation coordinator maintains contact with Raytheon to ensure employees are provided with information on routes of evacuation and off-post reception centers. All other contractors receive emergency procedure briefings prior to working on the Depot. They have been instructed to evacuate to an assembly area near the clinic when they hear the emergency alert siren.

Residents and their guests are directed to either shelter-in-place or evacuate based on the threat. The electronic reader board at the front gate indicates evacuation directions. This is also tested during CSEPP exercises.

RDC

At the time of the incident, notification was by word of mouth and the plant radio system via supervisors/foremen. This has now been augmented by a Public Address System, which has been installed in the Munitions Demilitarization Building (MDB) and the Pollution Abatement System (PAS).

**Bullet 3) How long did it take for that warning to reach all affected workers?**

JMCD

The chemical event alert and notification system was not sounded because it was a construction incident and did not involve the chemical munitions.

RDC

The warning reached all affected workers within approximately 5-8 minutes.

**Bullet 4) What procedures have been provided to the workers for actions to take in case of an industrial accident?**

JMCD - Spill Prevention and Countermeasure Plan (SPCC), Disaster Control Plan and RCRA Part B Application Contingency Plan

The hazardous material (HM) in question determines the appropriate response plan to be implemented; The CAIRA plan for chemical agents or the Spill Prevention and Countermeasure Plan (SPCC) for all other chemicals (an industrial accident). The North American Emergency Response Guidebook supplements the SPCC to determine protective action distances for non-chemical agent emergencies.

RDC

See response under: Emergency Evacuation and Initial Response, (1) Mobilization and Evacuation, Bullet 3.

EOC Meeting May 18, 2000  
Attachment W, Page W-43

**(Bullet 5) What was the exact warning provided to the workers--did they understand?**

RDC

The general statement made by craft supervisors and safety supervisor personnel over the radio at the time of the incident was "Evacuate the MDB". The statement was understood by the workers in the building.

**2. Initial Notification of the off-post community.**

**(Bullet 1) What are the procedures in place at UMCD to notify the off-post community in case of a non-surety accident?**

UMCD - CAIRA Plan, DA Pam 50-6 (Chemical Accident or Incident Response and Assistance (CAIRA) Operations, 17 May 91) and Chemical Stockpile Emergency Preparedness Program (CSEPP) Guidance

A non-surety emergency will be declared when events are likely to occur, or have occurred, that may be perceived as a chemical surety emergency or that may be of general public interest, but which pose no chemical agent hazard.

A non-surety event is defined in DA Pam 50-6 as any malfunction or other significant activity at a chemical demilitarization plant, which could reasonably be expected to cause concern within the local community.

If it is determined that public perception may associate an emergency with chemical surety material, a telephonic notification will be made to the off-post community via the all-call system.

**(Bullet 2) Were those procedures followed?**

UMCD

Initial notification confirmed this was a construction site vs. a chemical weapons incident. Therefore, normal CAIRA response plan actions were not taken. There was no indication initially as to the actual numbers of construction workers ultimately involved. Off-post notifications have not been made in the past when an ambulance took a worker to the hospital. However, once the Depot found out that 34 people were involved, experiencing respiratory difficulties and were being transported to the hospital, it was clearly more than a typical construction incident. Notification procedures were immediately initiated at that point.

The Soldier Biological and Chemical Command Safety and EOC, and the Army Operations Center were informed within specified time frames in accordance with Army guidance and internal procedures.

**(Bullet 3) Were there problems encountered in timely, accurate, and verified notification of the off-post community?**

UMCD

This was not a chemical event. There are no formal requirements to make notifications for a non-surety event. However, the Depot does realize the importance of the community receiving information to avoid misconceptions.

The All-Call system is a dedicated microwave system. Long distance problems such as the fiber optic lines being cut should not affect the ability to communicate. However, one EOC (Morrow County) experienced problems with the All-Call.

There were some reporting difficulties internally between RDC and the UMCD EOC. These have been identified and corrected. Procedures are being established to formalize reporting procedures. Furthermore, PMCD and RDC will now send liaison personnel to the Depot EOC during events.

Roll call was not taken at the time the initial call was made off-post. Because of the severed lines, phone calls were repeated to ensure that all jurisdictions were aware of the incident and that they had received a follow up fax with detailed information.

Lessons Learned: The All-Call system is now being recorded. Standing Operating Procedures are being reviewed and updated.

**(Bullet 4) In terms of this accident, what communication means were used to provide initial notification--recognizing that this situation was made more difficult due to the fiber optic cable cut in Oregon?**

EOC Meeting Mar 18, 2000  
Attachment W, Page W-44



The All-Call system is the primary means of initial alert and notification between UMCD, state and county EOCs. This system is operated via a microwave and includes Umatilla County EOC, Morrow County EOC, Hermiston Safety Center, Benton County EOC, Washington State EOC, Prosser Dispatch, Oregon State Police (Bend), and the Oregon Emergency Response System (OERS - Salem). All jurisdictions answered the all call with the exception of Morrow County, Hermiston Safety Center, Oregon Emergency Response System, and OSP (Bend).

According to Oregon Emergency Management, the all call system should not have been affected by cutting the long distance lines since it operates via microwave and is a dedicated line. Fax lines, however, are still dependent on landlines, but will soon be accessible by microwave as well.

This notification was followed up with a group fax.

There was no chemical agent involved so the Federal Emergency Management Information System (FEMIS) was not used to make initial notifications of the incident. However, the FEMIS computer program was used to maintain a time line of key events. This time line was shared with off-post EOCs. Cell phones were also used as a redundant communication system.

#### **Bullet 5) Was UMCD aware of the loss of telecommunications from the cable cut?**

JMCD

Yes, at 9:48 a.m. the EOC staff was informed that the long distance lines were out. This was noted in the daily log maintained by the staff. The primary means of communication is the All-Call as indicated earlier.

Lesson's Learned: A plan for aggressive communication equipment checks is being formulated and current procedures are being reviewed.

#### **Bullet 6) If so, what method was used to circumvent this communications link to provide essential information?**

JMCD

As indicated in bullet #4, the All-Call telephone system was used initially. This notification was followed up with a fax. The FEMIS computer program was used to maintain a time line of events. This time line was shared with off-post EOCs. Cell phones were also used. Morrow County was also obtaining information from the Planning Department in Irrigon. They have a local line established between the two locations. Washington State advised OERS, and OERS called OSP (Bend) to have them send a state trooper to Pendleton to pick up information. All jurisdictions were sharing information with those they could contact to pass on information.

### **WORKER SAFETY**

#### **1. When employees started experiencing symptoms of exposure, what steps were taken to ensure the employees were evacuated and received timely medical attention? If there was a delay—what was the cause?**

DC

The initial assessment of employee symptoms was made at the construction site infirmary by EMT/Paramedics. Employees displaying the most acute symptoms were transported to the hospital immediately. Other affected personnel were assessed and sent to the hospital depending on symptoms displayed. There was a 2-hour timeframe between transporting the most symptomatic employees and other employees to the hospital. Delays in transportation were created by limited availability of vehicles used to transport the employees.

#### **Once detected, what measures were taken to protect workers while investigating?**

DC

All initial entries to the building after the event (during the investigation phase) were made by personnel using self-contained breathing apparatus (SCBA). The perimeter of the MDB was first secured by wooden barricades and red danger tape. Building ventilation was shut down to isolate any fumes or vapors that may have been present, and to enhance opportunities to detect any residual fumes/vapors. A three person team, which included personnel from safety department, environmental department, and the site's industrial hygienist (using SCBA) made a sweep of all areas of the building using an organic vapor analyzer (Photo Ionization Detector - PID). No vapors were detected

by the initial investigation entry team on the evening of the event. Subsequent investigation entries into the MDB were made in accordance with Job Hazard Analysis (JHA) documents, specifically prepared to cover each aspect of the continuing incident investigation.

### 3. When were the off-post medical staff members advised of the situation at the Depot? Was full disclosure given?

RDC

Raytheon called "911" to request ambulance service from Hermiston Fire and Emergency Services and notified the UMCD Emergency Operation Center of the in-coming ambulance. Good Shepherd Hospital was not called by Raytheon. Full disclosure was given to the extent of the information available at the time of notification.

### 4. What information was conveyed to off-post response staff and the hospital so they could protect themselves?

RDC

The patient's condition were transferred to the medical team on-board the ambulance. The condition of those employees being transported by company van was provided at the time of their arrival to the hospital.

### 5. What safety and health plan and or expertise does the army Depot have to deal with industrial safety--beyond chemical/biological issues?

UMCD

UMCD does not store biological chemicals. The Depot clinic Officer in Charge is a General Practice Physician with specialized training in the management of chemical agent casualties, basic emergency toxicology, occupational health, and triage. He is certified in Advanced Cardiac Life Saving, Advanced Trauma Life Saving, Pediatric Advanced Life Saving, Basic Life Saving and maintains emergency procedure currency by supporting the local emergency room during his off-duty hours. The clinic is staffed with 5 medics, 1 ambulance and 2 patient transport vehicles.

The Depot doctor and medics will handle a chemical incident. The doctor will call local hospitals and describe the extent and nature of injuries for chemical and non-chemical incidents.

RDC

In accordance with contractual requirements, the UMCD Project has an infirmary staffed with two Emergency Medical Technicians (EMTs) during work hours. Additionally, a Nurse is on duty during the day shift to assist with medical issues. The UMCD medical team is equipped with life support equipment and ambulance. Ambulance and emergency medical services are available and supplemented through a contractual agreement with Hermiston Fire and Emergency Services. UMCD will have a medical clinic staffed with a medical staff including a physician, occupational nurse and support personnel.

## EMERGENCY EVACUATION AND INITIAL RESPONSE

### 1. Mobilization and Evacuation

#### (Bullets 1 and 2) What evacuation procedures are in place for UMCD/RDC personnel? Are such procedures coordinated with the off-post community?

UMCD - Chemical Accident/Incident Response and Assistance Plan (CAIRAP) with Changes 1-3, Disaster Control Plan SOP, Installation Spill Control Plan, Contingency Plan (Section G of RCRA B Permit), and DA Pam 50-6.

The Chemical Accident/Incident Response and Assistance Plan covers chemical munition incidents. UMCD employees have a role in responding to a chemical event. Those who don't, as well as contractors and residents, are only evacuated should the magnitude of the event dictate such action. In case of an evacuation, whether or not it involves chemical munitions, personnel are directed to a pre-designated assembly area where they will be accounted for prior to departure from the installation. In case of a chemical accident, pre-determined reception areas have been designated by the Chemical Stockpile Emergency Preparedness Program emergency planners. The evacuees are sent to areas that lead away from the disaster based on hazardous conditions.

UMCD - EOC Procedure, DA Pam 50-6, CSEPP MOU (to be published in the near future)

Off-post jurisdictions are telephonically notified simultaneously by UMCD EOC of all chemical emergencies within 10 minutes or once a non-surety emergency is declared. A non-surety chemical emergency will be declared when events are likely to occur, or have occurred, that may be perceived as a chemical surety emergency or that may be of general public interest, but which pose no chemical agent hazard. The list of jurisdictions notified include Umatilla County EOC, Morrow County EOC, Hermiston Safety Center, Benton County EOC, Washington State EOC,

Prosser Dispatch, Oregon State Police (Bend), and the Oregon Emergency Response System (Salem). After initial notification, these locations are kept informed telephonically and electronically through the Federal Emergency Management Information System (FEMIS).

RDC  
UM-PL-014, Management Plan Volume 1,  
Revision 2

See referenced procedures as indicated below:  
(Section 14.0, Depot Evacuation): RDC and RDC Construction have developed evacuation procedures in the event of a chemical agent release to safeguard visitors and facility personnel (PSP 02.03, Site Evacuation Plan and UM-SU-001, Site Evacuation...) (2 pages)

UM-SU-001, Site Evacuation, Revision 0

(Entire procedure – 7 pages): "The purpose of this procedure is to provide for a safe and orderly exit from the Raytheon Demilitarization Company (RDC) Umatilla Chemical Agent Disposal Facility (UMCDF) administrative areas..."

PSP 02.03, Site Evacuation Plan,  
Revision 3

(Entire procedure – 10 pages): "This procedure is to provide for a safe and orderly exit from the Umatilla Chemical Agent Disposal Facility (UMCDF) should the need arise due to a chemical event or impending operations in K-block that have the potential of a release of chemical agent to the UMCDF construction area."

PSP 02.07, Office Building Evacuation  
and Accountability Plan, Revision 1

(Entire procedure – 6 pages): This procedure is to provide accurate accountability for Raytheon Cost Plus Award Fee (CPAF) and Firm Fixed Price (FFP) non-manual employees on the Umatilla Chemical Agent Disposal Facility (UMCDF), should the need arise due to any type of non-chemical related emergency.

The procedures have not, at this time, been coordinated with the off-post community.

**(Bullet 3) What procedures have been provided to the workers for actions to take in case of an industrial accident?**

UMCD - Disaster Control Plan SOP,  
Installation Spill Control Plan, and  
Policy Statement Number 99-29 (Clinic  
First Policy). MOAs between St.  
Anthony Hospital (Pendleton), Good  
Shepherd Community Hospital (GSCH,  
Hermiston), Kadlec Medical Center  
(Richland, WA) and the Fire District  
Board of Directors (Hermiston).

Should a military/DOD employee become seriously injured or ill at work, they report to the occupational health clinic (OHC) for medical evaluation and treatment by the physician.

The Depot physician will assess the medical condition of the employee and provide treatment.

If a life or limb-threatening on-the-job injury or illness is reported to the on-call medic, he/she will call 911 (Hermiston emergency ambulance). Medics may not diagnose or treat some injuries or illnesses without prior screening by the Depot physician. Injuries or illnesses will be evaluated and treated, if possible. If a doctor is required, and the Depot physician can not be located, employees will be referred to the emergency room at Good Shepherd Community Hospital in Hermiston for treatment.

RDC

See the referenced procedures as indicated below.

UM-PL-014, Emergency Response Plan,  
Volume 1, Revision 2

(Section 8.0, Categories of Emergencies): "The appendixes address each of the five types of emergency situations with regard to initial response by discovery personnel and emergency response personnel..."

Property Damage (Appendix A)  
Accident, Injury, or Illness (Appendix B)  
Fire (Appendix C)  
Chemical Spill or Release (Appendix D)"

(Paragraph 10.3): "Each Raytheon and subcontractor employee intending to work at the UMCDF project will receive a general overview of the elements of this Emergency Response Plan to ensure they are aware of those steps to be taken in the event they discover or are in the area of an emergency occurrence. They will be given the

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emergency call-in phone numbers and will be made aware of proper reporting procedures. It will be stressed very strongly that unless they are a member of the emergency response team, have formal training in handling the emergency that could be safely utilized to terminate or impede the progression of the emergency, they are to report the incident and retreat from the area immediately."

(Section 11.0, Reporting of an Emergency Occurrence): "At new-hire orientation, each employee will be instructed on the proper procedure to report emergencies. Emergencies can be classified as minor emergencies or major emergencies. The reporting and activity for each is as follows. For each example given, refer to the appropriate appendix for more complete instructions.

#### Section 11.1 Minor Emergencies.

For minor emergencies, such as a small Class A fire (wood, paper, cardboard, etc.) or small Class B fire (flammable liquid), when a fire extinguisher is available and the employee can safely extinguish the fire, the employee should do so with extreme care but in no way jeopardize themselves. Once the fire is extinguished, the employee should call the RDC Construction Safety Office (564-7351) immediately and report it.

#### Section 11.2 Major Emergencies.

For major emergencies such as a large fire, chemical or gas release or serious injury, the employee shall call the predetermined emergency reporting phone number or, if possible, have someone report the situation to the Safety Department via radio. Other employees in the immediate area should also be made aware of the situation. Injured personnel should be attended to until the EMT arrives. It is important that assistance rendered be limited to that which one is trained to do. Seriously injured personnel are not to be moved unless they are in further danger from existing situations such as fire, falling, debris, etc. They should then be moved only the distance required to remove the threat of further injury."

#### (Appendix A, Property Damage):

"1.0 Area Worker

1.1 Stop work and notify area supervisor immediately. Isolate accident scene.

1.2 If injury or fire is involved, take the appropriate action according to Appendixes B and C of this plan."

#### (Appendix B, Accident, Injury, or Illness (Entire appendix - 2 pages):

"Should a worker become seriously injured or ill at the project, the following guidelines shall be used in summoning and rendering assistance..."

#### (Appendix C, Fire (Entire appendix - 2 pages):

"...Appendix C discusses measures to be taken should a fire occur on the project..."

#### (Appendix D, Chemical Spill or Release (Entire appendix - 1 page):

"For the purpose of this plan, hazardous materials will include fuels, chemicals and other materials typically used at a construction site. Military agents are not included in this plan because of the nature of activity on the site while this plan is in effect. No interaction with nerve or mustard gas is anticipated, however, construction personnel

will be instructed, during new-hire orientation on how to react to an agent release alarm. Evacuation procedures are discussed in Section 14.0 of this plan. Spill response and notification will be in accordance with UM-EC-008, Environmental Spill and Incident Reporting..."

CDRL A018A, Accident Prevention Plan,  
Volume 1, Revision 0

(Section 6.2, Medical and First Aid Reporting):

"All injuries, regardless of how minor must be reported to your foreman immediately and recorded in the site medical center. Minor injuries, if not treated immediately, can become more serious later.

Failure to report an injury immediately could result in loss of benefits and would cause delay in treatment if you leave the job site without reporting an injury that was sustained. If no injury is reported prior to leaving the project, it will be assumed that it occurred off the job. If an employee is injured on the job:

If there is a serious accident or injury, locate someone with a radio or go to the nearest building or trailer with a telephone and call the First Aid station at 564-7349.

The employee reporting the injury should give their own name, location of the injured person and type of injury, if known."

(Section 23.2, Accident and Incident Reporting):

"The employee must report all accidents, injuries, near misses and hazards or potential hazards that could result in injury or property damage immediately to their supervisor. The supervisor shall advise all affected employees and remove them immediately from the effects of the hazard. The supervisor shall then do the following:

- Notify personnel deemed responsible for correcting the situation.
- Secure the area by barricading or posting sentries to keep personnel from entering the affected area.
- Notify the construction Safety Manager.
- Ensure the proper steps are completed and the hazard is eliminated or proper control measures are put into place prior to removing barricades and allowing workers to return to the area. Each employee must be thoroughly briefed on the existing hazard and applicable control measures if it applies."

UM-PL-010, Facility Security Plan,  
Volume 1, Revision 1

(Section 13.0, Reporting of Incidents During Routine Work Hours):

"13.1 All security and emergency incidents occurring during working hours shall be reported to the Construction Manager or Construction Superintendent.

13.2 All project security incidents shall be reported immediately to the Raytheon SSC and UMCD shift security supervisor.

13.3 Should any incident arise involving UMCD property adjacent to the project, the UMCD security office (9-564-5240) at the main gate shall be notified, including a request that the shift commander on duty be notified."

UM-EC-008, Environmental Spill and  
Incident Reporting, Revision 1

(Section 5.0, Responsibility):

"5.1 All Raytheon Personnel

Immediately report each spill or environmental incident to Construction Safety."

**(Bullet 4) What was the exact warning message that was provided to the workers—did they understand?**

RDC

The general statement made by the craft supervisors and safety supervisor personnel over the radio at the time of the incident was, "Evacuate the MDB." The statement was understood by the workers in the building. (RDC) (NOTE: This is the same question and answer as shown above as bullet 5 for On-Post/Off-Post Notification.)

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**(Bullet 5) How long did it take for the RDC workers to be mobilized to evacuate?**

RDC Workers evacuated the affected building within 5 – 10 minutes.

**(Bullet 6) How long did it take for them to leave the Depot?**

RDC Workers from the UMCD construction site were not directed to leave the Depot when they evacuated the MDB. Construction employees were released from the site at approximately 12:30 p.m.

