OREGON
ENVIRONMENTAL QUALITY
COMMISSION MEETING
MATERIALS 11/02/1990

State of Oregon
Department of Environmental Quality

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NEIL GOLDSCHMIDT
GOVERNOR

Environmental Quality Commission

811 SW SIXTH AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

WORK SESSION
REQUEST FOR EQC DISCUSSION

Meeting Date: Nov. 1-2, 1990
Agenda Item: #4
Division: Water Quality
Section: Surface Water

SUBJECT:

Oil Spill Planning

PURPOSE:

Overview of current oil spill planning activities and discussion of upcoming issues.

ACTION REQUESTED:

_X_ Work Session Discussion
- _X_ General Program Background
- _X_ Potential Strategy, Policy, or Rules
- ___ Agenda Item ___ for Current Meeting
- ___ Other: (specify)

___ Authorize Rulemaking Hearing
___ Adopt Rules

Proposed Rules	Attachment ___
Rulemaking Statements	Attachment ___
Fiscal and Economic Impact Statement	Attachment ___
Public Notice	Attachment ___

___ Issue a Contested Case Order
___ Approve a Stipulated Order
___ Enter an Order

Proposed Order	Attachment ___

___ Approve Department Recommendation

___ Variance Request	Attachment ___
___ Exception to Rule	Attachment ___
___ Informational Report	Attachment ___
___ Other: (specify)	Attachment ___

DESCRIPTION OF REQUESTED ACTION:

ITEM 1: In the past two years, a number of large oil spills on the west coast have generated a great deal of interest nationally and regionally in improving the existing system for preventing and responding to oil spills. The states of California, Alaska and Washington have recently passed comprehensive oil spill legislation. The Department of Environmental Quality is currently implementing oil spill initiatives mandated by the 1989 Legislature (described in items 2 and 3 below). In addition, Oregon has participated on the States/ British Columbia Oil Spill Task Force which investigated ways to of prevent oil spills, reviewed oil spill response procedures, assessed mechanisms for handling compensation claims, and developed a coordinated interstate/province contingency plan.

STATUS: The final Task Force report has been released. It identifies a number of significant problems in the oil transportation industry and in existing spill response technology. It states that prevention of spills must be the primary focus in developing solutions, and that implementation of prevention strategies requires the involvement of all levels of government, the private sector and private citizens. The report also emphasizes the need to improve response preparedness and interstate cooperation.

ISSUES: The Task Force agreed to a set of 46 joint recommendations for specific action. Implementing a number of the Task Force recommendations will require state action and a significant commitment of resources. Based on the recommendations, the DEQ has proposed legislation which attempts to address these issues. Similar legislation has also been introduced by Senator Springer. Implementation will require significant staff and workload increases. The following responsibilities have been identified for the DEQ:

1. Approval of facility and vessel oil discharge prevention and contingency plans,

2. Certification of proof of financial responsibility,
3. Inspection of facilities, vessels and barges to insure compliance and structural integrity,
4. Development of a program for oil worker training certification,
5. Development of a method for natural resource valuation,
6. Development of a pilot system for near miss reporting,
7. Continued cooperation with other states in education programs, training programs, research, and response planning, and
8. Development of an Incident Command System.

ITEM 2: The 1989 Legislature directed DEQ (SB 1039) to develop oil and hazardous materials spill contingency plans for the Oregon coast, the Columbia River and the Willamette River to Oregon City.

STATUS: Work is ongoing. Sensitive natural resources are being mapped on Geographic Information System (GIS) computer maps. Strategies to protect sensitive resources and mobilize a response organization in cooperation with other agencies and industry to deal with large spills on water are being developed. Our technical advisory committee has met twice and will continue to meet monthly until the project is completed in July, 1991.

ISSUES: Strategies, policies and perhaps rules will have to be developed for the following spill related issues:

1. On scene response to a major spill to support the Coast Guard,
2. Prevention of spills,
3. Dispersant use,
4. Assessing damages to natural resources,
5. Managing volunteers,
6. Cleaning and rehabilitating oiled wildlife,
7. Disposal of large amounts of oiled debris, and
8. Bioremediation.