**EMERGENCY EVACUATION AND INITIAL RESPONSE**

**2. Initial Emergency Response**

**(Bullet 1 ) What are the procedures in place at UMCD for transportation of casualties off-post and were they followed?**

UMCD – PMCSO/RDC Medical Clinic and U.S. Army Occupational Health Clinic (OHC)-UMCD Emergency Response MOU (draft), MOAs with St. Anthony Hospital (Pendleton), Good Shepherd Community Hospital (GSCH, Hermiston), Kadlec Medical Center (Richland, WA) and the Fire District Board of Directors (Hermiston). UMCD will help transport or treat casualties from the Raytheon Clinic only when requested by RDC. There is a formal chain of command for each clinic to go through in order to make such a request. The UMCD clinic actually went even beyond this formal request channel and called the Raytheon Clinic to ensure that no help was truly needed. RDC representatives stated that UMCD clinic assistance was not needed. If requested, the UMCD clinic would have provided resources necessary to aid in the 15 Sep event. Since UMCD was not involved in the event, the Depot did not have any part in the notification of medical facilities, communication of relevant medical information, nor other information exchange during the initial event.

The UMCD clinic may aid the Raytheon clinic per the draft MOU as mission and resources permit. The UMCD clinic will always take care of chemical casualties and arrange transport of such patients to higher levels of care.

MOAs exist with area caregivers/first responders in case of chemical casualties.

RDC See the procedures as indicated below.

UM-PL-013, Medical Implementation Plan, Volume 1, Revision 1 (Section 8.0, Onsite Ambulance Service): "Raytheon shall maintain and operate a fully equipped ambulance for emergency response only. In the event of multiple injuries, Raytheon has a mutual aid agreement with the Hermiston Fire Department to augment the need for transportation of additional personnel."

UM-PL-014, Emergency Response Plan, Volume 1, Revision 2 (Appendix B, Accident, Injury, or Illness): "3.3 Once the injured person is stable, transport him/her to the appropriate medical facility."

**(Bullet 2) Is there an MOA/MOU in place for provision of such services?**

UMCD - MOA with the Fire District Board of Directors (Hermiston). It's important to note that the UMCD fire and rescue team arrived at the Raytheon site within minutes from the time they received the request for support.

The resources of the U.S. Army Occupational Health Clinic (USAOHC), Umatilla, are not sufficient to provide complete emergency treatment and care of personnel at UMCD following a major chemical or non-chemical event with multiple casualties, or to provide emergency transport of patients to area hospitals.

At the earliest possible time, following a chemical or UMCD non-chemical event, the Officer in Charge (OIC) of the UMCD clinic will notify the Hermiston Safety Center and communicate the requirement for ambulance support and the potential risk for contamination. This is delineated in the MOA between UMCD and the Hermiston Safety Center.

During duty hours, non-chemical patients/casualties may be stabilized in place by the USAOHC and transported from the site by community response teams, or transported to the USAOHC and stabilized prior to

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transport by community response teams.

During non-duty hours, non-chemical patients/casualties will be stabilized in place by any resources available and transported from the site by community response teams.

DC

Yes. See purchase order discussion as indicated below.

Raytheon Constructors, Inc., Purchase Order 1171, Seller - City of Hermiston

"Provide advanced life support ambulance when requested for the purpose of providing emergency medical care and transport to Good Shepherd Hospital.

The price listed herein is based upon an average of three responses per month at an average rate of \$514.00 per response. The value of this order shall not exceed that listed herein.

Each ambulance shall be fully equipped and staffed with two emergency medical technicians with advanced life support capabilities."

M-PL-013, Medical Implementation Plan, Volume 1, Revision 1

(Paragraph 8.1.1): "In the event of multiple injuries, Raytheon has a mutual aid agreement with the Hermiston Fire Department to augment the need for transport of additional personnel."

**Bullet 3) Was Good Shepherd Hospital notified on incoming casualties and by whom?**

MCD

RDC is responsible to notify all emergency facilities of inbound non-chemical incident related patients. The Depot physician was told by RDC that only one patient was to be transported by the Hermiston Fire Department ambulance.

DC

Raytheon called "911" to request ambulance service from Hermiston Fire and Emergency Services and notified the UMCD Emergency Operation Center of the incoming ambulance. Good Shepherd Hospital was not called by Raytheon.

**Bullet 4) What Essential elements of information were transferred from RDC/UMCD to the hospital?**

DC

The patient's conditions were transferred to the medical team on-board the ambulance. The condition of those employees being transported by company van was provided at the time of their arrival at the hospital.

**Bullet 5) Was this information also shared with all potential receiving hospitals?**

DC

N/A

**Bullet 6) In this particular case, did Good Shepherd Hospital convey any information back to UMCD or to County Emergency Operation Centers (i.e. the hospital may have determined the nature of exposure from the manner in which casualties responded to treatment)?**

DC

No information was received from the hospital.

**PUBLIC AWARENESS**

**How did RDC provide information to the public and the media? Perception is that information was released too slow and that something was being hidden (i.e. Was it chemical agent?)**

MCD

Raytheon participates as an integral part of the UMCD public affairs program. Public affairs is a partnership among three Army agencies (UMCD, PMCD and the Army Corps of Engineers) and two private contractors (Raytheon, the systems contractor; and Booz Allen & Hamilton, the Outreach Office operator). Public affairs staff members for each of these entities work together daily to coordinate activities, and take on various roles and responsibilities to work more efficiently and avoid duplicating efforts.

Public affairs is the UMCD commander's responsibility. In an emergency such as the Sept. 15 incident, the UMCD PAO has the task of disseminating information to the media and public. For this incident, Raytheon provided information for news releases, which were disseminated by and through the UMCD PAO. These procedures helped ensure accurate information was provided. They follow the Army's public affairs "speaking with one voice"

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philosophy, meaning those talking to the media and public are using the same information. This helps ensure accuracy and consistency. Although information was sketchy in the hours following the incident, at no time was information intentionally withheld from those who made inquiries.

Because initial reports confirmed this was a construction site incident rather than a chemical weapons incident, normal CAIRA response plan actions were not immediately taken (e.g., calling public affairs augmentees, notifying higher headquarters, and notifying the governor, congressional offices, media and outside agencies). Although there is not the same requirement for the UMCD to notify the public in a non-chemical event, we know we have an obligation to attempt to allay misinformation and community concerns. Therefore, the public affairs team started response actions as soon as information revealed the potential impacts of the incident.

**Lessons Learned:** It is now our intention to respond to such non-chemical events as "community" events. A top priority will be an immediate alert to major local print and broadcast media by telephone and/or fax to confirm an incident has taken place and provide available information.

Further, for such events we will explain in greater detail how and why we know chemical agents aren't involved.

**2. What is the relationship between RDC and UMCD for distribution of information to the media and the public? Raytheon was not seen as being up front and the perception is that information was filtered by the Army.**

UMCD/RDC

Regarding the relationship between Raytheon and the UMCD for information distribution, please see the response to Question 1.

Regarding the question of Raytheon being "up front" in providing public information, Raytheon was the chief source of information on Sept. 15, as events unfolded during the following weeks, and continues to be the primary information source. Raytheon project manager participated with the Depot commander in on-site television interviews with two Tri-City stations Sept. 17, and again at the on-site media opportunity Sept. 20, along with several other Raytheon employees and the commander. Raytheon staff members have continued to participate in various media interviews and public meetings following the Sept. 15 incident.

**3. When was the first press conference held?**

UMCD/RDC

The first general media invitation to visit the UMCD went out Sunday, Sept. 19 for Monday morning, Sept. 20.

Prior to Sept. 20, the public affairs staff responded to numerous requests from the media on an individual basis, including: *East Oregonian*, *Tri-City Herald*, *Hermiston Herald*, *The Oregonian*, KVEW Television, KEPR Television, KNDU Television, KGW Television (Portland), KOHU Radio, KLCC Radio (Eugene), Oregon Public Broadcasting (Portland), Associated Press (Portland). And, as stated above, two Tri-City TV stations were also on site Friday morning, Sept. 17, for interviews with the Depot command and Raytheon project manager.

**Lessons Learned:** An opportunity was lost to allay concerns and provide additional information for news articles by not holding a press conference as soon as feasible following the incident. The UMCD commander has now made it his policy to hold a press conference within 24 hours after such an event.

**4. How did the UMCD EOC ensure that sufficient information was provided to people that the incident was not related to chemical agents?**

UMCD

Initially, there was no reason to believe that the scope of the incident was anything other than a typical construction incident. There was a conscious decision by the leadership to treat it as such. There have been several instances in the past where construction workers were injured or have taken ill (such as heart attacks) and have been sent to the local hospital via ambulance. Once the magnitude of the event was realized it was obvious that the community may perceive the situation as a chemical event. It was determined at H+90 (event plus 90 minutes) that

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the off-post CSEPP community should be notified of a non-surety emergency (not related to chemical agents). Although, in retrospect, this decision could have occurred earlier, every attempt was taken from that point forward to keep emergency managers informed of the ongoing situation. There were communication challenges due to the long distance phone lines being cut. However, the basic notification system was not impacted since it is operated via microwave. Several redundant systems were used (computer, fax, cell phone, etc.), to ensure the community was kept informed.

The Citizens Chemical Advisory Commission was briefed on Sep. 16<sup>th</sup> at their monthly public meeting. Congressman Greg Walden was briefed on Sep. 17<sup>th</sup> in the headquarters conference room.

**Lessons Learned:** The fact that chemicals were not involved should have been reported much sooner. In order to avoid this delay in the future, the off-post community will be notified of any non-chemical event that may be perceived as a chemical agents and/or munitions accidents, including industrial accidents and grass fires.

A review of internal reporting procedures is currently being conducted.

### **Were FEMIS Shared Reports used to share information on the incident between UMCD OC and the counties?**

MCD

Yes. The CSEPP Coordinator kept a running time line of events in shared reports once the initial notification to off-post jurisdictions was made telephonically. The information was then provided by fax.

### **Has a log been kept of all messages sent out?**

MCD

A logbook is kept of all events by the Depot EOC. A timeline for this specific event has been collected during the period 15-23 Sep (attached).

**Lessons Learned:** It was discovered during the investigation that the All Call was not part of the voice recording system. This has been corrected. All emergency response phones used in the EOC are now connected to the voice recording system.

### **Are there pre-prepared fact sheets that were used?**

MCD

Fact sheets already existing on the program were provided to visiting media during the Sept. 20 press conference and at other times following the event, upon request. No fact sheets were prepared specifically for this incident.

### **Was a telephone number provided for media inquiries?**

MCD

All press releases relating to the incident included at least one telephone contact number, the UMCD Public Affairs Office. Many of the news releases also included the UMCD PAO's home and cell phone numbers and/or the Outreach Office. The UMCD, through its Outreach Office, also maintains a "Guide to Public Information Contacts" that gives phone numbers and areas of responsibility for two dozen public affairs specialists with interests in chemical disposal activities. This was distributed to members of the media, on request, following the Sept. 15 incident.

### **How were information needs of UMCD and RDC personnel handled?**

MCD

The UMCD commander conducted a "commander's call" Sept. 20 to personally update employees about the incident. Raytheon held "all hands" meetings for all UMCD employees on Sept. 20 and 21. In addition, Raytheon employees were provided information on the incident through the distribution of press releases and updates from supervisors, union stewards and business agents.

In early October, UMCD and RDC employees received "Inside the Fence," a special supplement to the monthly Depot newsletter. It provided information about K-Block, the Depot's chemical weapons, and storage and

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monitoring operations. This had been scheduled for October publication prior to the incident.

RDC

Raytheon employees were provided information related to the incident through the distribution of press releases and updates from supervisors and union shop stewards and business agents, which were integrally involved in the investigation.

**10. Did more people than normal visit the PMCD Public Outreach Office as a result of the incident?**

UMCD

No. The Outreach Office has averaged 20 to 25 visitors over the past year. During the week of the Sept. 15 incident and the following two weeks, the number of Outreach Office visitors fell below those average numbers. During the heaviest week of activity during this incident, the week of Sept. 20-24, the Outreach Office recorded 18 visitors and 28 callers, many of them media. Many of the visitors were aware of the Sept. 15 incident.

**11. Were there information requests from the community hospitals? Which ones? When did they call? Who did they call? What did they ask? What information was provided to them? When? By whom?**

UMCD

Yes, there was one information request from Good Shepherd Community Hospital. On the afternoon of Sept. 15, the hospital's media spokesman asked to be kept informed about the incident as it unfolded. As a result, his name was added to the list of elected officials, media and other interested parties who received press releases by fax.

**HAZARD ASSESSMENT**

**1. Perception of Hazard:**

**(Bullet 1) Who noticed the problem and did they follow the proper reporting procedures?**

RDC

Affected craft workers were the first to notice the problem as they were overcome by fumes. They told everyone in their immediate vicinity to get out of the facility; supervisors then spread the word via radio, and informed a safety supervisor who was currently located at an entrance to the facility. This is consistent with reporting procedures.

**(Bullet 2) Are there procedures in place to immediately notify UMCD to utilize RTAPs if a chemical agent release is suspected?**

UMCD

RTAP monitoring systems were employed to test the storage area after the accident was reported. This monitoring was conducted to assure the workforce that chemical agents were not a factor. Furthermore, the interior of the MDB was tested for the presence of chemical agents using the RTAP. All monitoring results, which were recorded, were negative. These were verified by OSHA, who concurred with our decision that chemical agent was not involved.

There is no formal procedure in place at this time to utilize UMCD's RTAPs when chemical agent is not an issue. RTAP monitoring will be included in future non-chemical emergency planning procedures.

**2. Hazard Assessment:**

**(Bullet 1) What information was collected to make a determination of the threat/incident?**

UMCD

There are two different aspects in this question. Raytheon will provide their response. However, it is necessary to point out that UMCD conducted a thorough investigation as well.

There were no weapons surveillance operations ongoing at the time of the incident. Routine monitoring operations were conducted (without opening the structures) earlier in Bunkers K1825, K1826, K1880 and K1881. Operations were also conducted that morning in Igloo K1897 and ceased at 1038 when the igloo was sealed. K1897 is 1,000 meters from the construction site. At no time did wind direction flow from the storage site over the boundary of the construction site. Likewise, all readings for chemical agent vapors were negative. The winds are monitored and recorded in real-time from meteorological sensors around the Depot and construction site.

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A Federal OSHA team fully investigated the weather and operational factors and concluded that chemical agents played no role in the incident. Doctors treating the individuals likewise ruled out chemical agents as a cause of the symptoms. Several factors support this:

1. Prior to surveillance operations that require opening storage igloos, a thorough computer-driven model and hazard/risk analysis is conducted in the Depot operations center. The operational risk is evaluated, and if weather conditions either indicate a possible toxic plume release off the Depot or threaten personnel on the construction site, surveillance operations are cancelled or relocated to another structure until weather permits. Weather conditions are continuously monitored. If changes occur that would threaten workers on the construction site or the off Depot community, ongoing operations are stopped immediately. Recorded weather conditions at the time of the incident did not indicate winds across the site.

2. Over fourteen hundred employees were working around the construction site. Furthermore, Depot employees were conducting routine security patrols and grounds maintenance in the storage yard without protection (masks). The workers involved in the incident were located within thirty feet of each other in the Munitions Demilitarization Building. The known behavior of chemical agent vapors would have resulted in more widespread injuries for workers in the downwind hazard. This hazard did not exist.

3. RTAP monitoring systems were employed to test the storage area and MDB after the accident. All monitoring results, which were recorded, were negative.

**Bullet 2) Does Raytheon have procedures to direct workers on how to respond in the event the incident was a chemical agent release?**

DC

See the referenced procedures as indicated below.

4-PL-014, Emergency Response Plan,  
Volume 1, Revision 2

(Section 14.0, Depot Evacuation)

"RDC and RDC Construction have developed evacuation procedures in the event of a chemical agent release to safeguard visitors and facility personnel. The RDC Construction procedure is PSP 02.03, Site Evacuation Plan. The RDC procedure is UM-SU-001, Site Evacuation. A map of the site evacuation route and assembly areas is provided as Figure 1..." (2 Pages)

(Appendix D, Chemical Spill or Release)

"For the purpose of this plan, hazardous materials will include fuels, chemicals and other materials typically used at a construction site. Military chemical agents are not included in this plan because of the nature of activity on the site while this plan is in effect. No interaction with nerve or mustard gas is anticipated, however, construction personnel will be instructed, during new-hire orientation, on how to react to an agent release alarm. Evacuation procedures are discussed in Section 14.0 of this plan. Spill response and notification will be in accordance with UM-EC-008, Environmental Spill and Incident Reporting..." (1 Page)

4-SU-001, Site Evacuation, Revision 0

(Entire procedure; 7 pages)

"The purpose of this procedure is to provide for a safe and orderly exit from the Raytheon Demilitarization Company (RDC) Umatilla Chemical Agent Disposal Facility (UMCDF) administrative areas."

P 02.03, Site Evacuation Plan,  
Revision 3

(Entire procedure, 11 pages)

"This procedure is to provide for a safe and orderly exit from the Umatilla Chemical Agent Disposal Facility (UMCDF) should the need arise due to a chemical event of impending operations at K-block that have the potential of a release of chemical agent to the UMCDF construction area..."

**Bullet 3) How long will it take for UMCD to respond with monitoring equipment if a chemical leak is suspected?**

It is our first priority to immediately respond when a chemical agent leaker is suspected. One RTAP is on standby to perform necessary monitoring functions. Our mission is to store the chemical munitions in a safe manner to protect the workers, the public and the environment.

Army operational procedures require that storage bunkers are monitored prior to initial entry for surveillance operations and then continuously while the bunkers are open and occupied. The Depot uses Real Time Analysis Platforms (RTAP) to conduct this testing. These monitors, which are basically mobile laboratories, are capable of real-time detection of chemical agent vapors at 17 parts per trillion, and corrective action can be taken immediately.

The commander has the authority to direct the monitoring of structures and the area. He has directed that if a leak is suspected, RTAPs will immediately support verification. He has also directed that RTAPs be used to verify that no agents were involved in the case of a non-chemical event that might be perceived as involving chemical agents.

**(Bullet 4) Are there protocols to use neutral, third party agencies to conduct air monitoring/sampling immediately following any suspected industrial incident at the worksite?**

RDC No.

**(Bullet 5) Does Raytheon have a process for screening chemicals, used on site, for toxicity, needed PPE (i.e. respirators), volatility, ventilation needs, etc.?**

RDC  
UM-PL-019, Environmental Compliance Plan, Revision 2

**(Section 8.1, ENVIRONMENTAL COMPLIANCE PROGRAM)**

**"8.1.1 Program Description**

An Environmental Compliance Program will be used to demonstrate and maintain conformity with environmental permits and regulations. This program will consist of routine audits, surveillances, and monitoring of site activities..." (1 page)

**(Section 16.4.2, General)**

"The following are general requirements.

Pesticides and herbicides must be approved for use by the Site Safety Manager prior to their purchase, and must be handled in accordance with FIFRA and Army Regulation AR 200-5, Pest Management..."

**(Section 16.4.3, CONSTRUCTION)**

"An inventory of all hazardous materials procured for the construction of the UMCD must be maintained by quantity, requestor, location, use and disposition. Per SARA Title III requirements, RDC is required to perform, notify, and/or submit via PMCS and the UMCD to applicable agencies the following:

1. Compare the inventory to the list of extremely hazardous substances and notify the Local Emergency Planning Committee within 60 days for those that are present in quantities above the threshold planning quantity.
2. Submit MSDSs or a list of MSDSs and other inventory information, 60 days after the material is received, to the responding agencies and the local fire department for those materials that the Occupational Safety and Health Administration (OSHA) requires be kept under Worker Right-To-Know laws.
3. Make emergency notification to the responding agencies for emergency releases. Annually report the amount of listed toxic chemicals released in the environment either routinely or by accident per Section 313 of SARA Title III for UMCD operations."