Policy direction and rule making authority on a number of these issues may be requested of the EQC at future meetings. In addition, an on going funding source to ensure implementation of strategies and continuous updating and exercising of plan will be needed.

ITEM 3: The 1989 Legislature directed DEQ (SB 1038) to develop rules to insure that vessels over 300 gross tons which transport bulk oil in waters of the state establish evidence of financial assurance in the amount of $1 million or $150/gross ton, whichever is greater.

STATUS: The Advisory Committee has met twice. The rule development process is currently on hold pending an Attorney General's Opinion on the financial responsibility coverage of the new Federal Oil Pollution Act of 1990.

ISSUES: Will Oregon be able to recover expenses under the new, expanded Federal Act or does it need to continue development of its own set of rules? If rules are needed, authority to hold public hearings and adopt rules will be requested at a future EQC meeting.

AUTHORITY/NEED FOR ACTION:

___ Required by Statute: _____ Attachment ___
Enactment Date: _____
___ Statutory Authority: _____ Attachment ___
___ Pursuant to Rule: _____ Attachment ___
___ Pursuant to Federal Law/Rule: _____ Attachment ___

___ Other: Attachment ___

_X_ Time Constraints: The work authorized under SB 1039 must be completed by July 1, 1991. If we are to adopt rules under SB 1038, that process must be completed in early 1991. New oil spill legislation will be a focus during the next legislative session.

DEVELOPMENTAL BACKGROUND:

___ Advisory Committee Report/Recommendation Attachment ___
___ Hearing Officer's Report/Recommendations Attachment ___
___ Response to Testimony/Comments Attachment ___
___ Prior EQC Agenda Items: (list) Attachment ___
___ Other Related Reports/Rules/Statutes: Attachment ___
_X_ Supplemental Background Information Attachment A,B,C

REGULATED/AFFECTED COMMUNITY CONSTRAINTS/CONSIDERATIONS:

All coastal communities and communities along the Columbia River and lower Willamette River could be highly impacted by a major oil spill. Planning for prevention and response must involve local government and citizens.

The oil transportation and storage industry has not adequately planned for nor does it have sufficient resources to respond to a major spill. Efforts to improve the system will involve a significant commitment from industry.

PROGRAM CONSIDERATIONS:

DEQ must determine the role it should play in oil spill prevention and response and identify the level of commitment this will require.

ALTERNATIVES CONSIDERED BY THE DEPARTMENT:

This report is strictly informational. The Department is considering alternatives for presentation to the EQC at a future meeting.

DEPARTMENT RECOMMENDATION FOR ACTION, WITH RATIONALE:

There are no recommended actions for the Commission at this time.

CONSISTENCY WITH STRATEGIC PLAN, AGENCY POLICY, LEGISLATIVE POLICY:

An active agency role in planning for the prevention of and response to oil spills is consistent with legislative policy and the agency goal of identifying threats to the public health or the environment and taking steps to prevent problems.

ISSUES FOR COMMISSION TO RESOLVE:

There are no issues for the Commission to resolve at the present time, however, a number of issues have been identified that may require future Commission action.

INTENDED FOLLOWUP ACTIONS:

The Department will be continuing its efforts to work with local, state and federal agencies, industry, environmental groups and local citizens to implement Senate Bills 1038 and 1039. The Department will also continue its involvement in the States/British Columbia Oil Spill Task Force and actively pursue implementing its recommendations.

Approved:

Section: _____

Division: Bryce A Taylor

Director: Fred Hamm

Report Prepared By: Bruce Sutherland

Phone: 229-6035

Date Prepared: October 5, 1990

(BS:crw)
(SW\WC7294)
(10-15-90)

STATES/BC TASK FORCE ON OIL SPILLS
Final Report

Contents

List of Tables

List of Figures

List of Maps

I. Executive Summary

A. OVERVIEW

Following the 231,000 gallon (873 m^3) Nestucca oil spill off the coast of Washington in December, 1988, British Columbia Premier William Vander Zalm and Governor Booth Gardner of Washington established the British Columbia/Washington Task Force on Oil Spills. The day after the first Task Force meeting, the Exxon Valdez struck Bligh Reef in Prince William Sound, and the Task Force membership soon expanded to include Alaska, Oregon, and California.