**(Section 1.0, PURPOSE)**

"During the construction of any facility, employees may be faced with varying levels of occupational health hazards. The intent of this plan is to establish means for identifying those hazards, evaluating levels of potential exposure, and developing and implementing measures to eliminate or reduce the hazard or protect employees against its

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designed to establish clear goals and objectives and to ensure that each employee is aware of all-hazardous materials and the measures required to eliminating or controlling them. This program shall be reviewed annually to ensure that any changes in company operations and Occupational Safety and Health Act (OSHA) hazard communication (HazCom) standards are addressed and included.

Raytheon shall provide a program for proper labeling of containers, describe other needed forms of warning labels, and detail the use and purpose of material warning labels, and detail the use and purpose of MSDSs. Raytheon shall generate a list of hazardous chemicals known to be present in the workplace. This list shall be kept in the RCI Safety Office. Each employee shall be trained in the use of MSDSs and shall be informed where the MSDS is kept. They shall also be advised that it is their right to ask to review the MSDSs anytime they intend to use a hazardous chemical or product. A copy of all MSDSs shall be maintained in the RCI Safety Office along with the chemical inventory... (5 pages)

**Bullet 6) Does Raytheon Safety conduct hazard assessments of each job to ensure that the proper PPE and work rules are being followed? Are there procedures documenting the proper PPE use and ventilation requirements?**

DC

Yes. This process occurs as part of the Job Hazards Analysis (JHA) process and the Hazards Communications (HazCom) program. See specific procedure references as indicated below.

DRL A018A, Accident Prevention Plan  
Volume 1, Revision 0

(Section 8.0, Job Hazard Analysis)

"The scope of this plan is to provide guidance for the development of a JHA..." (6 pages)

(Section 18.0, Respiratory Protection)

"The use of respiratory protection equipment is necessary for the safety and health of employees working in atmospheres where harmful or toxic dusts, fogs, fumes, mists, gases, smokes, or vapors exist or in an oxygen deficient atmosphere..." (4 pages)

**MEDICAL MANAGEMENT**

**Triage: Does Raytheon have procedures on how to triage? If procedures exist, who is trained and did triage occur during this incident?**

MCD

This is a Raytheon question, but also applies to the Depot. UMCD medical personnel frequently train in triage in preparation for a surety event. The OHC physician has trained much of the Hermiston Fire Department on the medical management of chemical casualties, which contains some training in general triage. The training is also available to the Raytheon clinic. However, many of their paramedics are also members of the Hermiston Fire Department.

DC

Yes. Paramedic/EMT personnel are certified by the State of Oregon to conduct these activities. These personnel work under protocols developed by Beverly Harn, M.D., who is their local area registered Physician Advisor with the State of Oregon. In addition, Paramedic/EMT personnel work to "Emergency Care in the Streets," 3<sup>rd</sup> edition, Nancy L. Caroline, M.D.

VI-PL-013, Medical Implementation  
Plan, Volume 1, Revision 1

(Section 6.3)

"The EMTs will hold a current State of Oregon EMT's certification. Their duties and responsibilities are as follows . . .

Evaluate injured and ill employees and determine the need for off site transportation and/or treatment."

(Section 9.0, FIRST-AID TREATMENT)

"9.1 GENERAL

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effects."

**(Section 5.0, HAZARD COMMUNICATION PROGRAM)**

Raytheon Engineers & Constructor's Corporate Hazard Communication (HazCom) Program shall be the basis for establishing employee right to know and training requirements on the UMCDF Project. These basic statutory requirements shall be expanded upon to meet specific project needs. The Raytheon HazCom Program has been developed in accordance with statutory requirements found in Federal standards, e.g., OSHA and EPA, and state standards as described in the Accident Prevention Plan (CDRL A018A).

The HazCom Program shall be an element of the new hire orientation training program for all employees. This training shall be documented and made available for review by the designated authority at any time.

**(Section 7.0, CHEMICAL HAZARDS)**

"A variety of products containing hazardous substances will be used on this project..." (3 pages.)

**(Section 8.0, PHYSICAL HAZARDS)**

"Construction activities pose a number of physical hazards to employees (i.e., noise, radiation, nuisance dust, airborne objects and temperature extremes)..."(4 pages)

**(Section 6.3, PERSONAL PROTECTIVE EQUIPMENT)**

"The following personal protective equipment (PPE) will be required while on the job site. Certain items, such as goggles, face shields, safety harnesses, etc. are needed only in specific situations. Employees are to be thoroughly instructed on the use, maintenance and inspection of all their equipment. This instruction shall be given by the site Safety Manager/designee as part of the new hire orientation. All training shall be documented and kept on file in the Safety Office. Additional safety related training will be conducted as required in the RCI Safety Training Building.

Visitors intending to enter the work area shall be required to meet all personal protective equipment requirements as the work force. All safety related equipment, (i.e., hard hats, safety glasses, goggles, etc.) will be issued by the Safety Department. At time of issue, the employer's training records will be reviewed to ensure he/she has been trained in the proper use of the personal protection equipment is being used..."

**(Section 6.4.9, Respiratory Protection)**

"Certain work tasks require additional protection against dust, fumes and other inhalation hazards. In such cases, it is necessary to install additional ventilation to remove these hazards. When this is not sufficient then additional respiratory protection is required. In such cases the employee must be properly trained in the use, selection and maintenance of his/her equipment as well as fit tested on the respirator to be used and medically qualified. Medical qualifications shall be determined by a licensed physician. All employees will receive instructions on the use and selection of maintenance free respirators at new hire orientation. (Respirators, dust masks, such as the MSA 9920 and MSA 8610 are considered as single use, maintenance free types.) Employees who are required to use negative pressure air purifying respirators will receive additional training, prior to use. The construction Safety Manager shall be consulted on all occasions where respiratory equipment is required."

**(Section 7.0, HAZARD COMMUNICATIONS)**

"This section will be communicated to all personnel that are assigned to the UMCDF project. Each employee will receive this information initially at new hire orientation and as needed if revisions, modifications or additions to the program as they occur. This program encompasses the entire workplace, regardless of number of employees. It is

CDRL A018A, Accident Prevention Plan  
Volume 1, Revision 0

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All treatment will be in accordance with established procedures and protocols. The on-scene EMT shall request a check of the employee's Safety File so as to better evaluate the injured employee's condition."

**"9.2 CHEMICAL ACCIDENT/INCIDENT MEDICAL RESPONSE**

UMCDF employees suspected of the chemical agent exposure will be referred to the UMCD clinic until such time the UMCDF health clinic is established and equipped to provide."

(Appendix B, Accident, Injury, or Illness)

"Should a worker become seriously injured or ill at the project, the following guidelines shall be used in summoning and rendering assistance..."

**3.0 RDC CONSTRUCTION EMT**

3.1 Obtain information from the caller and proceed to the scene.

3.2 Assess the injured person's condition and administer treatment according to medical direction and protocol.

3.3 Once the injured person is stable, transport him/her to the appropriate medical facility.

3.4 The EMT will keep the RDC Construction Safety Manager informed of the injured person's condition as it is made available.

M-PL-014, Emergency Response Plan,  
Volume 1, Revision 2

**Treatment: Are there procedures on how to treat employees suffering from any condition: chemical or traumatic? Do the procedures incorporate a UMCD clinic or off-post fire/rescue?**

UMCD - PMCSD/RDC and U.S. OHC-  
UMCD MOU (draft).

"Chemical casualties (i.e. from surely chemical material) will always be treated by the UMCD clinic. Other types of injuries (including irritant exposures from an industrial accident) sustained at the UMCDF site which involve UMCDF employees are treated by the Raytheon clinic unless help is requested of the UMCD clinic (i.e. for a Mass Casualty event) per the MOU that is in progress."

DC

Yes. As addressed in question #1 above, and as described in reference procedures as indicated below.

M-PL-013, Medical Implementation  
Plan, Volume 1, Revision 1

(Section 3.0, SCOPE) "An integral part of the Plan is how injured employees will be treated. The UMCDF project will staff two intermediate level EMTs any time work is being conducted for evaluating and treating occupational illnesses and injuries related to construction activities."

(Section 7.4, OBJECTIVES) "The objectives of the UMCDF Infirmary and staff are as follows...

Provide emergency first-aid response in the event of occupational illness or injury.

Respond to the needs of employees regarding non-job related conditions that may result in loss of life or other serious consequences (e.g., heart attack, seizures, etc.)."

(Section 9.0, FIRST-AID TREATMENT)

**"9.1 GENERAL**

All treatment will be in accordance with established procedures and protocols. The on-scene EMT staff shall request a check of the employee's medical resume for preexisting conditions and/or allergies from the employee's Safety File so as to better evaluate the injured employee's condition."

**9.2 CHEMICAL ACCIDENT/INCIDENT MEDICAL RESPONSE**

UMCDF employees suspected of chemical agent exposure will be referred to the UMCD clinic until such time the UMCDF health clinic is established and equipped to provide this service."

**Decontamination: Does Raytheon have procedures for employee decontamination on the job site? If so, were they followed (the concern is how employees got to the hospital without being decontaminated at the site)?**

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UMCD

This is a Raytheon question, but it's important to note that there were no weapons surveillance operations ongoing at the time of the incident. At no time did wind direction flow from the storage site over the boundary of the construction site. Likewise, all readings for chemical agent vapors were negative. The winds are monitored and recorded in real-time from meteorological sensors around the Depot and construction site when operations are in progress. There was no need for chemical agent decontamination.

Although the cause is not yet known, the source was definitely not the Depot's chemical weapons stockpile. Depot mobile air monitoring labs monitored the storage area; the area between the workmen and the storage area; and the building's interior and exterior. All readings have been negative.

RDC

Our first assessment was that incident victims were suffering from a respiratory irritant, showed no signs of skin or appreciable eye irritation, and no signs of visible contamination. Had the agent been involved there would have been other symptoms. Therefore, there was no perceived need to conduct any special decontamination process(es) prior to victim transport to the hospital facility. In the case of a chemical agent contamination, (at this time) it is the responsibility of the UMCD to conduct personnel decontamination.

**4. Medical Transportation:**

**(Bullet 1) Does Raytheon have a procedure/protocol on how injured/sick workers are to be transported off of the UMCD grounds? If yes, were they followed?**

UMCD

This is also a Raytheon question. However, the UMCD clinic may aid the Raytheon clinic per the MOU noted previously. The Depot clinic's mission will ALWAYS take care of chemical casualties (i.e. from surety chemical material) and arrange for transport of such patients to higher levels of care.

**Lessons Learned:** One deficiency made in the event was that there is not a plan or MOA between RDC and UMCD for additional evacuation support (i.e. UMCD bus) for a mass casualty situation. RDC has recognized this and has one dedicated 19-passenger van and two additional vans in close proximity for patient evacuation. This is in addition to the RDC ambulance that has been on station since construction started.

RDC

UM-PL-013, Medical Implementation Plan, Volume 1, Revision 1

(Appendix B. ACCIDENT, INJURY, OR ILLNESS)

"3.3 Once the injured person is stable, transport him/her to the appropriate medical facility."

**"4.0 OUTSIDE AMBULANCE SERVICE**

4.1 In the event an outside ambulance must be summoned, call "9-911" for Hermiston Ambulance. Advise the main gate (9-564-5217) of the situation so that an escort can be set up upon their arrival.

**5.0 Multiple Injuries/Illnesses**

In the event there are multiple injuries and/or illnesses, off site ambulances shall be called immediately to augment ambulance personnel. This decision shall be made by the first medical person on scene."

UM-PL-014, Emergency Response Plan, Volume 1, Revision 2

(Section 6.3, UMCD EMERGENCY MEDICAL TECHNICIAN STAFF)

"The EMTs will hold a current State of Oregon EMT's Certification. Their duties and responsibilities are as follows. . .

Evaluate injured and ill employees and determine the need for off site transportation and/or treatment. Ensure that UMCD Security is made aware of the off site ambulance being called and request that an escort be

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stationed at the southeast gate to escort ambulance to the patient's location."

(Section 8.0, ONSITE AMBULANCE SERVICE)

"8.1.1 Raytheon shall maintain and operate a fully equipped ambulance for emergency response only. In the event of multiple injuries, Raytheon has a mutual aid agreement with the Hermiston Fire Department to augment the need for transport of additional personnel."

**Bullet 2) Do the above procedures take into consideration chemical vs. traumatic injuries?**

DC

Yes. In addition to the above procedures, chemical versus traumatic injuries would be considered as part of the triage process, which are enumerated in the Paramedic/EMT protocols, discussed in the response to question #1.

**Medical Screening of Workers:**

**Bullet 1) Are there procedures in place on how to screen all employees leaving the work site?**

DC

Government employees who work for UMCD, PMCSD, SAIC and the Corps of Engineers receive training in First Aid, CPR, chemical surety, hazardous communications, and hazardous waste operations and emergency response. RDC and DEQ representatives who have offices at the UMCD are required to attend a chemical safety, surety, and security orientation conducted by the UMCD surety office. They are taught how to identify chemical agent symptoms in themselves and others. Individuals who have been in an area that is contaminated, or are showing two or more signs and symptoms, are immediately taken to the Depot clinic for evaluation and/or treatment. Nerve agent symptoms are immediate, so it is highly unlikely that anyone would be evacuated who had been exposed.

DC

The initial assessment of employee symptoms was made at the construction site infirmary by EMT/Paramedics. Employees displaying the most acute symptoms were transported to the hospital immediately. Other affected personnel were assessed and sent to the hospital depending on symptoms displayed. UMCD would request support from off-site, as needed.

**Bullet 2) Were all employees assembled and screened before they were allowed to leave the site?**

DC

All affected/exposed employees were triaged at the infirmary prior to their transport for additional medical assistance. All employees were screened prior to leaving the site. No employees were exposed to chemical agent.

**Bullet 3) What is the process to ensure that all employees are accounted for during an emergency? Is the process documented and are employees trained?**

DC

M-SU-001, Site Evacuation, Revision 0

(Section 10.0, ACCOUNTABILITY)

6.5.1 All UMCD personnel will be provided with a card that bears that individual's name and a color code to indicate category of employee. These cards will be worn behind the Depot badge at all times. If this card is lost or left at home, notify the SC Surety Manager for a permanent or temporary replacement.

6.5.2 Upon arrival at the designated assembly area in A-block, these cards will be placed in the drop box located on "I" street. Since RDC has one assembly area the SC Surety Manager will gather these cards and take them to the command post located on Pier 2 and report to the point posted with the respective group identification number.

6.5.3 Personnel going on long term medical, temporary duty, family leave, vacation, etc., in excess of 3 days, will turn their card in to the SC Surety Manager prior to departure. The SC Surety Manager will process these cards in accordance with section 6.5.4. This will facilitate the accountability process for this category of employee.

6.5.4 The evacuation cards will be compared with the current Roster of Personnel furnished by the Human Resources (HR) Manager to assure accountability of all personnel. The SC Surety Manager will take a copy of the

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current roster, cards that have been turned in, and cards/lists from the drop box to Pier 2. Managers and/or supervisors are responsible to notify the Pier 2 command post of personnel who are absent from the workplace for unforeseen reasons or for 3 days or less. This may be accomplished by listing the individual's name(s) and placing the list in the drop box.

NOTE: This is an exception to section 6.5.3.

6.5.5 Personnel traveling in carpools, with drivers having assembly area other than "I" street, will deposit their accountability cards in the drop box in the assembly area of the driver. Accountability will be resolved at the Pier 2 command post.

6.5.6 Visitors, vendors, and sub-contractors will be provided with a temporary evacuation card (Figure 3) by the RDC point of contact. Temporary cards are available from the SC Surety Manager. These cards will be collected and discarded upon departure of the visitor. If an emergency occurs and the visitor will not return, the temporary card will be discarded after the emergency has been terminated and accountability reconciled. The point of contact or escort of the visitor will assure that the visitor evacuates via the appropriate route. Visitors who have been issued Depot badges will comply with the directions in this procedure.

6.5.7 Cards will be returned to the SC Surety Manager at the evacuation assembly point and returned to the employees as soon as possible by the SC Surety Manager."

**(Section 6.6, TRAINING)**

"6.6.1 All SC personnel will be trained on the requirements contained in this procedure. This training will be recorded and maintained on file for the effective period of this procedure."

6.6.2 Changes to this procedure will be communicated through the management structure to all employees to keep them informed of new or changed procedures.

**(Section 10.0, ACCOUNTABILITY)**

"10.1 All Raytheon personnel will receive an accountability card. It must be worn behind their project badge. When they reach their assembly area, in "A" block they are to drop evacuation I.D. card only, not their regular badge, in the drop box and proceed to the end of the road or behind the next vehicle ahead of them and wait for further instructions. Once traffic has stopped and it appears all personnel are at the assembly area, the general foreman and job stewards will gather up the I.D. cards and take them to P-2 and report to the areas posted with their respective number. The I.D. cards will be compared with the employee master lists to insure everyone is accounted for. . ."

**(Section 13.0, TRAINING)**

"All Raytheon personnel will be trained on the element of this plan prior to it being implemented. This plan will also become part of the new hire orientation."

**(Entire Procedure)**

"This procedure is to provide accurate accountability for Raytheon Cost Plus Award Fee (CPAF) and Firm Fixed Price (FFP) non-manual employees at the Umatilla Chemical Agent Disposal Facility (UMCDF)..." (6 pages)

PSP 02.03, Site Evacuation Plan,  
Revision 3

PSP 02.07, Office Building Evacuation  
and Accountability, Revision 1

EQC Meeting May 18, 2000  
Attachment W, Page W-62

ATTACHMENT X

**"FACILITY STARTUP CHECKLIST"**

*(DEQ Item Nos. 00-0504 and 00-0505)*

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# Oregon

John A. Kitzhaber, M.D., Governor

## Department of Environmental Quality

Eastern Region  
Hermiston Office  
256 E Hurlburt  
Hermiston, OR 97838  
Phone: (541) 567-8297  
FAX: (541) 567-4741  
TTY: (503) 229-6993

April 6, 2000

Lieutenant Colonel Thomas F. Woloszyn : Mr. Jay T. Bluestein  
Commander : Project Manager  
Umatilla Chemical Depot : Raytheon Demilitarization Company  
Attn.: SCBUL-CO : 78068 Ordnance Road  
Hermiston, OR 97838 : Hermiston, OR 97838

Mr. Raj Malhotra  
UMCDF Site Project Manager  
Program Manager for Chemical Demilitarization  
78072 Ordnance Road  
Hermiston, OR 97838

Re: Facility Startup Checklist  
Umatilla Chemical Agent Disposal Facility  
ORQ 000 009 431  
DEQ Item No. 00-0504 (26.27)

Dear LTC Woloszyn, Mr. Malhotra, and Mr. Bluestein:

The Department of Environmental Quality (Department) has developed the enclosed Startup Checklist to assist in assessing the readiness of the Umatilla Chemical Agent Disposal Facility (UMCDF) to begin thermal operations. The Department is currently preparing specific evaluation criteria to assess the status of the Facility against the Startup Checklist. All the items listed will need to be satisfied prior to the Department making a recommendation to the Environmental Quality Commission (EQC) that the UMCDF is ready to begin thermal operations. The Startup Checklist may be supplemented by additional issues as they arise over coming months; however, the existing list is very comprehensive.

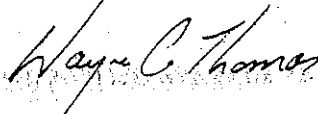
The Department considers the decision to commence thermal operations as critical as the decision to issue the Hazardous Waste Storage and Treatment Permit in February 1997. A public review and comment process is a vital component in any decision that will be reached by the EQC. Therefore, the Department expects to conduct at least a 30 day public comment period as part of its evaluation process prior to submitting a recommendation to the EQC.

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LTC Woloszyn, Mr. Malhotra and Mr. Bluestein  
April 6, 2000  
DEQ Item No. 00-0503 (26.27)  
Page 2

If you have any questions concerning this matter, please call me at (541) 567-8297, ext. 22.