The mandate of the Task Force was to a) investigate ways and means of preventing oil spills; b) to review oil spill response procedures; c) document and assess the mechanisms for handling compensation claims; and d) to develop a coordinated contingency plan for preventing and responding to oil spills in the future. This goal was to culminate in the adoption of a comprehensive set of recommendations which, if implemented, would minimize (to the extent practicable) the probability of major and catastrophic spills and help assure an effective response to such incidents. The Task Force used periodic meetings, subcommittee investigations, training forums, and other tools to accomplish this mandate.

B. MAJOR FINDINGS

Four Task Force subcommittees produced a detailed set of findings, many of which underlie joint and individual recommendations. These findings can be summarized by the following points:

1. Recent spills from the Nestucca, Arco Anchorage, Exxon Valdez, and American Trader have revealed significant problems in oil transportation management, including:

   a. Inadequate personnel training and qualifications
   b. Shortcomings in vessel design and integrity
   c. Insufficient traffic management
   d. Gaps in regulatory oversight
   e. Incomplete cost recovery by states/provinces

2. Despite research in spill cleanup technology, it is unlikely that a large fraction of oil can be recovered from a catastrophic spill.

3. Since response efforts can not effectively reduce the impact of large oil spills, prevention of spills must be the prime strategy in developing solutions to this issue.

4. Readiness and response to smaller size spills of oil or refined petroleum products must still be emphasized, since much of the West Coast traffic is by barge and there is a continuous risk of collisions and groundings from non-oil carrier vessels.

5. Comprehensive oil spill prevention demands participation by industry, citizens, environmental organizations, and all governmental jurisdictions.

6. The States/B.C. Task Force on Oil Spills should continue to promote coordination of West Coast oil spill prevention and response efforts.

7. Response and readiness must still be emphasized to address smaller spills from barge and freighter traffic.

C. JOINT RECOMMENDATIONS

The following recommendations have the full support of all Task Force members. Individual recommendations by each Task Force member are presented in the body of the report, beginning on page 52. Recommendations have been subdivided by the technical nature of the issue to assist the reviewer in analyzing recommendations with similar characteristics.

The **recommendations are not in priority order**; priorities are detailed in section IV. The recommendations vary as to the governmental body that has authority to make the suggested changes, and will be forwarded to the appropriate "authorizing agent" through mechanisms identified in an implementation plan (page 77).

The main objective of this Task Force, as reflected in the following recommendations, is to continue to work towards coordinated prevention and response to oil spills for the Pacific coast. Two aspects of this effort are particularly important: mutual assistance among the members for catastrophic spills, and interjurisdictional protocols for transboundary spills. To achieve these objectives, the Task Force will continue to work together to implement similar response procedures to ensure consistency among the separate jurisdictions. To minimize the need for any response, recommendations to prevent spills occurring along the coast have been developed and given high priority.

Vessel Traffic Reduction

RECOMMENDATION 1: Petroleum Conservation

Implement programs designed to reduce petroleum consumption, such as conservation measures (including appliance and automobile efficiency standards, recycling, and effective mass transit), alternative energy source research, and economic incentives.

RECOMMENDATION 2: Alternative Oil Transportation

Review proposals for alternative transportation modes which would reduce petroleum transportation by tanker in high risk and environmentally sensitive areas. Such proposals include, but are not limited to, pipeline proposals. In reviewing any proposals, Task Force members are committed to insuring compliance with all applicable state/provincial/federal laws, including their processes to involve the public.

Vessel Traffic Management

RECOMMENDATION 3: Tug Escorts - Single Propulsion

Require tug escorts for all single boiler or single engine, and single screw tank vessels carrying oil or other petroleum products in waterways designated as high risk by an individual state or province.

RECOMMENDATION 4: Tug Escorts - Tonnage Requirements

Review and, if appropriate, reduce dead weight tonnage specifications for tug escort requirements.

RECOMMENDATION 5: Vessel Traffic Service Systems

Upgrade vessel traffic service systems by replacing outdated equipment, eliminating gaps in coverage, increasing operator training and assignment length, and establishing mandatory participation in vessel traffic service systems in high-risk or congested areas.

RECOMMENDATION 6: Near Miss Reporting System

Establish, on a trial basis with a subsequent assessment of usefulness, a near miss reporting system which links directly with vessel inspection information, vessel traffic, and vessel casualty database systems.

RECOMMENDATION 7: Tow Cables

Develop and implement a mandatory set of guidelines for tugs on tow cable size and material specifications, cable maintenance practices, cable handling equipment design, and barge recovery plan preparation.

RECOMMENDATION 8: Vessel Safety Measures

Establish regional safety measures, including speed limits, based on escort vehicle or other limitations, for all laden tank vessels in inland waters and their critical approaches.

RECOMMENDATION 9: Tow Systems

Require towing systems and plans on all tankers carrying oil and other petroleum products.

Vessel Design

RECOMMENDATION 10: Double Hulls

Require double hulls for all new tank vessels designed to carry oil or other petroleum products as cargo.

RECOMMENDATION 11: Onboard Navigation Improvements

Require all tankers carrying oil or other petroleum products in coastal and inland waterways to possess and operate an onboard navigation system, such as an Electronic Chart Display Information System (ECDIS).

Personnel

RECOMMENDATION 12: Petroleum Facility Worker Training

Require state/province certification of training programs for managers, workers, and safety officers at terminals which handle oil or other petroleum products. Program certification requirements should include spill prevention and response training.

RECOMMENDATION 13: Mariner Qualifications

Require more stringent mariner qualifications, including spill prevention and response training, simulator training, vessel class and size restrictions on deck officer certification, and alcohol and drug testing.

RECOMMENDATION 14: Tug Crew Training

Mandate oil spill response training for all tug crews involved in tank vessel operations.

RECOMMENDATION 15: Crew Requirements

Require two licensed officers (including pilot where appropriate) to be present on the bridge of all tankers carrying oil or other petroleum products while in inland waterways. Require adequate crew levels, sufficient to meet normal and emergency operation needs, for tank vessels carrying oil or other petroleum products.

RECOMMENDATION 16: Dedicated Tug Crews

Assign dedicated tug crews to specific classes of tugs and tank barges carrying oil or other petroleum products to assure familiarity with tug and tank barge operating characteristics.

Enforcement, Penalties, and Liability

RECOMMENDATION 17: Strong Sanctions

Legislate strong levels of civil and criminal sanctions for noncompliance with oil spill regulations.

RECOMMENDATION 18: Proof of Financial Responsibility

Raise state/Canadian federal proof of financial responsibility requirements to ensure spillers can finance oil spill related cleanup and damage costs.

RECOMMENDATION 19: Natural Resource Valuation

Develop and require use of methods of natural resource valuation which fully incorporate non-market and market values in assessment of damages resulting from spills.

RECOMMENDATION 20: Cost Recovery

Develop responsible party contracts to aid in the recovery of all natural resource damage and cleanup costs.

RECOMMENDATION 21: Liability Limits

Remove any ambiguity in federal law and guarantee a state's right to fully exercise its own liability standard. Increase the maximum limit of liability for oil pollution damage under Canadian law.

RECOMMENDATION 22: Coast Guard Enforcement

Increase the Coast Guard's ability to conduct routine on-water surveillance patrols by increasing funding to U. S. Marine Safety Offices and Canadian Coast Guard Regional Offices.

RECOMMENDATION 23: Enforcement Staff

Establish adequate environmental resource agency staffing level devoted to enforce compliance with spill planning requirements, and aggressively pursue legal action against violators.