Sincerely,



Wayne C. Thomas  
Program Administrator  
Chemical Demilitarization Program

Enclosure: Startup Checklist for Thermal Operations (DEQ Item No. 00-0505)

Cf: Langdon Marsh, Director, DEQ  
Stephanie Hallock, Office of the Governor  
Environmental Quality Commission  
Judge Terry Tallman, Morrow County  
Chair Bill Hansell, Umatilla County  
Bob Flournoy, Chair, CAC

## UMCDF Startup Checklist (Surrogate Operations)

Revision 1 (March 31, 2000)

### PERMITTING DOCUMENTATION/PERMIT COMPLIANCE

1. UMCD Storage Permit approved, issued and implemented.
2. UMCDF Class 3 Storage Permit Modification Request approved and implemented.
3. UMCDF Dunnage Incinerator Permit Modification Request submitted and approved.
4. Final decision issued on Class 3 UMCDF Compliance Schedule Permit Modification Request, and if approved, all required provisions implemented.
5. UMCDF HW Permit and RCRA Part B Application current and approved. All information, attachments and documentation will be revised and updated, and will include valid PE stamps where required.
6. All required surrogate trial burn plans submitted (at least 180 days prior) and approved.
7. UMCD/UMCDF in compliance with all HW Permit Conditions and other Department requirements.
8. 40 CFR 264 Subparts AA/BB/CC requirements incorporated into the HW Permit and Application, as well as the UMCDF design and operational configuration.
9. Revisions to OAR 340-101 and 340-102 to address the appropriate application of the Oregon state-only waste codes F998/F999 and P998/P999 have been promulgated and corresponding changes properly incorporated into the HW Permit and RCRA Part B Permit Application.
10. UMCDF Perimeter Monitoring Network for CMP Baseline air monitoring activated at least 1 calendar year prior.
11. UMCDF Independent Oversight Program structure and implementation acceptable to the Department.
12. All required tank and tank system, including primary containment sumps, certifications submitted to the Department.
13. Information demonstrating that the planned surrogate materials are "non-ignitable" submitted (at least 6 months prior) and approved by the Department.
14. All required miscellaneous treatment unit certifications submitted to the Department.
15. At least eight CMP sampling events completed and resulting data included in the CMP baseline dataset.
16. Remote UMCDF monitoring station(s) installed and operational per Department request.
17. UMCD/UMCDF standard operating procedure related to operational limitations during adverse weather conditions submitted at least 180 days prior.
18. Treatment and disposal options, including sampling and analytical requirements, identified and implemented for ALL expected UMCDF secondary waste streams.
19. BRA limited stack test plan submitted to the Department (90 days prior to the test) and approved.  
*This may not be necessary prior to start of surrogate operations, depending on the timing of the test.*

### EMERGENCY RESPONSE READINESS

20. CSEPP readiness approval received from the Oregon Governor's office.

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FACILITY CONSTRUCTION/SYSTEMIZATION/OPERATIONS

21. All required Facility Construction Certification (FCC) packages submitted and approved.
22. UMCDF construction complete, facility turned over to operations and maintenance, and all systemization activities successfully completed, including preparation of necessary operational and maintenance procedures.
23. Unlined carbon steel duplex strainers removed from PAS's and replaced by new dual simplex strainer design. This includes the submittal and approval of a Permit Modification Request to reflect the change.
24. UMCDF waste/munitions tracking procedure and system developed, approved and implemented.
25. Pollution Abatement System carbon filter system (PFS) and upstream sampling/monitoring system installed and operational.
26. All necessary waste management processes and contracts implemented to manage all waste streams generated during surrogate operations.

MISCELLANEOUS ISSUES

27. Appropriate Department personnel approved for unescorted access to UMCDF.
28. Post-Trial Burn Risk Assessment Protocol completed and issued by the Department.
29. UMCDF/UMCDF in compliance with approved/issued Air Quality Permit and all applicable MACT and air quality regulations. All outstanding air quality issues resolved to Department's satisfaction.
30. UMCDF/UMCDF in compliance with all applicable water quality regulations. All outstanding water quality issues resolved to Department's satisfaction.
31. Department Public Outreach efforts completed.





# Oregon

John A. Kitzhaber, M.D., Governor

Department of Environmental Quality

811 SW Sixth Avenue

Portland, OR 97204-1390

(503) 229-5696

TDD (503) 229-6993

## Memorandum

To: Environmental Quality Commission  
From: Langdon Marsh  
RE: Director's Report

Date: May 15, 2000

### City of Portland Combined Sewer Overflows (CSOs)

DEQ, the Governor's office and the City of Portland have been meeting to reach agreement on a Combined Sewer Overflow (CSO) strategy. The strategy being discussed is to allow the city to reduce the size of the "big pipes" structural facilities. Cost savings from that could be used on in-flow controls and to meet the 2011 performance and control program deadline.

### The Cleanup Program Customer Survey

Presentations on initial results were made to our Environmental Cleanup Advisory Committee (ECAC) and Voluntary Cleanup Program Focus Group in April. The final survey report is due on May 15, 2000. ECAC will meet on June 7 to recommend potential program improvements.

### Portland Harbor

The Environmental Protection Agency (EPA) is proposing to place a 6-mile stretch of the Willamette River between Sauvie Island the Swan Island, referred to as Portland Harbor, on the National Priority List, commonly known as Superfund. On April 5, EPA Region 10 Administrator Chuck Clarke sent a letter to Governor Kitzhaber requesting his concurrence with EPA's decision to list the site. The Governor has not yet given official concurrence. While the Superfund listing package goes forward, work continues on investigating and cleaning up Portland Harbor. EPA and DEQ will be working together to identify and contact the responsible parties to pay for and implement the cleanup work in Portland Harbor.

Efforts to receive an EPA deferral for a Portland Harbor clean up under state authority could not go forward without signed tolling agreements between the Natural Resource Trustees and the Potentially Responsible Parties. The parties were unable to reach an agreement by the end of March. DEQ and EPA will jointly plan the next cleanup steps.

### New Carissa Wreck Removal

At the April 18 meeting of the State Land Board, the Responsible Party's on-site representative Bill Milwee, advised state officials that the conditions at the wreck site make further work too dangerous and too difficult to continue. State Lands Director Paul Cleary reminded the Responsible Party (RP) that the State's full and complete removal demand continued in effect. The Governor advised the RP that if they cannot remove the wreck, then the state will require a \$25 million commitment in lieu of removal. The Governor stated that the state would initiate legal action if necessary.

### Governor's Sustainability Order

Governor Kitzhaber will sign an order on May 17 that directs the Department of Administrative Services (DAS) and other specific state agencies to adopt sustainability practices for internal operations. The order also directs DAS to develop and assist other state agencies in efficiently achieving sustainable internal operations. The order does not direct DEQ to do anything but DEQ is already working to identify opportunities and to facilitate actions to achieve sustainability in internal operations.



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### **Pennington v. DEQ**

Oregonians in Action (OIA) appealed DEQ's issuance of a Clean Water Act (CWA) Section 401 certificate for the Day Road Prison near Wilsonville. The certificate was issued as part of an application to the US Army Corps of Engineers for a CWA Section 404 permit to fill of approximately 1.5 acres of wetland. OIA asserts that the certificate is inadequate because it does not include conditions requiring the Department of Corrections to comply with statewide land use goals and act local land use regulations. DEQ believes it did comply with relevant land use provisions when issuing the certificate.

### **Snake River Decision**

On March 31, 1999, a consortium of environmental and fishery groups filed a suit against the US Army Corps of Engineers in federal district court. The suit alleged violations of the State of Washington's temperature and total dissolved gas water quality standards in relation to operation of the four lower Snake River hydroelectric dams. In a ruling released in March, Judge Helen Frye ruled that the federal government is not exempt from complying with the provisions of the Clean Water Act, and that citizen groups have the right to pursue legal avenues to have standards enforced. In ruling, Judge Frye acknowledged evidence of damage to the Snake River, but gave both sides 90 days to gather evidence from the administrative record to demonstrate whether or not dams were the cause of the violations.

### **Garcia River Law Suit**

The United States District Court for the Northern District of California decision in the Prosolino et al vs. EPA, referred to as the Garcia River Case, affirmed that EPA has the authority to issue Total Maximum Daily Loads (TMDLs) for nonpoint source listed waterbodies. The court also clarified that implementation of load allocations for nonpoint sources are the responsibility of the state.

### **Hawes v. State of Oregon**

Ranchers Daryl and Barbara Hawes, the Baker County Farm Bureau and The Baker County Livestock Association filed suit against the Department, EQC and Oregon Department of Agriculture. DEQ's understanding is that the lawsuit is being financed by the Oregon Agriculture Legal Foundation. The suit seeks to invalidate the Memorandum of Agreement between DEQ and EPA relating to the development and implementation of Total Maximum Daily Loads (TMDLs). It also seeks a court order declaring that EPA and DEQ have no authority under the federal Clean Water Act to establish TMDLs for water bodies that violate water quality standards because of pollution caused solely by nonpoint sources such as farming, grazing and logging. The federal District Court for Northern District of California recently ruled against the California Farm Bureau in a strikingly similar case. *Prosolino v. Marcus* (March 30, 2000). We expect a similar result in Oregon.

### **Northwest Environmental Defense Center and Churchill v. Carol Browner**

The Sierra Club joined Jack Churchill in requesting the court enter an order and decree that finds EPA in violation of a 1987 consent decree requiring EPA to ensure that Oregon complete a certain number of TMDLs. They also requested the court to issue an order compelling EPA to issue TMDLs for Oregon's identified polluted waters in six months. At a May 2<sup>nd</sup> hearing, Judge Hogan delayed any decision pending the outcome of settlement negotiations involving parties in the cases of Northwest Environmental Advocates, et.al. v. Browner, and NEDC and Churchill v. Thomas. Both cases are related to completing TMDLs for Oregon's listed waterbodies. Settlement discussions are ongoing and hopefully resolution is near.



EXECUTIVE ORDER NO. EO-00-07

**DEVELOPMENT OF A STATE STRATEGY PROMOTING  
SUSTAINABILITY IN INTERNAL STATE GOVERNMENT OPERATIONS**

**WHEREAS** the unique natural qualities of the Pacific Northwest are unparalleled in the world and state government, as a large employer and facilities manager, impacts these qualities through its internal state government operations;

**WHEREAS** the people of the State of Oregon have a long history of finding innovative solutions to the most challenging and complex problems;

**WHEREAS** the State of Oregon strategic plan, *Oregon Shines*, reflects values that balance community, environmental and economic aspects of life in Oregon;

**WHEREAS** analysis of current trends described by the *Oregon Benchmarks* and by the *Oregon State of the Environment Report* shows significant threats to quality of life and environmental and economic sustainability;

**WHEREAS** the State of Oregon aspires to learn from the leadership of private industry, business, labor, educational institutions and other governments in addressing the goal of sustainable development;

**WHEREAS** it is the goal of the State of Oregon to increase efficiency in state government, cut long-term costs associated with state programs and save taxpayer dollars; and

**WHEREAS** this complex challenge is evolving, it is believed there are important steps the State of Oregon can take now to amend internal government operations to meet important goals.

**THEREFORE, IT IS HEREBY ORDERED AND DIRECTED:**

The State of Oregon shall develop and promote policies and programs that will assist Oregon to meet a goal of sustainability within one generation - - by 2025.



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A number of significant steps will be necessary to achieve a sustainable future and will require the participation of all Oregonians. As an initial effort under this executive order, the State of Oregon shall focus on improving its internal operations as state government's first step toward meeting the goal of sustainability. This step is the first of many to be taken as we advance the state toward a sustainable future.

The State of Oregon adopts the following definition, goals and guidelines to promote sustainability.

### Definition

Sustainability means using, developing and protecting resources at a rate and in a manner that enables people to meet their current needs and also provides that future generations can meet their own needs. Sustainability requires simultaneously meeting environmental, economic and community needs.

### Goals

1. Increase the economic viability of all Oregon communities and citizens;
2. Increase the efficiency with which energy, water, material resources and land are used;
3. Reduce releases to air, water and land of substances harmful to human health and the environment; and
4. Reduce adverse impacts on natural habitats and species.

### Guidelines

As the State of Oregon works toward sustainability, the state shall:

1. Employ the knowledge, expertise and creativity of Oregon's citizens in developing solutions;
2. Build upon existing private and public efforts throughout the state to ensure efficient and complementary results;



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3. Integrate efforts in ways that enhance the effectiveness of new and existing efforts;
4. Collaborate and cooperate to remove barriers and find solutions;
5. Emphasize on-going learning and adaptive management as techniques needed to inform and improve the process continually;
6. Develop voluntary, incentive-based and performance-oriented systems to supplement traditional regulatory approaches;
7. Seek to understand the full costs and benefits of possible actions to ensure that decisions are fully informed;
8. Using good science, measure resource use, environmental health and costs to determine progress in achieving desired outcomes; and
9. Establish clear, measurable goals and targets to guide state efforts toward sustainability.

### **THEREFORE, IT IS HEREBY ORDERED AND DIRECTED:**

All state agencies and employees are expected to take actions to promote sustainable practices within state government. As an initial step, the Department of Administrative Services, with its central role in state buildings, procurement and communication, shall lead efforts focused on internal government operations. The following specific actions shall be taken under this executive order:

1. **Adopt Sustainability Practices within State Government Operations to Demonstrate how to Reduce Waste**

The Governor designates the Department of Administrative Services as the leader in implementing early sustainability measures in such areas as: facilities construction and operations; purchasing; energy usage; vehicle use and maintenance; information systems operations; and publishing and distribution.

The Department of Administrative Services, in collaboration with other state agencies, shall implement the following objectives:



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- a. Within six months following the date of this order, the Department of Administrative Services shall adopt sustainable facilities standards and guidelines. These shall guide the siting, design, construction, deconstruction, operation and maintenance of state buildings and landscapes, and the selection, terms and conditions for state leaseholds.

The department shall:

- i. Review and consider sustainable facilities standards, practices and principles employed by businesses, educational institutions and other governments;
- ii. Obtain input from the existing Central Facilities Planning Committee and the existing Capital Projects Advisory Board, organized for state facilities coordination under ORS 276.227;
- iii. Review and update state sustainable facilities standards and guidelines at least biennially; and
- iv. Track and report key sustainable facilities performance elements through the existing State Facilities Coordination Program.

- b. The Department of Administrative Services shall use the North Mall Complex design, construction and maintenance as a pilot project to employ and evaluate sustainability methods and programs. The facility design shall employ a wide range of compatible, reliable sustainability actions. Where feasible, it shall test such programs and standards as the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program.



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- c. The Department of Administrative Services shall expand state government purchasing power by aggressively entering into joint bidding agreements with other state and local governments and with multi-government purchasing alliances, and by encouraging local governments to access resulting low-price, high-value purchase agreements that promote sustainability. This will make sustainable products and services more widely available to local governments.
- d. To the extent that it is effective and practical to do so, the Department of Administrative Services shall take immediate action to purchase electrical energy from renewable resources such as wind, solar, geothermal and biomass. In the immediate future, this shall involve purchasing green power from private utilities as appropriate; beginning October 2001, this shall involve purchasing green power through direct access to the power generation market.
- e. The Department of Administrative Services shall appoint a Sustainable Supplier Council. In consultation with the council, the department, by June 2001, shall develop sustainability purchasing policies, targets and benchmarks for each of the following areas: paper products; building construction; cleaning products and coatings; general purpose motor vehicles and office furniture. In determining benchmarks, the council shall consider benefits and costs that could arise as a result of purchasing sustainable alternatives.

The Department of Administrative Services shall develop, based on its experience in implementing the preceding objectives, appropriate mechanisms to assist other state agencies in efficiently achieving sustainable internal operations. Mechanisms may include replication of department procedures or collaboration on the development of alternative approaches. In this effort, the department shall consult with the sustainability work group.





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The Department of Administrative Services shall report biennially to the Governor and the Legislative Assembly on actions taken to promote sustainability. The first such report shall be submitted by December 15, 2000 and shall address actions taken by the Department of Administrative Services and other state agencies to implement this executive order.

**2. Create a Sustainability Work Group**

To improve the efficiency and effectiveness of efforts related to the sustainability of state operations, the Governor shall assemble a Sustainability Work Group comprising representatives of the Legislative Assembly, state agencies, business, natural resources industry and environmental interests, labor, education and local government for the purpose of providing evaluations, recommendations and feedback on state efforts. The work group shall also be asked to develop options for additional steps the state can take to promote sustainability. Staffing for the work group shall be coordinated by the Governor's office. The work group shall present a first report to the Governor and the Legislative Assembly by December 15, 2000, with a final report due by June 1, 2001.

**3. Assess Options for Sustainability Indicators and Targets**

The Oregon Progress Board shall evaluate potential measures, including Oregon Benchmarks and the State of the Environment Report, for their effectiveness in measuring progress toward sustainability. In this evaluation, the Progress Board shall consult with the Sustainability Work Group and with the Department of Administrative Services. The Progress Board shall report to the Governor and Legislative Assembly on their findings as part of the board's biennial reporting process.



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4. **Conduct Business, Community and Public Outreach**

***Business and Community Outreach***

In order for state government to develop sustainable internal operations and assist local organizations to do the same, the Economic and Community Development Department, after consultation with the Economic and Community Development Commission, other Community Solutions Team agencies and other appropriate state agencies, shall develop and implement strategies to accomplish the following actions:

- a. Develop partnerships among state and local governments; businesses and communities that support and promote sustainability;
- b. Coordinate efforts to better market sustainable products, industries and services from Oregon and encourage development of environmental technologies;
- c. Develop a range of resources to support organizations adopting sustainable practices. These resources may include training and educational opportunities, electronically available information, case studies and other services of greatest value to businesses, communities and other organizations;
- d. Intensify efforts to increase the economic stability of communities designated as "economically distressed;" and
- e. Evaluate a range of incentives that would make investments in sustainably-oriented businesses and practices more attractive.



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By September 30, 2000, the Economic and Community Development Department shall prepare and submit to the Sustainability Work Group for its review a plan to encourage businesses and communities throughout the state to learn about and voluntarily adopt sustainable practices.

By December 15, 2000, the Economic and Community Development Department shall prepare and submit to the Governor and the Legislative Assembly a report on the actions taken to implement this executive order.

***Public Outreach***

The Governor's office, the Department of Administrative Services and the Economic and Community Development Department shall, after consultation with the Sustainability Work Group, develop and maintain Internet web sites describing the plans, actions and accomplishments of state agencies and highlighting examples of successful sustainability practices from the public and private sectors. In addition, these entities, in collaboration with the Sustainability Work Group, shall develop and implement short-term plans to communicate with the general public about the state's efforts to promote sustainability.

5. **Pursue Further Efforts**

The State of Oregon, in cooperation with businesses, non-profit organizations, local governments and other citizens, will pursue further actions in an on-going effort to meet the goals and principles outlined in this executive order. The Governor, in subsequent orders and directives, may announce additional objectives to be pursued by agencies. Directives may also identify steps to ensure broad public participation in this sustainability effort.



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Done before me at Salem, Oregon, this \_\_\_\_ day of May, 2000.

\_\_\_\_\_  
John A. Kitzhaber, M.D.

GOVERNOR

ATTEST:

\_\_\_\_\_  
Bill Bradbury

SECRETARY OF STATE

**Richard E. Condit, Esq.  
Post Office Box 77001  
Washington, D.C. 20013-8001  
202-955-6968 ext. 4**

May 17, 2000  
VIA HAND DELIVERY

Melinda S. Eden, Chair  
Harvey Bennett, Member  
Deirdre Malarkey, Member  
Mark Reeve, Member  
Tony Van Vliet, Member  
Environmental Quality Commission  
c/o Department of Environmental Quality  
811 Southwest Sixth Avenue  
DEQ Conference Room 3A  
Portland, Oregon 97204

Dear Chairperson Eden and Commission Members:

Enclosed for your consideration are six copies of a briefing paper responding to some of the information contained in the DEQ's April 17<sup>th</sup> Memorandum regarding the pending request to revoke the Army's permit to incinerate chemical warfare agents at the Umatilla Chemical Demilitarization Facility (UMCDF). There is one copy for each Commissioner and an extra copy for the DEQ staff.