Regulatory Oversight

RECOMMENDATION 24: Prevention Plans

Require all facilities (and tank vessels larger than 10,000 dwt) which handle oil or other petroleum products to develop and implement spill prevention plans, which would at a minimum include risk-reducing transfer methods and personnel training specifications.

RECOMMENDATION 25: Response Plans

Require all facilities (and tank vessels larger than 10,000 dwt) which handle oil or other petroleum products to develop and implement spill response plans, which would at a minimum include response time, equipment, and staff support specifications.

RECOMMENDATION 26: Local Participation

Each state/province shall recognize and utilize local citizen expertise and knowledge in spill prevention and response efforts. This may include a volunteer training and coordination plan to enhance preparedness.

RECOMMENDATION 27: Clean Up Requirements

Ensure that all state, provincial, and federal agencies act in full cooperation to require the spiller or other responsible party to meet all applicable state, provincial, and federal performance requirements.

RECOMMENDATION 28: Vessel Inspections

Require periodic (but not less than every two years) structural and mechanical integrity inspections of vessel equipment and hull structures on all tank vessels carrying oil or other petroleum products. Develop a priority inspection system for more frequent inspections of particular tanker features essential to safety, and for certain tankers, equipment, and companies with a history of stress fracture incidents and other safety problems.

Education

RECOMMENDATION 29: Prevention Education

Develop a joint spill prevention education strategy for industry and the public, including a program aimed at preventing small chronic oil spills by operators of fishing vessels, ferries, ports, cruise ships and marinas.

Transfer Operations

RECOMMENDATION 30: Transfer Operations Review

Review the adequacy of and make appropriate improvements in equipment, operating procedures, and the appropriateness of existing West Coast locations used for transfer of oil and other petroleum products (with particular emphasis on non-dockside locations).

Spill Response Enhancement

RECOMMENDATION 31: Response Training

Develop, in cooperation with the Coast Guards, industry, and local communities, local programs to provide spill response training to fishing boat operators, ports and harbor districts, marinas, and local communities.

RECOMMENDATION 32: Wildlife Rescue Training and Equipment

Develop and oversee joint programs which provide wildlife rescue volunteer training. Work with industry and others to acquire wildlife rescue equipment, including mobile equipment.

RECOMMENDATION 33: Onboard Response Equipment

Require all tank vessels carrying oil or petroleum products to have onboard response equipment for commencement of spill response efforts as soon as practicable, in amounts and types appropriate to the vessel's class and size.

RECOMMENDATION 34: Response Drills

Conduct a major spill response drill in each of the Western coastal states/provinces at least annually, with joint Coast Guard cooperation when the drill area crosses international boundaries. The drills should emphasize interjurisdictional simulations and all Task Force members should be invited to participate in the other member's drills.

RECOMMENDATION 35: Transfer Containment

Require placement of booms and other appropriate equipment, such as in-water oil sensors, around tank vessels during transfers of oil or other petroleum products in areas designated by individual states/province.

RECOMMENDATION 36: Contingency Plans

Revise state/provincial contingency plans to include the Emergency Response Subcommittee's Mutual Aid Plan, including continual updates of the "call down" lists.

RECOMMENDATION 37: Public Involvement

Ensure that all appropriate governmental agencies, industry, and interested citizens have the opportunity to become involved in development of major spill response policies and plans.

RECOMMENDATION 38: Mutual Aid

In the event of a major spill affecting the waters and coastline of a Task Force member, other Task Force members will cooperate to the fullest extent possible to provide back-up equipment and personnel to respond to the emergency.

RECOMMENDATION 39: Incident Command System (ICS)

The Task Force members should adopt a form of an Incident Command System (ICS) to enhance their ability to manage responses to major spills of oil and other petroleum products.

Research

RECOMMENDATION 40: Research Coordination

Encourage, fund where feasible, and coordinate oil spill research, with emphasis on west coast issues, through university systems and other means, and develop a framework for information sharing and combined funding projects.

Structure and Process of the Task Force

RECOMMENDATION 41: Annual Meeting

Meet annually, with responsibility for the meeting location rotated uniformly among the Task Force members; meetings will include reports by each member on progress in implementing recommendations. Each Task Force member will independently ensure the involvement of interested parties and the public in their respective jurisdiction. Task Force members will review and where appropriate, modify recommendations during annual meetings.

Multi-state/province compact

RECOMMENDATION 42: Interstate Compact

Work cooperatively with the Western Legislative Conference in their evaluation of the advantages and disadvantages of developing an interstate compact to make binding agreements concerning spill prevention and cleanup measures on the West Coast.

Studies and Other Recommendations

RECOMMENDATION 43: Petroleum Industry Response Cooperatives

Conduct a review of PIRO's, Burrard Clean's, and other spill clean-up cooperatives' proposals and schedules for west coast spill response centers.

RECOMMENDATION 44: Information Sharing

Share reports and other information regarding oil spill prevention and response among Task Force members (e.g. information on spill response worker training and liability issues). Following major spill events in Task Force jurisdictions, the Task Force members will participate in a debrief and take appropriate action, including changes to recommendations. These activities should not jeopardize litigation efforts by Task Force members.

RECOMMENDATION 45: Coordination of Studies

In the event of a major trans-boundary spill affecting the waters and coastline of two or more Task Force members, those affected members will coordinate their subsequent studies and activities designed to identify damage, restore the natural environment, and pursue damage claims.

RECOMMENDATION 46: Spill Equipment Updates

Review annually, and update if necessary, response equipment lists and mutual aid provisions for response to catastrophic spills. Continue to work towards consistency among the members in individual contingency plans and response criteria.

ATTACHMENT B: SENATE BILL 1039: OIL SPILL PLANNING PROJECT WORK OUTLINE (4/1/90 - 7/1/91)

MAPPING ACTIVITIES prime responsibility - ODFW

For the Oregon coast, all estuaries, the Columbia River to tri-cities, and Willamette River to Oregon City Falls;

1. gather all available pertinent information
2. locate the following on maps
   - shoreline types
   - sensitive species
   - migration routes
   - natural areas
   - marinas
   - disposal sites
   - boom sites
   - critical habitats
   - concentration areas
   - spawning areas
   - parks and refuges
   - outfalls and intakes
   - equipment storage sites
   - water dependant commercial or industrial facilities
   - tide gates and other water structures
   - access points: boat ramps, road ends, beaches...- available info on currents, tides, winds,
3. work with Dept of Energy to enter information of GIS maps, tables, charts, etc.
4. verify mapped information
5. prioritize sensitive areas and develop response strategy
6. develop explanatory narrative

STRATEGIC PLANNING ACTIVITIES prime responsibility - DEQ

1. develop computer index of response resources
2. develop response strategy for:
   * discovery of spill,
   * notification of affected parties,
   * evaluation of situation,
   * initiation of response activities,
   * incident command,
   * containment of spill,
   * necessary cleanup actions,
   * response cost recovery
   - develop narrative consistent with above plans to describe response to major oil spills to include in spill plan
3. develop policies and procedures for:
   * interstate coordination on information sharing
   * integrated statewide emergency command system
   * prevention options
   * dispersant use
   * damage assessment and recovery of costs
   * volunteer management
   * wildlife rehabilitation
   * debris disposal
   * bioremediation
   - develop discussion papers on the above issues for presentation and review to the 1039 advisory committee. Include approved policies and procedures in spill plan

4. determine long term oil spill response needs
   - develop strategy for plan implementation
   - identify short comings of present system
   - identify needed legislation to strengthen Oregon spill response capabilities
   - identify funding necessary to maintain and build program
   - develop white paper on long term needs

FINAL SPILL PLAN

1. Develop a basic response plan for on scene responders containing colored maps with essential response information and flow charts of response system and basic procedures.
2. Develop accompanying text and maps with detailed resource information, explanatory narrative, response strategy narrative, policy and procedures narrative, and recommendations for future actions.
3. Print and distribute plans by July 1, 1991