I apologize for the timing of delivery but the DEQ's Memorandum was only received and distributed among the various groups and individuals that I work with about two weeks ago. This was not enough time to prepare an analysis and deliver it before today.

It is essential that each of you carefully consider the issues noted in the briefing paper and in the materials that have already been distributed to you. The people who live in the shadow of the UMCDF are confident that if you each weigh the issues and supporting information carefully you will conclude, as they have, that continuing with an incineration system at UMCDF is not legally or factually supportable. They urge you to vote in favor of revoking the Army's current permit.

Finally, I request that the Commission allow me to participate in the meeting on May 18<sup>th</sup> by telephone. The Commission has extended this

hospitality to me in the past and my clients and I would greatly appreciate your consideration once again. My participation by phone is especially important because local counsel Stuart Sugarman will likely be involved in a trial on the 18<sup>th</sup>.

Thank you for your consideration. I look forward to participating in the meeting on May 18<sup>th</sup>.

Respectfully submitted,

Richard E. Condit, Esq.

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the Army's  
A Contribution  
one of the Forces

BRIEFING PAPER  
PREPARED FOR THE  
ENVIRONMENTAL QUALITY COMMISSION

A RESPONSE TO THE APRIL 17, 2000  
MEMORANDUM OF THE DEPARTMENT  
OF ENVIRONMENTAL QUALITY

Prepared for

**GASP**  
Oregon Wildlife Federation  
Sierra Club (Oregon Chapter)  
and Concerned Individuals Living  
Near UMCDF

Prepared by

Richard E. Condit, Esq.

Dated: May 16, 2000



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1. One of the biggest myths of the Army's chemical warfare agent incineration program is that the risk of continued storage is so significant that we must act hastily in order to avoid great danger. The Army's claims regarding the risk of continued storage at the Umatilla Chemical Depot are completely overstated. In 1988, one storage risk scenario alone accounted for at least ninety-eight percent (98%) of the storage risk for Umatilla involved the following series of events. That scenario considered the following events: (1) an earthquake caused a leak of mustard agent, (2) an electrical short in a nearby building caused a fire that burned up the mustard agent stockpile, and (3) resulting in the uncontrolled release of mustard and byproducts. This scenario has been virtually eliminated by moving electrical services and changing them to earthquake sensitive units. There are other storage risk scenarios reflecting external triggering events, as well as speculation about storage problems relating to M55 rockets. However, the risk of continued storage of M55 rockets at the Umatilla Chemical Depot will not be mitigated in a timely manner due to the baseline incineration system's **proven inability** to destroy rockets containing gelled, crystallized, or otherwise partially solidified chemical warfare agents. At the rates the Utah

facility has been processing rockets over the last year, it will take anywhere from six years to twenty years just to complete disposal of the M55 rockets in the Umatilla stockpile.

2. Recently, some emergency management officials involved with the Umatilla Chemical Depot indicated that "the most notable effects for the public from a chemical weapons accident at the depot would be runny noses and blurry vision to a maximum of a couple hundred people." According to an April 19<sup>th</sup> story in the East Oregonian the quoted claim was "firmly backed up by Steve Myren of the Oregon Division of Health." Therefore, it appears that the risk of accident from continued storage is truly minimal and there should be no rush to burn or otherwise dispose of the chemical weapons stockpile in an unsafe manner.
3. The Army has employed non-incineration technologies at two locations thus far. Both locations store bulk agent. At least sixty-three (63) percent of Umatilla's total stockpile is comprised of bulk stored mustard agent, which could easily be disposed of via neutralization and a follow on process. This change alone would result in a significant reduction in emissions and secondary wastes.
4. The Army is considering non-incineration technologies that have been evaluated through the Advanced Chemical Weapons

Assessment (ACWA) process for the Pueblo, Colorado stockpile.

The Army recently announced that it will prepare an environmental impact statement (EIS) comparing both incineration and non-incineration options for the Pueblo stockpile.

5. The current baseline incineration system has repeatedly experienced operational difficulties. Most recently, the Utah facility allowed agent GB (sarin) to escape out of the smokestack. The release was not reported to the public or emergency managers for three hours. What most people don't know is that there was a second release about two hours later that was not reported. This most recent of many incidents occurring in the Army's incineration program reflects the real operational issues faced by deployment of incineration to destroy chemical weapons. The DEQ and EQC no doubt find continued comfort in the proclamations by "outside" organizations in support of incineration. These organizations include the National Research Council (NRC) the Centers for Disease Control (CDC). However, these agencies rarely, if ever, evaluate actual operating conditions and actual operations data from the Army's chemical warfare agent incinerators. They consider the theories of how incineration might work and test burn data that



is carefully created and does not reflect actual operational experiences. The DEQ and EQC cannot rely on such agencies in order to meet their obligations under Oregon law.

6. Umatilla County is one of the top agricultural counties in the United States. Morrow County and other nearby counties all make significant contributions to food production for the region and the nation, if not the world. The proposed baseline incineration system will create and/or release dangerous and persistent toxic chemicals that will contaminate the food grown in the Umatilla area and elsewhere. The toxic chemicals that will be emitted from the baseline incineration system include: chemical warfare agents; dioxin; dioxin-like compounds; polychlorinated biphenyls (PCBs); mercury, lead, and other potentially dangerous chemicals known as products of incomplete combustion (PICs). Many of the PICs that are released from the Army's chemical weapons incinerators are unknown. That is, only ten to fifteen percent of PICs may be identified.
7. Persons who will be injured by the release of dioxins, PCBs, and other persistent and dangerous chemicals are developing fetuses, infants, children, elderly adults, and persons who currently have or have suffered from a serious illness (e.g.,

cancer, asthma, immune deficiency). In addition, Veterans or others who have been exposed to Agent Orange, chemical warfare agents, or pesticides are highly susceptible to illness from additional exposures due to incinerator emissions. No cumulative assessment of the impacts of the chemicals that will be released from the Army's incinerators in combination with current exposures (e.g., pesticides, industrial pollutants, etc.) has been performed in approving the Army's plan to incinerate the chemical warfare agents stored at the Umatilla Chemical Depot.

8. The Army was aware, prior to permit approval in February 1997, that chemical warfare agents were even more toxic than originally thought. Yet, the Army chose to hide this information from regulators, the public, and the media.
9. The chemical warfare agent monitors (known as ACAMS) that are placed around the incineration facilities and in the smokestack do not provide adequate detection capabilities and have not been validated by the DEQ or U.S. Environmental Protection Agency (EPA) as capable continuous emission monitors for chemical warfare agents. DEQ acknowledges that even the NRC recommends that the Army's detection system needs improvement. DEQ Memo at 48. Yet, plans and

construction proceed as if this and other critical issues are irrelevant details.

10. The Army has misled the DEQ and EQC about the maturity and capability of the baseline incineration system. A technology is not mature and capable when it requires hundreds of permit modifications. The Army's Utah facility has over 18,000 pages of documents dedicated to permit modifications. Gary Harris, a former Army contractor employee in charge of permits at the Utah facility, has stated that piling on the paperwork was a tactic to keep the regulators overwhelmed. The Utah facility has given up on operation of the dunnage incinerator (DUN) and the brine reduction area (BRA). The pollution abatement system carbon filters have never been tested on any Army chemical warfare agent incinerator. Utah regulators posed serious questions about the carbon filters and the Army decided not to add them to that facility. The carbon filter design for Umatilla was still incomplete as of November 1, 1999. Oregon will be the experiment for the Army's carbon filter system. What will happen if the filters catch fire, become over pressurized, or clog? What will happen if the filters have to be bypassed due to a malfunction?



More detailed information on some of the key issues referenced is provided below.

### **The Law and Standards the EQC Must Uphold**

The Oregon Legislature has explicitly mandated that protection of public health, safety, and the environment is the paramount purpose of the State's hazardous waste law.

(b) ... the Legislative Assembly declares that it is the purpose of [the hazardous waste law] to:

(A) Protect the public health and safety and environment of Oregon to the **maximum extent possible**.

ORS § 466.010(1)(a)(b)(A) (emphasis added). Both the DEQ and EQC are directed to enforce and carry out the provisions of the State's hazardous waste law. ORS §§ 466.015 and 466.025.

The Legislature has given some specific direction to the DEQ/EQC regarding the manner in which the agencies implement the hazardous waste law. For example, Oregon law requires the following:

Before issuing a permit for a new facility designed to dispose of or treat hazardous waste or PCB, the commission must find, on the basis of information submitted by the applicant, the department or any other interested party, that the proposed facility meets the following criteria:

- (1) The proposed facility location:
  - (a) Is suitable for the type and amount of hazardous waste or PCB intended for treatment or disposal at the facility;

(b) Provides the maximum protection possible to the public health and safety and environment of Oregon from release of the hazardous waste or PCB stored, treated or disposed of at the facility; and

(c) Is situated sufficient distance from urban growth boundaries, as defined in ORS 197.295, to protect the public health and safety, accessible by transportation routes that minimize the threat to the public health and safety and to the environment and sufficient distance from parks, wilderness and recreation areas to prevent adverse impacts on the public use and enjoyment of those areas.

(2) Subject to any applicable standards adopted under ORS 466.035, the design of the proposed facility:

(a) Allows for treatment or disposal of the range of hazardous waste or PCB as required by the commission; and

(b) Significantly adds to:

(A) The range of hazardous waste or PCB handled at a treatment or disposal facility currently permitted under ORS 466.005 to 466.385; or

(B) The type of technology employed at a treatment or disposal facility currently permitted under ORS 466.005 to 466.385.

(3) The proposed facility uses the best available technology for treating or disposing of hazardous waste or PCB as determined by the department or the United States Environmental Protection Agency.

(4) The need for the facility is demonstrated by:

(a) Lack of adequate current treatment or disposal capacity in Oregon, Washington, Idaho and Alaska to handle hazardous waste or PCB generated by Oregon companies;

(b) A finding that operation of the proposed facility would result in a higher level of protection of the public health and safety or environment; or



(c) Significantly lower treatment or disposal costs to Oregon companies.

(5) The proposed hazardous waste or PCB treatment or disposal facility has no major adverse effect on either:

- (a) Public health and safety; or
- (b) Environment of adjacent lands.

ORS § 466.055. Many of these standards go well beyond or supplement EPA requirements.

Oregon's hazardous waste disposal standards clearly exceed those of many other states, including Utah. Therefore, the DEQ's frequent reference to and reliance upon court and agency opinions in Utah are misguided and is largely irrelevant to deciding the issues in Oregon.

Oregon regulations provide additional guidance regarding the application of the best available technology standard to the proposed Umatilla Chemical Demilitarization facility (UMCDF) incinerators.

The facility shall use the best technology as determined by the Department for treatment and disposal of hazardous waste and PCB. The facility shall use the highest and best practicable treatment and/or control as determined by the Department to protect public health and safety and the environment.

OAR 340-120-010(2)(c). See, also, OAR 340-120-001(1). If a permit applicant cannot demonstrate that these criteria will be met, then the permit must be denied.

In addition to the best technology requirements, the DEQ/EQC must also ensure that UMCDF meets the General Facility Standards established by state and federal law or regulations. 40 C.F.R. Part 264, Subparts A - H. GASP, OWF, Sierra Club, et al.

Similarly, the Agencies must ensure that UMCDF meets specific requirements for hazardous waste incinerators. 40 C.F.R. Part 264, Subpart O.

One of the most critical EPA authored requirements mandates that the UMCDF incinerator "shall be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any unplanned sudden or nonsudden discharge of hazardous waste or hazardous waste constituents to air, soil, groundwater, or surface water which could threaten the environment or human health." 40 C.F.R. § 264.31. The most important words in this requirement are: "could threaten the environment or human health." This phrase means that the DEQ/EQC have a duty to prevent injury to the environment or human health by denying authorization to operate or sufficiently limiting such operations to ensure protection.

The DEQ Memorandum correctly notes that the EQC can unilaterally modify or terminate the permit for UMCDF. DEQ Memo at 2. Reasons for permit termination/revocation include: (1) noncompliance with any permit condition; (2) the permittees' failure to disclose relevant facts or misrepresent any relevant facts; and (3) a determination that the permitted facility endangers human health or the environment and cannot be adequately regulated without terminating or modifying the permit. See, e.g., 40 C.F.R. § 270.43.

The DEQ did not mention that you may also revoke the UMCDF permit "upon a finding that the Permittee has violated any provision of ORS 466.005 to 466.385 and 466.992 or rules adopted pursuant thereto . . ." UMCDF Permit, Module I, ¶ I.C.2. This means that if you determine upon consideration of the permit revocation request now before you: (1) that the Army's proposed facility is not the best available technology (ORS § 466.055(3)), or (2) that you can no longer find that the proposed facility will have "no major adverse effect" on human health and safety or the environment of adjacent lands (ORS 466.055(5)), then you must revoke the permit.

#### **UMCDF's Dangerous Emissions Have Been Underestimated**

Two important analyses that have been ignored by the DEQ indicate that the emissions from the Army's chemical weapons incinerators have been underestimated. First, A recent EPA research report on the emissions of hazardous waste incinerators provides the following critical assessment:

It can be concluded from these experiments that the current sampling and analytical schemes for characterizing HWC [hazardous waste combustion] emissions are inadequate and provide an incomplete picture of the emission profile. This is primarily due to the presence of an extremely complex mixture of organic compounds in the HWC emission samples.... the number of compounds suspected to be present in incinerator **emissions may be an order of magnitude greater** than initially suspected.

Development of a Hazardous Waste Incinerator Target Analyte List of Products of Incomplete Combustion; EPA Office of Solid Waste; National Risk



Management Research Laboratory, Research Triangle Park (USEPA -600/R-98-076 July 1998) at 4-1 (emphasis added) ("EPA PIC Study 1998"). The information provided in this EPA report reveals that any assessment of risks caused by emissions from the Army's incinerators is flawed, it also means that the assessment of risks caused by release of chemicals from a the filter units and other facility components has not been properly characterized.

Second, is the air modeling analysis performed by Dr. Halstead Harrison of the University of Washington. The DEQ report rejects Dr. Harrison's analysis as "not applicable" to assess "chronic health risks." However, as the thoughtful reply by Dr. Harrison makes clear:

1. The Umatilla airshed experiences positive potential temperature gradients, . . . [that is, the near-surface air is statically stable] in over 50% of all hours, and over 90% of nighttime hours. In 23% of all hours . . . exceeds 0.06 deg C/m, which is very stable, indeed.
2. In consequence of this high incidence of stable air, initially buoyant plumes emitted from the Umatilla facility are expected often to limit their rise and to be transported close to the surface over significant distances [km], with little dispersion.
3. Most of the time, the plume will miss populated targets.
4. Brief episodes, however, are to be expected at the surrounding populated centers [Hermiston, Umatilla, Plymouth, Irrigon, Boardman] with peak tracer concentrations that are many times the annual averages there.
5. For this reason, citing annual averages of tracer concentrations, only, obscures the extreme variations of the transport process.
6. For this reason also, short episodes dominate the

potential for damage in the Umatilla airshed. It is not ordinary operations that should most concern us, but the potential for upsets and accidents.

7. Attention should especially be paid to off-design fugitive emissions that may, even if rarely, escape the demilitarization facility in non-buoyant plumes, near the surface.

8. Effects of topography, meandering winds, and recirculating trajectories are significant in the Umatilla airshed. These effects are not well simulated by steady-state air-quality models.

Reply at 12 (attached). In other words, Dr. Harrison's model warns that the Umatilla airshed is capable of conditions in which plumes emitted from the Umatilla facility are expected often to limit their rise and to be transported close to the surface over significant distances [km], with little dispersion."

Such meteorological conditions are potentially dangerous when toxic substances are being emitted from the facility (e.g., warfare agents, dioxin, PCBs, etc.). Adjustments to calculations of acute and chronic risks should be performed to determine the additional impacts of the conditions noted by Dr. Harrison. Unfortunately, the implications of Dr. Harrison's work have been ignored by the DEQ.

### **The Inadequacy of the Assessment of Risks to Human Health Posed by the UMCDF Incinerators**

DEQ's analysis of concerns raised about the risks posed by the proposed incineration of chemical weapons fails to specifically address or to resolve those concerns. The DEQ states: "risk management decisions must

be made and sometimes those decisions must be made in the face of

GASP, OWF, Sierra Club, et al.

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incomplete, conflicting, and/or uncertain information." DEQ Memo at 27. The DEQ tries to reassure persons living in the shadow of UMCDF that all is well by advising that more risk assessments will be done after the incinerators are built. DEQ Memo at 28. DEQ's cavalier discussion of the legitimate concerns raised fails to acknowledge the DEQ's and EQC's obligation to resolve many of these questions before a permit is issued. In addition, sound principles of Public Health practice require that most uncertainties be resolved by erring on the side of greater protection, not by ignoring those uncertainties. Some of the key risk issues that are unique to incineration technologies are discussed below.

**The Creation and/or Release of PCBs and Other Dioxin-Like Chemicals Will Cause Harm and Present an Unreasonable Risk of Injury to Human Health and the Environment**

*There are documented worldwide increases in the number of diseases or conditions of the reproductive system in infants, children, and adults that may be linked to early exposures to hormonally active chemicals . . . the world's populations of humans and wildlife participate in the ongoing experiment.*

*- From "Generations at Risk: Reproductive Health and the Environment"<sup>1</sup>*

As mentioned previously, the Army's chemical warfare agent incinerators and related components will create and/or release dangerous contaminants such as: PCBs, dioxins, furans, metals, and a host of other known and

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<sup>1</sup> Schettler, Solomon, Valenti, and Huddle, "Generations at Risk: Reproductive Health and the Environment," MIT Press 1999, pp. 168-169 ("Generations at Risk").  
GASP, OWF, Sierra Club, et al.  
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unknown substances. The DEQ has failed to fully assess these impacts. For example, the DEQ refuses to determine the non-cancer risks associated with exposure to dioxin and related chemicals. DEQ Memo at 17 - 18. The DEQ admits that research "indicates that there may be adverse health effects from low-level exposure to . . . agents, including the nerve agent GB." DEQ Memo at 23. Yet, DEQ has not considered the health impacts of such "low-level" releases. The subsections that follow reflect some of the current research on non-agent emissions. Analyses concerning the potential impacts of exposures to non-lethal quantities of chemical warfare agents are reflected in Exhibits 40, 40.2, 40.4, 40.5, 41, and 50 - 53, which are already in the record.

### **Impacts Of PCBs Will Cause Harm**

Like its cousins from the dioxin family, PCBs are a very dangerous class of chemicals that are presently spread throughout the world, including the bodies of most humans. The analysis of the dangers associated with PCB emissions is similar to that of dioxins. Simply stated, people in Oregon and throughout the United States are already overexposed to PCBs. The following passage makes the point.

**It appears that despite a twenty-year ban on U.S. production, PCB exposures at current ambient environmental levels impair intellectual and motor development of children.** The environmental persistence of these chemicals and their tendency to bioaccumulate ensure continued exposure for years to come<sup>2</sup>



This statement is consistent with the views of many distinguished scientists who met in Erice, Sicily in November 1995 regarding environmental endocrine disrupting chemicals. The consensus statement of those scientists, in part, is reflected here.

The full range of substances interfering with natural endocrine modulation of neural and behavioral development cannot be entirely defined at present. However, **compounds shown to have endocrine effects include dioxins, PCBs, phenolics, phthalates, and many pesticides.** Any compounds mimicking or antagonizing actions of, or altering levels of, neurotransmitters, hormones, and growth factors in the developing brain are potentially in this group.

\* \* \* \* \*

Because certain **PCBs and dioxins are known to impair normal thyroid function, we suspect that they contribute to learning disabilities, including attention deficit hyperactivity disorder and perhaps other neurological abnormalities.** In addition, many pesticides affect thyroid function and, therefore, may have similar consequences.

Statement from the work session on environmental endocrine disrupting chemicals: Neural, endocrine and behavioral effects, Erice, Sicily, November 1995 (emphasis in original)<sup>3</sup>

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2 "Generations at Risk," p.179 (emphasis added). See the review of the scientific evidence supporting the quoted statement at pp. 175 - 179.

3 The authors of the Erice Statement are: Dr. Enrico Alleva, Head Section of Behavioral Pathophysiology Institute of Neurobiology, Rome, Italy; Dr. John Brock, Chief, PCBs and Pesticides Laboratory National Center for Environmental Health Centers for Disease Control Atlanta, GA; Dr. Abraham Brouwer Associate Professor and Toxicology and Research Coordinator Department of Toxicology Agricultural University Wageningen, The Netherlands; Dr. Theo Colborn, Senior Program Scientist Wildlife and Contaminants Project World Wildlife GASP, OWF, Sierra Club, et al.



We cannot afford to add additional PCBs to our already overexposed bodies and environment. As the literature cited points out, we may already be at or above the danger point. The incineration technologies proposed by the Army create and release many known and unknown dangerous substances.<sup>4</sup> No set of approval conditions that could be crafted can erase the dangerous flaws in the proposed technologies.

As documented above, PCBs are of great concern to human health because they are resistant to breakdown in the environment and concentrate in the fatty tissues of animals and people. Recently, the U.S. Public Health Service, The Agency for Toxic Substances and Disease Registry noted:

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Fund Washington, DC; Dr. M. Cristina Fossi, Professor Department of Environmental Biology University of Siena, Siena, Italy; Dr. Earl Gray Section Chief Developmental and Reproductive Toxicology Section US EPA Research Triangle Park, NC; Dr. Louis Guillette, Professor Department of Zoology University of Florida Gainesville, FL; Peter Hauser, MD, Chief of Psychiatry Service (116A) Baltimore VAMC 10 North Greene Street Baltimore, MD; Dr. John Leatherland, Professor, Chair Department of Biomedical Sciences Ontario Veterinary College University of Guelph Ontario, Canada; Dr. Neil MacLusky, Professor Director Basic Research Div of Reproductive Science Toronto Hospital Ontario, Canada; Dr. Antonio Mutti, Professor Laboratory of Industrial Toxicology University of Parma Medical School, Parma, Italy; Dr. Paola Palanza, Researcher Department of Biology and Physiology University of Parma, Parma, Italy; Dr. Susan Porterfield Associate Professor and Associate Dean of Curriculum Medical College of Georgia, Augusta, GA; Dr. Risto Santti, Associate Professor Department of Anatomy Institute of Biomedicine University of Turku Turku, Finland; Dr. Stuart A. Stein, Associate Professor or Neurology, Medicine, Pediatrics, OB-GYN, and Molecular and Cellular Pharmacology University of Miami School of Medicine, Miami, FL and Chief of Neurology Children's Hospital of Orange County, Orange, CA; Dr. Frederick vom Saal Professor Division of Biological Sciences University of MO Columbia, MO; Dr. Bernard Weiss Professor Department of Environmental Medicine University of Rochester School of Medicine and Dentistry Rochester, NY.

<sup>4</sup> In fact, incineration is probably the worst technology from a public health and environmental perspective. See, Pat Costner, D. Luscombe, M. Simpson, "Technical Criteria for the Destruction of Stockpiled Persistent Organic Pollutants," Greenpeace, October 7, 1998. This report eloquently discusses the weaknesses of incineration and describes other technologies that may be more suitable for dealing with persistent organic chemicals (e.g., PCBs).

Recent findings indicate that susceptible populations (e.g., certain ethnic groups, sport anglers, the elderly, pregnant women, children, fetuses, and nursing infants) continue to be exposed to PCBs via fish and wildlife consumption. Human health studies discussed in this summary indicate that: 1) reproductive function may be disrupted by exposure to PCBs; 2) neurobehavioral and developmental deficits occur in newborns and continue through school-aged children who had in utero exposure to PCBs; 3) other systemic effects (e.g., self-reported liver disease and diabetes, and effects on the thyroid and immune systems) are associated with elevated serum levels of PCBs; and 4) increased cancer risks, e.g., non-Hodgkin's lymphoma, are associated with PCB exposures.

“Public Health Implications Of Exposure To Polychlorinated Biphenyls (PCBs),” U.S. Public Health Service, The Agency for Toxic Substances and Disease Registry, U.S. Department of Health and Human Services, and The U.S. Environmental Protection Agency (Revised February 2, 1999).

In fact, separate studies on U.S., Dutch, Japanese, and Taiwanese populations link fetal and infant exposure to PCBs with a wide range of neurological and developmental problems, including lower IQ, poor short term memory, slower reflexes, poor reading comprehension, low birth weight, and poor cognitive functioning<sup>5</sup> When alternatives to incineration

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5 Longnecker, MP, WJ Rogan and G Lucier, "The human health effects of DDT (dichlorodiphenyltrichloroethane) and PCBs (polychlorinated biphenyls) and an overview of organochlorines in public health," *Annual Review of Public Health*, 18:211-244, 1997.

Jacobson, JL, SW Jacobson, GG Fein, PM Schwartz, JK Dowler, "The effect of PCB exposure on visual recognition memory," *Child Development* 56: 853-860, 1985.

Jacobson, JL, SW Jacobson, HEB Humphrey, "Effects of exposure to PCBs and related compounds on growth and activity in children," *Neurotoxicology and Teratology* 12: 319-326, 1990.



are clearly available there is no reason to subject humans or the environment to the dangers of PCBs.

PCBs can "bio-magnify," increasing in concentration at each higher level of the food chain. Food chain exposures to PCBs can exceed inhalation exposure by 10 to 3000 times, depending on food consumption patterns<sup>6</sup>. In

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Jacobson, J.L., S.W. Jacobson, H.E.B. Humphrey, "Effects of in utero exposure polychlorinated biphenyls and related contaminants on cognitive functioning in young children," *Journal of Pediatrics* 116: 38-45, 1990.

Jacobson, J.L. and S.W. Jacobson, "Intellectual Impairment In Children Exposed to Polychlorinated Biphenyls In Utero," *New England Journal of Medicine* 335:783-789, 1996.

Lanting, C.I. "Effects of Perinatal PCB and Dioxin Exposure and Early Feeding Mode on Child Development," Thesis, 1998.

Patandin, S. "Effects of Environmental Exposure to Polychlorinated Biphenyls and Dioxins on Growth and Development in Young Children, A Prospective Follow-up Study of Breast-fed and Formula-fed Infants from Birth Until 42 Months of Age." Thesis, 1999.

Rogan WJ and BC Gladen, "Neurotoxicology of PCBs and related compounds," *NeuroToxicology* 13: 27-36, 1992.

Taylor, PR, JM Stelma, CE Lawrence, "The relation of polychlorinated biphenyls to birth weight and gestational age in the offspring of occupationally exposed mothers," *American Journal of Epidemiology* 129: 395-406, 1989.

Wasserman, M, M Ron, B Bercovici, D Wasserman, S Cucos, A Pines, "Premature delivery and organochlorine compounds: polychlorinated biphenyls and some organochlorine insecticides," *Environmental Research* 28: 106-112, 1982.

Rogan, WJ, BC Gladen, JD McKinney, N Carreras, P Hardy, et al, "Neonatal effects of transplacental exposure to PCBs and DDE," *Journal of Pediatrics*, 109: 335-341, 1986.

<sup>6</sup> D. Cleverly, U.S. EPA, G. Rice, U.S. EPA, S. Durkee, U.S. EPA, F. Bradford, ORNL, C. Travis, ORNL, "Estimating Total Human Exposure to Toxic Air Pollutants Emitted from the Stack of Municipal Waste Combustors," paper presented at the 1993 International Municipal Waste Combustion Conference, Williamsburg, VA, March 30,-April 2 (Sponsored by the Air and Waste Management Association and the U.S. Environmental Protection Agency.)  
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addition, PCBs often travel long distances to impact communities and water bodies that are some distance away from the source of the PCBs. The issue of long and medium range transport of PCBs and other persistent compounds is most evident in EPA's work involving the Great Lakes. See, e.g., Great Lakes Mass Balance Study. The DEQ has failed to consider the impacts of long-range transport of UMCDF emissions. Spreading the risk of PCB dispersion through poorly designed incineration fails to protect human health or the environment from unreasonable risk as mandated by Oregon and Federal law.

### **1.1. The Impacts From Dioxin Emissions Will Cause Harm**

One dangerous chemical that is often analyzed together with PCBs because of similarities in persistence and health and environmental impact is dioxin. In general, the family of chemicals referred to as dioxin has been described as follows:

In the world of synthetic chemicals, dioxin has enjoyed the reputation of being the worst of the troublemakers--the most deadly, the most feared, and the most elusive to scientists seeking to unravel the secrets of its toxicity. Lab tests had shown dioxin to be thousands of times more deadly than arsenic to guinea pigs, who died after swallowing only one-millionth of a gram per kilogram of body weight, and the most potent carcinogen ever tested in a number of animal species.

. . . the chemical known to scientists as 2,3,7,8-TCDD [one form of dioxin] and to the public as the "most toxic chemical on earth"--is for the most part an inadvertent by-product of twentieth-century life, a contaminant created during the manufacture of certain chlorine-containing chemicals such as pesticides and wood preservatives . . . incinerating trash . . . and burning fossil fuels. Like DDT and PCBs, dioxin is a fat-loving persistent compound that accumulates in the

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body. And like other persistent chemicals it has been detected virtually everywhere-in air, water, soil, sediment, and food.

Although discussion usually focuses on 2,3,7,8-TCDD, it is important to remember this is only the most toxic and notorious member of the dioxin family, which contains 74 other problematic chemicals. Moreover, dioxin is found more often than not in the company of furans-a related family of contaminants containing 135 chemicals with a structure similar to dioxins and with similar toxic and biological effects on animals.<sup>7</sup>

Actually, the dioxin family is likely even larger than described in the passage quoted when one considers brominated, bromochloro, and sulfur analogs of dioxins and furans.<sup>8</sup>

In an effort to understand and assess the potential impacts of dioxin and related compounds, EPA has been involved in an evaluation of these dangerous chemicals. EPA has provided, in part, the following assessment:

**. . . [data suggests] dioxin results in a broad spectrum of biochemical and biological effects in animals and, based on limited data, some of these effects occur in humans. Relatively speaking, these exposures and effects are observable at very low levels in the laboratory and in the environment when compared with other environmental toxicants. [emphasis in original] [EPA's Dioxin Health Assessment, Draft, Aug. 1994] at 9-74.**

These compounds . . . are extremely potent in producing a variety of effects in experimental animals based on traditional toxicology studies at levels hundreds or thousands of times lower than most synthetic chemicals of environmental interest. In addition, human studies demonstrate that exposure to dioxin and related compounds is

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7 Colburn, Dumanoski, and Peterson, "Our Stolen Future," Plume Books, 1996, p. 113.

8 EPA PIC Study 1998 at 1-1 (complete citation in text).  
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associated with subtle biochemical and biological changes whose clinical is as yet unknown . . . Id. at 9-74 to 9-75.

**A large variety of sources of dioxin have been identified and others may exist. Because dioxin-like chemicals are persistent and accumulate in biological tissues, particularly in animals, the major route of human exposure is through ingestion of foods containing minute quantities of dioxin-like compounds. Certain segments of the population may be exposed to additional increments of exposure by being in proximity to point sources or because of dietary practices. [Emphasis in original] Id. at 9-75.**

**There is adequate evidence based upon all available information, including studies in human populations as well as in laboratory animals and from ancillary experimental data, to support the inference that humans are likely to respond to a broad spectrum of effects from exposure to dioxin and related compounds, if exposures are high enough. These effects will likely range from adaptive changes at or near background levels of exposure to adverse effects with increasing severity as exposure increases above background levels. [Emphasis in original] Id. at 9-79.**

**In TCDD-exposed men, subtle changes in biochemistry and physiology, such as enzyme induction, altered levels of circulating reproductive hormones, or reduced glucose tolerance, have been detected in a limited number of available studies. These findings, coupled with knowledge derived from animal experiments, suggest the potential for adverse impacts on human metabolism and developmental and/or reproductive biology and, perhaps, other effects in the range of current human exposures . . . As body burdens increase within and above [average background intake], the probability and severity as well as the spectrum of human noncancer effects most likely increase . . . the margin of exposure (MOE) between background levels and levels where effects are detectable in humans in terms of TEQs is considerably smaller than previously estimated. [Emphasis in original]. Id. at 9-81.**

**With regard to carcinogenicity, a weight-of-evidence evaluation suggests that dioxin and related compounds (CDDs, CDFs, and dioxin-like PCBs) are likely to present a cancer hazard to humans. [Emphasis in original]. Id. at 9-85.**



Concerning the carcinogenicity of dioxin-like compounds, the International Agency for Research on Cancer (IARC) which is part of the World Health Organization (WHO) has formally defined the most potent member of the dioxin family as being carcinogenic to humans. See, 1997 Abstract of IARC Monograph. Among other things, the IARC stated that “[b]ecause of the long half lives of many [dioxin-like] substances in humans (e.g., ca. 7 years for TCDD), a single, acute exposure from the environment results in the exposure of the potential target tissues for a period of years.”Id. at 1.

Physicians and scientists who have reviewed EPA's work on the assessment of dioxin as well as other data concerning the current impacts of dioxins provide similar warnings.

The extensive six-year EPA review documents a wide range of health effects that result from exposure to dioxin, some of which occur at extremely low exposure levels, and provides important information about dioxin sources. Although there is some variation with geographical location and diet, **many people have dioxin levels at or near those known to cause harmful effects in animal studies.**<sup>9</sup>

Investigators in the Netherlands found that higher dioxin levels in breast milk correlate with lower thyroid hormone levels in breast-feeding infants.<sup>10</sup> **This finding is particularly important since the correlation appears at current levels of ambient dioxin**

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9 "Generations at Risk," p. 170 (emphasis added), citing, Birnbaum LS. The mechanism of dioxin toxicity: relationship to risk assessment. *Environ Health Perspect* 102(Suppl 9): 157-167, 1994.

10 "Generations at Risk," p. 175, citing, Koopman-Esseboom C, Morse D, Weisglas-Kuperus N, et al. Effects of dioxins and polychlorinated biphenyls on thyroid hormone status of pregnant women and their infants. *Pediatr Res* 36:468-473, 1994.

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**exposure.** Moreover, in pre-term and low-birth-weight babies, decreased thyroid hormone in the first weeks of life is associated with increased risk of neurological disorders, including the need for special education by age nine.<sup>11</sup>

Once dioxin occupies the receptor in a human cell, researchers have found it binds to DNA in the cell nucleus, prompting many of the same changes in gene expression seen in animal experiments. Humans seem no less sensitive to this effect. But what happens afterwards to produce all of dioxin's disparate biological effects, including developmental disruption, remains a mystery. However it happens, **dioxin acts like a powerful and persistent hormone that is capable of producing lasting effects at very low doses—doses similar to levels found in the human population.**<sup>12</sup>

. . . no matter which agency's calculations are used to establish safe daily intake levels of dioxins, the average daily intake of the average person, approximately 120 pg, exceeds or equals them all. The average daily intake of Americans, which is about 2 pg/kg bw (Schechter, 1999) is more than 200 times higher than the EPA dose, twice the ATSDR MRL, and in the middle of the WHO TDI range. If dioxin-like PCBs are included, then the daily intake of dioxin is that much higher than these standard guidelines . . . the average daily intake of dioxin in the U.S. is well above these federal and international guidelines<sup>13</sup>

. . . dioxin harms people at body burden levels ranging from 14 to 83 ng/kg, levels comparable to those that harm other animals. If depression of the immune system occurs at 7 ng/kg . . . and Americans have an average dioxin body burden of 10 ng/kg, then the immune system of some Americans may be compromised, and any general increase in dioxin exposure may be even more harmful to the general population. Whether one uses daily intake rates or body burdens, the levels of dioxin that Americans have been exposed to are harmful or just short of being near harmful. Dioxin is an ubiquitous toxin that

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11 "Generations at Risk," p. 175 (emphasis added), citing, den Oden AL, Verkerk PH, et al. The relation between neonatal thyroxine levels and neurodevelopmental outcome at age 5 and 9 years in a national cohort of very preterm and/or very low birth weight infants. *Pediatr Res* 39:142-145, 1996.

12 "Our Stolen Future," p. 120 (emphasis added).

13 Center for Health, Environment and Justice, "American People's Dioxin Report: Technical Support Document," Falls Church, VA, November 1999, at 33.  
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reaches people in a most fundamental way: through our food. Whether that food comes from supermarket shelves, fish in a river, or breast milk, it contains measurable and often harmful amounts of dioxin.<sup>14</sup>

As the work done by EPA and the analyses provided by independent physicians and scientists makes clear, we already have enough dioxin in our bodies to cause a variety of health effects. Adding more dioxin to the environment through incineration of the Army's chemical warfare agents will surely cause harm or increase the harm already being experienced.

EPA's concerns about dioxin and related compounds are shared by the Agency for Toxic Substances and Disease Registry (ATSDR). See, ATSDR Toxicological Profile for Chlorinated Dibenzo-p-Dioxins, December 1998.

ATSDR outlines a number of important concerns regarding dioxin:

[B]ecause of the magnitude of uncertainty in dose response relationships for 2,3,7,8-TCDD, the possibility that current background exposures may be sufficient to contribute to a risk of adverse health effects in human populations cannot be completely excluded. *Id.* at 266].

Children appear to be unusually susceptible to the dermal toxicity of 2,3,7,8-TCDD . . . Additionally, the available animal data suggests that the developing fetus is very sensitive to 2,3,7,8-TCDD-induced toxicity. 2,3,7,8-TCDD appears to interfere with the development of the reproductive, immune, and nervous systems; the mechanisms of action for these toxic effects have not been elucidated. *Id.* at 317].

ATSDR also noted that children face additional risks of exposures to 2,3,7,8-TCDD through dietary habits if they are: breast-fed; children of local fishers

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<sup>14</sup> *Id.* at 36.  
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who consume larger amounts of local fish than the general population; children of subsistence hunters; or children of subsistence farmers. Id. at 477 - 478. In general populations that face potentially high exposures to 2,3,7,8-TCDD include: persons exposed through environmental contamination; persons living near waste disposal facilities; recreational and subsistence fishers; subsistence hunters; and subsistence farmers. Id. at 485 - 497. Unfortunately, it is clear that the Army's incinerators will create dioxin and dioxin-like compounds and cause them to be released into the environment. It is equally clear on the present record that the DEQ and EQC have failed to analyze the combined impacts of the PCBs, dioxins, and other hazardous compounds that will be released by the Army's incinerators.

In sum, because the Army incinerators will release PCBs, dioxins, and other hazardous chemicals, and harmful effects may already be occurring as a result of current exposures to these compounds, there are no permit conditions that can adequately protect human health and the environment. Consequently, the EQC must revoke the Army's permit to incinerate chemical warfare agents at UMCDF.

**Current Operating Conditions for the Army's Utah Incinerators Makes Clear that Incineration Cannot Safely and Efficiently Dispose of M55 Rockets**

A brief look at the last year of operation at the Army's Utah incinerators makes it clear that the baseline incineration system is not the best technology for eliminating the risks posed by agent-filled M55 rockets.

During the period April 1999 to April 2000, the Utah facility burned 5,246 M55 rockets. This means that on average the Army burned 14.37 rockets per day.

At the same rate it will take UMCDF 7,373 days, or 20.2 years, to destroy 105,961 GB and VX filled rockets. Assuming that somehow UMCDF will process its rockets twice as fast as the Utah facility, it will still take 10.1 years just to destroy the M55 rockets. Assuming a three times faster rate only gets the total time for the M55 rockets down to 6.7 years.

## **Conclusion**

Given the information presented previously and in this briefing paper, it is clear that the EQC must revoke the permit issued to the Army. The incineration technology promoted by the Army is dangerous and has proven through actual operating experience to be incapable of safely and efficiently destroying chemical warfare agent munitions. Clearly, Oregon law requires a change.

Minutes are not final until approved by the EQC

## **Environmental Quality Commission Minutes of the Two Hundred and Eighty-Fourth Meeting**

**May 17-18, 2000  
Regular Meeting**

The regular meeting of the Environmental Quality Commission (EQC) was held on May 17 and 18, 2000, at the Department of Environmental Quality (DEQ) headquarters, 811 SW Sixth, Portland, Oregon. The following Environmental Quality Commission members were present:

Melinda Eden, Chair  
Deirdre Malarkey, Member  
Tony Van Vliet, Member  
Mark Reeve, Member

Also present were Larry Knudsen and Larry Edelman, Assistant Attorneys General, Oregon Department of Justice (DOJ); Langdon Marsh, Director, Department of Environmental Quality; and other staff from DEQ.

Note: The Staff reports presented at this meeting, which contain the Department's recommendations, are on file in the Office of the Director, 811 SW Sixth Avenue, Portland, Oregon 97204. Written material submitted at this meeting is made a part of the record and is on file at the above address. These written materials are incorporated in the minutes of the meeting by reference.

The Commission held an executive session at 8:00 a.m., May 17, 2000 to consult with legal counsel concerning the Commission's legal rights and duties with regard to potential litigation relating to tax credit applications Nos. 4570 and 4800.

Chair Eden called the meeting to order at 8:55 a.m. on Thursday, May 17.

### **A. Approval of Minutes**

Commissioner Van Vliet made a motion to approve the minutes of the March 31, 2000, EQC meeting as written. It was seconded by Chair Eden and carried with four "yes" votes.

### **B. Approval of Tax Credit for Portland General Electric Company's Independent Spent Fuel Storage Installation at the Trojan Nuclear Power Plant Site in Rainier**

This agenda item was postponed until the September 28-29, 2000 Commission meeting.

### **C. Action Item: Consideration of Tax Credit Requests**

#### Approvals

The following applications were removed from the list recommended for approval.

Jim Aden of Willamette Industries requested application 4979 be removed from the agenda to allow the applicant an opportunity to respond to the findings contained within the applicable tax credit review report. Application 4979 was scheduled before the Commission on November 18, 1999 and on February 10, 2000.

The Director's recommendation to approve the Mitsubishi Silicon America applications 5049, 5100, 5101, 5102, 5103, 5104 and 5105 specifically rely upon the definition of "substantial completion." The Department recommended the applications be removed from the agenda until clear guidance was brought back before the Commission.



Tom McCue requested removal of Wacker Sitronic Corporation's application 5140, presented for certification of its wastewater treatment system agenda. The applicant is reviewing the disallowed costs and the cost savings associated with the installing of a treatment system.

Gary Fish of Deschutes Brewery, Inc. requested removal of application 5159 for certification of its wastewater treatment from the agenda. Since the time of the original application, Mr. Fish has identified additional information that challenges the original assumptions the applicant had made.

Tom Wood, counsel for Smurfit Newsprint Corporation, asked that application 5236 be removed from the agenda. They will submit additional information regarding those portions of the claimed facility the Department identified as not being submitted within the timing requirements of ORS 468.165 (6).

Ms Vandehey noted the addendum to agenda item C and two corrected review reports for the record.

On the review of Oregon Steel Mill's application 5262, the Department had subtracted \$582,577 as an unsubstantiated amount. All claimed costs have been substantiated; therefore, the Director's recommendation for the certified facility cost increased from \$1,806,533 to \$2,389,110.

Denton Plastics, Inc. leases some of their equipment from Neo Leasing, Inc. However, the equipment represented in application 5311 is owned by Denton Plastics. Therefore, the certificate should be issued to Denton Plastics, Inc. as shown on the review report in the addendum. The applicant name and the business description are the only items that have changed on the review report.

Commissioner Van Vliet expressed his division of interest, stating he had a conflict of interest on applications 5298, 5300, 5301, 5302, and 5304 (Willamette Industries and Hewlett Packard).

The policy implications of the approval of Willamette Industries' application 4989 for all material recovery facilities was discussed. It would set a precedence for including crucial raw materials as a valid expenditure in the return on invest (ROI) calculation for a material recovery facility. There had not been a previous consideration of this type for a material recovery process. The additional resin is required to bind the sanderdust; and without the additional resin the sanderdust would not be able to be utilized and would be solid waste that would be stockpiled, burned, or sent to a landfill. This issue has not come up in relation to material recovery but had come up with the other types of tax credits and it is not allowed. The material recovery part of the statute and rule clearly states any "material recovery process" is a valid method for accomplishing the pollution control.

Staff explained the difference from the previous ones. A crucial raw material had not been claimed before – a material that is required to be utilized in the process. It would be a raw material they would not use otherwise, and they would only be using it to utilize the waste material. Commissioner Reeve paraphrased stating, they use the resin together with the sanderdust and they actually make a useful product, they make a profit on it, and the Department is discerning the cost of the procedure. Ongoing material costs are generally not considered but the cutoff is at the pollution control equipment. The consideration does not extend to any materials they need to produce their product. In this case, the resin is required in the material recovery process.

Chair Eden asked for clarification regarding the two sentences on page 2 of the Staff Report where "The applicant limited its consideration of income to material recovery components not the entire production process," and the next sentence indicates "the increase in resin is necessary in order to produce particle board." Is it all part of production and are there any rules or guidelines to give the Commission some help in determining what would be a crucial raw material? When staff indicated there were no guidelines, Chair Eden asked if the Commission would be better off if some were developed; otherwise they would be in the situation of making these determinations on a case by case basis in terms of what is crucial and what is not. Counsel added, it is necessary and appropriate for the Commission to interpret legislative and rule based concepts on a case-by-case basis as the applications came to the Commission. The EQC could consider adopting interpretive rules; however, they normally would not apply to these applications. Staff stated the word "crucial" was not in the rule and the Department used it as a distinction from all materials used in the production process. Counsel suggested pulling the application from the agenda and the Department or counsel could give the Commission either a written or a staff discussion of that item taken out of the context of a particular application. Chair Eden said she would appreciate discussion from scientists or industry people on the particleboard process and perhaps other processes

to help the Commission determine if they are valid expenditures.

Commissioner Reeve stated he has struggled with ROI for as long as he has been reviewing tax credits. If the EQC really delves into ROI issues, of which this is a subset, there seems to be more questions than answers. He would rather adhere to a more clear-cut alternatives analysis and would like a workshop on this subject. Counsel agreed it would be valuable to the new Commissioners to provide at least a brief history of ROI. Ms. Vandehey said she would set up a workshop later in the year. She requested the Commission remove application 4989 from the agenda.

Commissioner Reeve would like guidance to a consistent approach to how cost savings are applied as noted in applications 5140 and 5223, Oregon Steel Mills, Deschutes Brewery. They all appeared to be wastewater treatment systems. Staff will provide the Commission with guidance on how the reviewers approach cost savings.

Commissioner Reeve made a motion to approve the applications as set forth in the revised summary recommendation with the removal of application 4989 and setting aside until a later date applications 5298, 5300, 5301, 5302, and 5304. Ms. Vandehey asked Commissioner Reeve to include Mitsubishi Silicon America's applications. Commissioner Reeve amended his motion. Commissioner Van Vliet seconded the motion and it passed with four "yes" votes.

A motion was made by Commissioner Reeve to approve applications 5298, 5300, 5301, 5302, and 5304. Commissioner Malarkey seconded the motion and the motion passed with three "yes" votes. Commissioner Van Vliet abstained due to conflict of interest.

App.No.	Media	Applicant	Commission Action			Value
			Removed From Agenda	Certified Cost	Percent Allocable	
<b>Approvals – Attachment B</b>						
4867	Water	PGE		\$37,382	100%	\$18,691
4979	Air	Willamette Industries, Inc.	X			
4989	SW	Willamette Industries, Inc.	X			
5049	Air	Mitsubishi Silicon America	X			
5100	Water	Mitsubishi Silicon America	X			
5101	Air	Mitsubishi Silicon America	X			
5102	Air	Mitsubishi Silicon America	X			
5103	Air	Mitsubishi Silicon America	X			
5104	Air	Mitsubishi Silicon America	X			
5105	Air	Mitsubishi Silicon America	X			
5140	Water	Wacker Siltronic Corp.	X			
5158	Water	Balzer Pacific Equipment Co.		\$93,023	100%	\$46,512
5159	Water	Deschutes Brewery	X			
5161	Air	AGPR, Inc.		\$275,003	100%	\$137,502
5210	Air	Barenburg USA, Inc.		\$93,376	100%	\$46,688
5223	Water	Cascade General, Inc.		\$1,996,920	100%	\$998,460
5236	Air	Smurfit Newsprint Corp.	X			
5242	Water	Carson Oil Company		\$138,278	100%	\$69,139
5262	Water	Oregon Steel Mills, Inc.		\$2,389,110	100%	\$1,194,555
5270	Water	PGE		\$146,409	100%	\$73,205
5278	Water	PGE		\$14,099	100%	\$7,050
5280	Air	Forrest Products Company		\$19,604	100%	\$9,802
5284	Plastics	Denton Plastics, Inc.		\$22,619	100%	\$11,310
5285	Water	Elf Atochem North America		\$948,062	100%	\$474,031
5289	Water	Portland General Electric		\$220,632	100%	\$110,316
5298	Water	Willamette Industries, Inc.		\$29,166	100%	\$14,583
5300	Water	Willamette Industries, Inc.		\$100,280	100%	\$50,140
5301	Water	Willamette Industries, Inc.		\$169,065	100%	\$84,533
5302	Air	Willamette Industries, Inc.		\$116,162	100%	\$58,081

5303	Air	The Ridge Company		\$107,099	100%	\$53,550
5304	Air	Hewlett-Packard Company		\$4,476,238	100%	\$2,238,119
5311	Plastics	Denton Plastics, Inc.		\$18,000	100%	\$9,000
5321	Plastics	Neo Leasing, LLC		\$4,995	100%	\$2,498
5326	Air	Eagle Foundry Company		\$232,902	100%	\$116,451
5327	Air	Smith Seed Services		\$133,047	100%	\$66,524
5335	Water	PGE		\$31,323	100%	\$15,662
5336	Water	PGE		\$49,090	100%	\$24,545
5348	USTs	WSCO Petroleum Corp.		\$138,618	88%	\$60,992
5350	USTs	Deschutes Valley Equipment		\$11,834	100%	\$5,917
5355	SW	Dunn & Leblanc, Inc.		\$6,750	100%	\$3,375
5356	USTs	Roland J. Schmidt		\$30,040	100%	\$15,020
5360	SW	Capitol Recycling & Disposal		\$156,043	100%	\$78,021
5362	SW	Environmental Waste Systems		\$32,350	100%	\$16,175
5364	SW	Environmental Waste Systems		\$23,000	100%	\$11,500
5366	Perc	Philip B. Park		\$68,800	100%	\$34,400
5367	USTs	PMD Fuel, LLC		\$129,128	91%	\$58,753
5368	SW	Pacific Sanitation, Inc.		\$29,772	100%	\$14,886
5369	Air	Tokai Carbon USA, Inc.		\$57,938	100%	\$28,969
5370	SW	United Disposal Service, Inc.		\$4,250	100%	\$2,125
5371	SW	United Disposal Service, Inc.		\$4,570	100%	\$2,285
5372	SW	Albany-Lebanon Sanitation		\$10,242	100%	\$5,121
5374	USTs	Blue Dog Farms		\$96,297	90%	\$43,334
5375	Water	Bruce Pac		\$111,329	100%	\$55,665
5376	SW	United Disposal Service, Inc.		\$46,603	100%	\$23,301
5377	SW	United Disposal Service, Inc.		\$18,220	100%	\$9,110
5378	Water	Willamette Egg Farms LLC		\$189,732	100%	\$94,866
5380	Air	PED Manufacturing, Ltd.		\$27,272	100%	\$13,636
5381	SW	KE Enterprises, Inc.		\$286,543	100%	\$143,272
5382	SW	KE Enterprises, Inc.		\$211,440	100%	\$105,720
5383	SW	KE Enterprises, Inc.		\$35,000	100%	\$17,500
5385	SW	Pacific Sanitation Inc.		\$33,244	100%	\$16,622
5396	Plastics	Denton Plastic, Inc.		\$14,050	100%	\$7,025
5398	Plastics	Neo Leasing, LLC		\$87,751	100%	\$43,876
5403	SW	Environmental Waste Systems		\$5,947	100%	\$2,973
5404	SW	Environmental Waste System		\$45,504	100%	\$22,752

Denials

The following applications were removed from the list recommended for denial.

Jim Aden of Willamette Industries requested applications 5167 and 5299 be removed from the agenda in order to allow the applicant an opportunity to respond to the findings contained within the applicable tax credit review reports. Application 5167 was previously scheduled before the Commission on November 18, 1999. This is the first time on the agenda for application number 5299.

Andy Nichols of Wah Chang requested applications 5276 and 5286 be removed from the agenda. They would like to present additional materials to further justify their applications.

Only one denial remained on the agenda, application 5232 – Fujitsu Micro Electronics, Inc. Commissioner Reeve moved the Commission deny application 5232. Commissioner Van Vliet seconded the motion and it carried with four "yes" votes.

**Denials – Attachment C**

5167	Air	Willamette Industries, Inc.	X			
5232	Noise	Fujitsu Microelectronics Inc.		\$809,813	100%	\$404,907
5276	Water	Teledyne Industries, Inc.	X			
5286	Water	Teledyne Industries, Inc.	X			
5299	Water	Willamette Industries, Inc.	X			

Rejections

Mr. Tom McCue of Wacker Siltronic Corporation requested application 5141 for certification of their scrubbers be removed from the agenda. The applicant is reviewing the disallowed ducting amounts and the date the scrubbers were actually complete and placed into operation. This application was originally on the summary of applications listed for approval. Commission Reeve noted the reason for the rejection of application 5141 was "untimely submittal" yet the Department seemed to go ahead and look for the eligible costs. He asked if that was an unusual procedure. Staff stated it is not always evident in the beginning of a review if an application is submitted in a timely manner. If that analysis has been made then it is included in the Review Report.

**Rejection – Attachment D**

5141	Air	Wacker Siltronic Corp.	X			
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Transfers

Weyerhaeuser Company requested certificate 2385 be transferred to Sierra Pine. A motion was made by Commissioner Van Vliet to transfer the certificate. Commissioner Malarkey seconded the motion and it carried with four "yes" votes.

Willamette Industries' application 4570 was to be scheduled for this agenda item. At the applicant's request, it was removed from the agenda and scheduled for the July EQC meeting.

**D. Rule Adoption: Lane Regional Air Pollution Authority (LRAPA) Open Burning Rule Amendments and State Implementation Plan (SIP) Revision**

Andy Ginsburg, Air Quality Administrator, and Laurey Cook, SIP Coordinator, presented this item. The presentation included a brief summary of the LRAPA's rule amendments and the procedure for revising the SIP. The SIP is revised through amending the Department's general rule OAR 340-200-0040. LRAPA exists under statutory authority.

Prior to the adoption of the rule amendments, the Department reviewed the rules for stringency and found the rules were at least as stringent as the Department's rules. LRAPA adopted the open burning rules as a revision to the State Implementation Plan. LRAPA's open burning rule amendments include a change in the fee structure from a flat fee to a volume based fee of \$4 a cubic yard, with a \$50 minimum. The fee will assist in covering LRAPA's cost to run the open burning program and provide an incentive to seek alternatives to burning. LRAPA also added a flat fee of \$100 for burning vegetation in wetlands and expanded its open burning boundary to include all of Fire District 1. Additionally, LRAPA updated its definition of the Eugene-Springfield Urban Growth Boundary.

Commissioner Reeve made a motion to approve the rule adoption amending LRAPA's open burning rules as a revision to the SIP. It was seconded by Commissioner Malarkey and carried with four "yes" votes. The rule amendments will be submitted to the Environmental Protection Agency (EPA) for approval into the SIP.

**E. Rule Adoption: Title V Permitting Program Consumer Price Index (CPI) Fee Increase**

Andy Ginsburg and Scott Manzano, lead rule writer, presented this item. The proposed rule would increase Title V fees by the 1999 consumer price index (CPI) of 2.27 % to fund increased Title V program costs due to salary increases and inflation. The Department did not receive any public comment. The lack of comment was most likely because the Department took advantage of several opportunities to inform fee payer representatives and sources of the proposal during the course of the rulemaking.

In response to questions from the Commission, staff explained the CPI used in the proposal was and has always been the national CPI, not the Oregon CPI. The national CPI was slightly lower than the Oregon CPI for this year's proposal. The Department recently completed a workload analysis which supports the CPI increase, and was used to determine resource need for the program. In the event such an analysis indicated additional Title V staff was needed, a statutory change would be required to establish a new base fee.

A motion was made by Commissioner Reeve to adopt the rules and amend the SIP. Commissioner Van Vliet seconded the motion and it carried with four "yes" votes.



## **G. Informational Item: Report to the EQC Regarding Hazardous Waste-Derived Fertilizer and Related Issues**

Mary Wahl, Waste Prevention and Management (WPM) Administrator; Anne Price, Hazardous Waste Program and Planning Manager; and Gary Calaba, WPM staff, presented this item. The metal concentration limits EQC set last year for K061 hazardous waste derived fertilizer became effective on March 31, 2000. The Oregon Department of Agriculture (ODA) will ask registrants whether their zinc fertilizer is waste derived; if so, the registrant will be advised there are metal limits for their fertilizer. Other fertilizer issues remain, and DEQ is participating with ODA to set limits for non-nutritive in non-waste derived fertilizers. In addition, EPA is developing standards for K061 fertilizer, and DEQ will have to evaluate its standards in the future to ensure they are comparable to EPA's standards.

Commissioners asked whether metals are tied up in an organic soil. Staff responded that that appears to be the case, although scientists do not always agree on such matters. The Commission requested a persistent bioaccumulative toxins (PBT) briefing in the fall.

## **F. Rule Adoption: Solid Waste Rule Amendments to Waste Planning and Recycling Grants OAR 340-083-0010 to 340-083-0100**

Mary Wahl; Chris Taylor, Solid Waste Manager; and Jacquie Moon, Project Coordinator, presented this item. Each person in Oregon generates 7.2 pounds of solid waste each day. The Department collects a \$1.25 per ton fee on waste disposed at disposal sites. A portion of the fees funds the Solid Waste Planning and Recycling Grants. The Department has offered nine grants rounds, each adhering to the original program objectives, which were to help financially needy local governments located far from markets for recyclable material with recycling opportunities. Solid waste planning grants have been given to most counties, and the original objectives have largely been accomplished.

The solid waste grant program has been a "stand alone" program, and the Department would like to bring it in line with other solid waste programs, and use it as a tool to implement solid waste policies. DEQ would like to use grants as the direct way to provide financing to local governments focusing on waste prevention. It is a relatively small program with approximately \$250,000 available annually for grants. Since the first grant round in 1991, 105 grants totaling approximately \$2,000,000 have been awarded. The median grant award is \$15,000. The range is \$1,134 - \$80,000. This rule proposal would amend the grant rules to change the selection criteria, making them broader than before, and adding a provision for focused grants, which would allow the solid waste program to give priority funding to defined types of projects intended to achieve specific environmental objectives. The changes to the grant rules will allow the Department the flexibility to be creative, and ultimately impact waste generation and waste recovery in a positive manner.

Commissioner Van Vliet asked how the grants were distributed between categories over the life of the program. Staff answered that for small local governments, 25% of the grant funds went to projects to develop or enhance recycling depots, 44% to projects to prepare solid waste management plans, and 31% to projects for general recycling and education activities.

Commissioner Reeve asked if the solid waste program had evaluated the grants in terms of what types were successful and what types were not successful. Staff indicated this had been done on two occasions, once in 1996, and again in 1999. The regional technical assistant staff are available to work with local governments to guide them towards effective grant proposals. The Department could provide information to local governments before they prepared a grant.

A motion was made by Commissioner Van Vliet to adopt these rules. Commissioner Malarkey seconded the motion and it carried with four "yes" votes. The Commission requested an informational item in the fall on the 2000 recovery rate report.

## **M. Director's Report**

DEQ, the Governor's office and the City of Portland have been meeting to reach agreement on a Combined Sewer Overflow (CSO) strategy. The strategy being discussed is to allow the City to reduce the size of the "big pipes" structural facilities. Cost savings from that could be used on in-flow controls and to meet the 2011 performance and control program deadline.

Presentations on initial results of the cleanup program customer survey were made to the Environmental Cleanup Advisory Committee (ECAC) and Voluntary Cleanup Program Focus Group in April with the final

survey report due May 15, 2000. ECAC will meet in June to recommend potential program improvements.

EPA is proposing to place a 6-mile stretch of the Willamette River between Sauvie Island and Swan Island, referred to as Portland Harbor, on the National Priority List, commonly known as Superfund. On April 5, EPA Region 10 Administrator Chuck Clarke sent a letter to Governor Kitzhaber requesting his concurrence with EPA's decision to list the site. Efforts to receive an EPA deferral for a Portland Harbor clean up under state authority could not go forward without signed tolling agreements between the Natural Resource Trustees and the Potentially Responsible Parties. The parties were unable to reach an agreement by the end of March. DEQ and EPA will jointly plan the next cleanup steps.

At the April 18 meeting of the State Land Board the responsible party's on-site representative, Bill Milwee, advised state officials the conditions at the wreck site of the New Carissa make further work too dangerous and too difficult to continue. State Lands Director Paul Cleary reminded the Responsible Party (RP) that the State's full and complete removal demand continued in effect. The Governor advised the RP that if they cannot remove the wreck the state will require a \$25 million commitment in lieu of removal. The state would initiate legal action if necessary.

Governor Kitzhaber will sign an order on May 17 directing the Department of Administrative Services (DAS) and other specific state agencies to adopt sustainability practices for internal operations. The order also directs DAS to develop and assist other state agencies in efficiently achieving sustainable internal operations. DEQ is already working to identify opportunities and to facilitate actions to achieve sustainability in internal operations.

The Commission requested a briefing on Environmental Cleanup Division (ECD) survey results report at a future meeting.

Larry Knudsen, Department of Justice, commented on the following court cases that were mentioned in the Director's report.

**Pennington v. DEQ: Oregonians in Action (OIA)** appealed DEQ's issuance of a Clean Water Act (CWA) Section 401 certificate for the Day Road Prison near Wilsonville. The certificate was issued as part of an application to the US Army Corps of Engineers for a CWA Section 404 permit to fill of approximately 1.5 acres of wetland. OIA asserts the certificate is inadequate because it does not include conditions requiring the Department of Corrections to comply with statewide land use goals and act local land use regulations. DEQ believes it did comply with relevant land use provisions when issuing the certificate.

**Snake River Decision:** On March 31, 1999, a consortium of environmental and fishery groups filed a suit against the US Army Corps of Engineers in federal district court. The suit alleged violations of the State of Washington's temperature and total dissolved gas water quality standards in relation to operation of the four lower Snake River hydroelectric dams. In a ruling released in March, Judge Helen Frye ruled that the federal government is not exempt from complying with the provisions of the Clean Water Act, and citizen groups have the right to pursue legal avenues to have standards enforced. In ruling, Judge Frye acknowledged evidence of damage to the Snake River, but gave both sides 90 days to gather evidence from the administrative record to demonstrate whether or not dams were the cause of the violations.

**Garcia River Law Suit:** The United States District Court for the Northern District of California decision in the *Prosolino et al v. EPA*, referred to as the Garcia River Case, affirmed that EPA has the authority to issue Total Maximum Daily Loads (TMDLs) for nonpoint source listed waterbodies. The court also clarified that implementation of load allocations for nonpoint sources are the responsibility of the state.

**Hawes v. State of Oregon:** Ranchers Daryl and Barbara Hawes, the Baker County Farm Bureau and The Baker County Livestock Association filed suit against the Department, EQC and Oregon Department of Agriculture. The suit seeks to invalidate the Memorandum of Agreement between DEQ and EPA relating to the development and implementation of Total Maximum Daily Loads (TMDLs). It also seeks a court order declaring that EPA and DEQ have no authority under the federal Clean Water Act to establish TMDLs for water bodies that violate water quality standards because of pollution caused solely by nonpoint sources such as farming, grazing and logging.

**Northwest Environmental Defense Center and Churchill v. Carol Browner:** The Sierra Club joined Jack Churchill in requesting the court enter an order and decree that finds EPA in violation of a 1987 consent decree requiring EPA to ensure that Oregon completes a certain number of TMDLs. They also requested

the court to issue an order compelling EPA to issue TMDLs for Oregon's identified polluted waters in six months. At a May 2<sup>nd</sup> hearing, Judge Hogan delayed any decision pending the outcome of settlement negotiations involving parties in the cases of Northwest Environmental Advocates, et.al. v. Browner, and NEDC and Churchill v. Thomas. Both cases are related to completing TMDLs for Oregon's listed waterbodies. Settlement discussions are ongoing.

**Public Comment:** Charles Logue and Tom VanderPlaat from the Unified Sewerage Agency commented on the extension of the Tualatin River Basin TMDL Compliance Order.

#### **L. Commissioners' Reports**

Commissioner Malarkey reported on the environmental concerns she observed on vacation. Commissioner Reeve is now the Co-chair of the Oregon Water Enhancement Board (OWEB). Chair Eden participated in the emergency response exercise at the Umatilla Chemical Depot.

The meeting was recessed for the day at 12:05 p.m. so the Commission could tour multiple sites in North and Northeast Portland and along the Columbia Slough.

The meeting resumed at 8:00 a.m. on Thursday, May 18.

#### **H. Informational Item: Total Maximum Daily Loads (TMDLs)--A Status Report**

Dick Pedersen, Manager Watershed Management Section, provided the Commission with an update and status of Oregon's TMDL Program. The schedule for completing TMDLs in Oregon is partially based on consistency with the Oregon Plan and partially on agreements revolving around lawsuits regarding TMDLs in Oregon. Oregon's TMDL schedule is aggressive. DEQ is directed to complete TMDLs for all 91 sub-basins in a systematic fashion by the end of 2007. DEQ agreed to the schedule and the TMDL methodology in a Memorandum of Agreement signed with EPA in February of this year. DEQ's approach to completing TMDLs is to include water quality management plans that will identify the management implementation measures addressing TMDL load and wasteload allocations. Using place based basin coordinators, DEQ is actively working in approximately 25 of the 91 sub-basins. During the last legislative session, DEQ was directed to complete 9 of the 12 Willamette Basin sub-basins on a shortened schedule. These sub-basins are to be completed by the end of 2003 rather than the original 2005 to 2007 timeframe. DEQ was authorized to hire staff to complete this task. DEQ just recently completed and EPA approved the Upper Grande Ronde sub-basin TMDL. This is one of the first sub-basin level TMDLs dealing with all parameters and all land management units. It will pave the way for other similar sub-basin TMDLs. Our plans are to complete TMDLs for the Tualatin, Wilson-Trask-Nestucca, Williamson, Sprague, and Upper Klamath Lake and have them available for public review and comment this calendar year.

#### **I. Action Item: Extension of the Tualatin River Basin TMDL Compliance Order**

Andy Schaedel, Water Quality Manager, and Rob Burkhart, Tualatin Basin Coordinator, presented this item. After explaining the reasons for the extension of the Tualatin River basin TMDL compliance order, staff opened the discussion for questions from the Commission.

In answer to a question concerning new data about phosphorous, staff responded that the lower river is currently achieving the pH standard during good flow conditions. Phosphorous concentrations are lower but still above the TMDLs. Recent data gathered by U.S. Geological Survey and the Oregon Graduate Center is showing that concentrations in deeper groundwater is higher than expected. The Department is proposing to adjust the phosphorus TMDLs upward to background levels. A temperature TMDL is also being developed.

Although it will be a tight time frame to complete the TMDLs, given the complexity of TMDLs for the basin, it is doable within the seven month timeline. The Tualatin TMDL is behind schedule, for the commitment given EPA (which was 1999), but is not considered late until one year after the due date shown. The extension does not include any tasks that were to be completed earlier. The tasks to be completed under the extension are all ongoing tasks. The Department will come back to the EQC to address compliance elements once the TMDLs are finalized.

Chair Eden indicated this order has been extended several times and asked that this be the final request for an extension. Commissioner Reeve made a motion to approve the extension. Commissioner Malarkey seconded the motion and it carried with four "yes" votes.

## **J. Informational Item: DEQ Budget Update**

Andy Ginsburg, Air Quality Administrator, and Mike Llewelyn, Water Quality Administrator, updated the Commission on the proposed packages they will be presenting from their respective sections in DEQ's budget proposal to the legislature.

## **K. Action Item: Permit Revocation Request Related to the Umatilla Chemical Agent Disposal Facility (UMCDF)**

(A videotape and written transcript of Agenda Item K are available upon request from DEQ's Hermiston office.)

Wayne C. Thomas, DEQ's Chemical Demilitarization Program Administrator, and Larry Edelman, Assistant Attorney General, provided the Commission with a background on the UMCDF Permit Revocation Request made by G.A.S.P., et al. ("Petitioners"). The Department received a letter in December, 1998 from the Petitioners that was not, at the time, interpreted by the Department as a request for revocation of the UMCDF Hazardous Waste Storage and Treatment Permit ("HW Permit," ORQ 000 009 431). During a hearing before the Multnomah County Circuit in June, 1999 the Department agreed to treat the December, 1998 letter as a request for revocation and proceed accordingly.

Mr. Edelman provided the Commission with a discussion of the legal nature of today's proceeding and emphasized this was not a request for "reconsideration," but a request for "revocation." He explained the distinction between the two and discussed the specific criteria that must be met in order for the Commission to make a decision to revoke or to modify the UMCDF HW Permit, as laid out in a memorandum to the Commission dated August 4, 1999 (Attachment C of the Staff Report). Mr. Edelman also discussed the Commission's and the Permittee's options concerning contested case proceedings in the event the Commission decided to revoke or modify the HW Permit. Mr. Edelman pointed out that the Commission has broad discretion in applying the criteria.

The Petitioners, represented by Karyn Jones, President of G.A.S.P., and Richard Condit, Counsel for the Petitioners (participating by telephone), then provided oral testimony. Mr. Condit provided information to the Commission about an incident involving the confirmed release of chemical agent on May 8 from the stack of the Tooele, Utah Chemical Agent Disposal Facility (TOCDF). Mr. Condit pointed out the release as confirmation of what the Petitioners have maintained: "Smokestack technology of this nature is bound to have releases of the chemicals or materials being burned as well as the other byproducts of such burning, such as dioxin, PCBs, heavy metals and a host of other nasty compounds." He also discussed the "Dioxin Reassessment" being prepared by EPA and the latest draft of the Dioxin Reassessment "confirms that the current body burden of dioxin in the general population are at or near levels that could cause some adverse effects." The Petitioners believe the UMCDF will contaminate the agricultural lands around the Depot and put sensitive human populations at risk.

Representatives of the Permittees then testified before the Commission. Present on behalf of the Permittees were Lieutenant Colonel (LTC) Timothy Connelly, Judge Advocate General; Stephen DePew, interim UMCDF Project Manager for the Army's Program Manager for Chemical Stockpile Disposal; Loren Sharp, UMCDF Project Manager for Raytheon Demilitarization Company; and LTC Thomas Woloszyn, Commander of the Umatilla Chemical Depot. LTC Connelly stated the Army agreed with the legal analysis presented by the Oregon Attorney General's office, and the Army "generally concurred" with the Department's Staff Report. LTC Connelly said the Army was still reviewing the Petitioners' comments (which were received on May 17), and Attachment X to the Staff Report. Attachment X included a copy of the "Facility Start-up Checklist" that was prepared by the Department, but the narrative discussing Attachment X was inadvertently left out of the Staff Report. A correction to Page 57 the Staff Report was distributed just prior to the beginning of this meeting.

Mr. DePew reiterated the Army's commitment to its "foremost goal"—the "safe and environmentally sound operation" of UMCDF. Mr. Sharp discussed the procedures Raytheon has put in place in response to recommendations from various agencies to preclude further problems in responding to incidents at the construction site similar to the worker exposure incident that occurred in September, 1999. Mr. Sharp told the Commission Raytheon has now installed a public address system in the Munitions Demilitarization Building, acquired additional cell phones and pagers, identified and established additional evacuation routes, increased training sessions for workers, conducted emergency drills, and entered into agreements with various on-and off-post medical resources.

LTC Woloszyn also discussed the improvements that have been put in place at the Depot in the aftermath of the September incident. The Memorandums of Agreement have been put in place, communication systems have been improved, a public awareness program has been initiated, and numerous drills and exercises have been conducted. In response to a question from Commissioner Van Vliet, Mr. Sharp explained that the purchase of Raytheon by Morrison-Knudsen would not be finalized until about mid-June.

Commissioner Reeve requested the Permittees and the Department provide the Commission, the public, and the Petitioners with a full report on the May 8 chemical agent release at the Tooele facility. Commissioner Eden emphasized the need for the Commission to get all available information about the May 8 Tooele incident, and also requested additional information be provided about the EPA's Dioxin Reassessment as soon as it was available.

Wayne C. Thomas, accompanied by Sue Oliver, Senior Hazardous Waste Specialist with the Department's Chemical Demilitarization Program, then presented the staff report. Mr. Thomas explained how the staff report was organized and the methodology used by the Department in reviewing all of the information. The Department examined all of the legal documents submitted during proceedings from *G.A.S.P., et al. v. EQC, et al.*, public comments received during two public comment periods, and Department records. Each document was then reviewed more closely and assessed whether or not it supported the Petitioners' argument on any given issue.

Ms. Oliver then presented the Department's staff report by reviewing each section.

Pollution Abatement System Carbon Filter System (PFS): Many of the issues related to the PFS had already been reviewed by the Commission and discussed at previous meetings. In November, 1999 the Commission concurred with the Department's recommendation that the PFS be retained in the UMCDP design. The Department's review in this staff report was limited mainly to a document submitted by the Oregon Clearinghouse for Pollution Reduction, which was responding to documents related to the November, 1999 proceeding. The Department concluded the comments did not provide a basis for revisiting the decision made by the Commission last November.

Dioxin Issues: The Department reviewed approximately 33 documents related to dioxin, health effects of dioxin, and emissions of dioxin and dioxin-like compounds from incinerators. Most of the issues being brought forth by the Petitioners had been previously considered by the Department and the Commission, and had also been argued extensively during legal proceedings in Utah. Commissioner Reeve had several questions related to the distinctions between EPA's Human Health Risk Assessment Protocol and the Dioxin Reassessment, and how the Department would use that information. Ms. Oliver explained that EPA's Dioxin Reassessment has not been released yet; but the Department will use the most recent guidance available when the UMCDP Post Trial Burn Health Risk Assessment is conducted. The Department concluded the information did not provide a basis for unilateral modification or revocation of the UMCDP HW Permit.

Acute Toxicity/Chronic Health Effects of Low Level Exposures To Chemical Warfare Agents: The Department reviewed approximately 30 documents related to the effects of low level exposures to chemical agent, including numerous documents related to the Gulf War Syndrome. The Department does not believe there will be any health effects from the operation of UMCDP, an opinion also held by both the National Research Council and the Centers for Disease Control. No health effects have been observed at any of the workers at the Johnston Atoll facility, which has been in operation for over 10 years. The Department knows the toxicity of chemical warfare agents is being reviewed and will continue to monitor advances in research for potential applications at UMCDP. The Department concluded there was no basis for unilateral modification or revocation of the UMCDP HW Permit.

Human Health Risk Assessments: Approximately 20 documents related to Human Health Risk Assessments were reviewed by the Department. The vast majority of the information submitted related to risk assessments that had been previously reviewed and discussed by the Commission. The risk assessment guidance is always changing, and the Department will use the most current information available when the next UMCDP risk assessment is conducted. The Department concluded the results of the 1996 Risk Assessment are still valid, and the information provided did not provide a basis for unilateral modification or revocation.

Incineration Vs. Alternative Technologies: The Department reviewed approximately 21 documents related to the availability of alternatives to incineration for destruction of the chemical weapons stockpile at the

Umatilla Chemical Depot. The Department does not believe there is an alternative "ready to go" to replace incineration and concluded there was not a basis for unilateral modification or revocation.

Risk of Storage vs. Risk of Incineration: The results of the "Quantitative Risk Assessment" (QRA) conducted by the Army to assess the risks of catastrophic events at the Umatilla Chemical Depot were discussed. The Petitioners had argued that the Department and the Commission "improperly relied upon" the QRA in concluding that the risk of storage far outweighed the risk of incineration. A "Phase 2" QRA is being conducted that will include more site-specific information. Ms. Oliver also discussed the difficulties of "re-configuring" the munitions as a means of reducing risk. The Department concluded the risk of storage outweighs the risk of incineration, and the information provided did not provide a basis for unilateral modification or revocation.

The Commission asked several questions about the M-55 rockets and the processing difficulties that are being encountered at the Tooele facility. Ms. Oliver explained that rocket processing at Tooele has been slowed because the facility is unable to drain the rockets due to gelled or crystallized agent. To stay within the permitted agent feed rate to the Deactivation Furnace the Tooele facility must dramatically lower the rocket feed rate when the rockets cannot be fully drained of chemical agent. The Umatilla facility will be able to use the experience gained at Tooele to devise a methodology for handling rockets with gelled or crystallized agent.

Performance Of The Tooele Chemical Agent Disposal Facility (TOCDF): The Department reviewed the information submitted by the Petitioners and other commenters related to the performance of TOCDF. The Department reviewed numerous transcripts of depositions and testimony during various legal proceedings in Utah, both with the federal court and the Utah Solid and Hazardous Waste Board. Also reviewed were recent "whistleblower" allegations, issues related to cracking in the concrete, failure of the Agent quantification System, numerous incident reports involving agent releases and/or worker exposures, and reports by various agencies on TOCDF's safety and environmental performance. The Commissioners asked several questions related to the PCB trial burn at TOCDF. The Department concluded the operational history of Tooele does not provide a basis for unilateral modification or revocation of the Umatilla permit. The Department will continue to monitor what happens there and apply any lessons learned that we can to this facility.

Treatment of Secondary Wastes: Most of the documents the Department reviewed on the secondary waste issue were related to the dunnage incinerator and the brine reduction area, and whether the Army intended to operate these two units at Umatilla. The Commission has been actively involved with the issues surrounding the treatment and disposal of secondary wastes at Umatilla, and the Department is participating in an "Integrated Process Team" formed by the Army to address secondary waste at Umatilla. The Department concluded that the information related to the treatment of secondary waste did not provide a basis for unilateral modification or revocation of the Umatilla permit. The Commission asked several questions related to whether there was progress being made and when the dunnage incinerator permit modification request was anticipated.

Emergency Preparedness and the September, 1999 Industrial Exposure Incident At UMCDP: The Department reviewed the testimony of the Petitioners given before the Commission in November, which focused on the September, 1999 exposure incident at UMCDP. Although this incident did not involve chemical agents, the Department concurred with the Petitioners that there were significant failures on the part of Permittees in responding to the incident, but did not agree that the incident provided a basis for unilateral modification or revocation of the HW Permit.

The Department also reviewed a "Dispersion Modeling" report submitted by the Oregon Clearinghouse for Pollution Reduction, but concluded that the model was suited more for emergency response planning than for the kind of modeling the Department requires for assessment of health and ecological risks. The Commission had several questions related to the different types of models used for emergency planning purposes. Mr. Thomas explained the use of the "D2PC" model that the Army currently uses for modeling catastrophic releases.

The Department shares the public's concern about the secondary waste issues and the response by the Permittees to the September incident at UMCDP. The Department strives to be responsive to public comments, and the UMCDP HW Permit contains numerous permit conditions that were put in place in direct response to public concerns. The Department has developed a checklist of items the Permittees will need to complete prior to facility start-up, and the Department has every intention of engaging the public in that process.