WORK SCHEDULE

	1990												1991						
ACTIVITY	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J
Mapping																			
Coast				>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>								
Columbia R.				>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>								
Willamette R.				>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>								
Narrative										>>>	>>>	>>>	>>>	>>>	>>>	>>>			
Planning																			
Index				>>>	>>>	>>>	>>>	>>>	>>>										
Strategy				>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>			
Policies				>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>			
Narrative									>>>	>>>	>>>	>>>	>>>	>>>	>>>	>>>			
Documents																			
Draft																X			
Final																			X

STATUS OF SENATE BILL 1038

I. Background: SB 1038 was enacted at 1989 Legislative Session in response to concerns over the impacts of the Exxon Valdez spill. In mirrors similar legislation passed in the State of Washington. It requires DEQ to develop rules that require ships over 300 gross tons that transport bulk oil to have evidence of financial assurance in the amount of $1 million or $150/gross ton, whichever is greater.

II. Current status: A techncial advisory committee was formed with representatives from the various sectors of the affected maritime industry, state agencies and environmental groups. The committee has met twice but has postponed further action pending a decision by the legislature as to whether the new Federal Oil Pollution Act meets and fulfills the intent of SB 1038.

III. Comparison of the Federal Act to SB 1038:

	OIL POLLUTION ACT OF 1990	OREGON SENATE BILL 1038
1. Vessel Size	Any vessel over 300 gross tons	Any vessel over 300 gross tons that transports bulk oil
2. Liability Limits	Not to exceed the greater of $1200/gross or $10 million for tank vessels over 3000 gross tons or $1200/gross ton or $2 million for tank vessels less than 3000 gross tons	$150/gross ton or $1 million, whichever is greater
3. Evidence of Assurance	Certificate issued by the US Coast Guard	Certificate issued by the DEQ
4. Methods of Compliance	Insurance, surety bond guarantee, letter of credit, qualification as a self insurer, or other evidence	insurance, surety bond, qualifications as a self insurer, or other evidence
5. Inspection Authority	US Coast Guard or US Customs	Maritime pilots
6. Enforcement	US Coast Guard	DEQ
7. Implement-ation	New regs being drafted, finalized by Coast Guard 10/91. New limits enforced under existing law 33 CFR 130 for all vessels over 300 gross tons pending new regs	DEQ prepared to draft regulations by 1/91

IV. Concerns:

1. State's ability to collect damages under existing Federal regulations and under new law.
2. Coordination and consistency with Washington State.
3. Will implementation of SB 1038 improve Oregon's existing ability to collect damages and/or insure that Oregon would collect damages first?

State of Oregon

Department of Environmental Quality Memorandum

Date: October 17, 1990

To: Environmental Quality Commission

From: Fred Hansen, Director

Subject: Agenda Item A-2; November 2, 1990 EQC Meeting

Approval of Deputy Director Position

Attached is a copy of the background memorandum and Position Description for the Deputy Director Position that was initially provided to the Commission for the September 20, 1990, work session.

I recommend that the Commission approve the establishment of a Deputy Director position for the Department of Environmental Quality as outlined in the attachments.

FH:l

Attachment

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: September 7, 1990

TO: Environmental Quality Commission

FROM: Fred Hansen

SUBJECT: Agenda Item 2, September 20 EQC Work Session

Deputy Director Position Description

This memo begins the process of appointing a Deputy Director. ORS 468.050 requires that the position be approved by the Environmental Quality Commission, and that a written order be filed with the Secretary of State. DEQ had a Deputy position until 1975. I think that the Commission should now re-establish the position.

Since 1984, the Department staff has grown by 54% and the operating budget has more than doubled. In 1984, having a director and no deputy was sufficient. The Department's growth reflects the broader scope and responsibility given to DEQ by the state legislature and the federal government. These include Superfund, Opportunity to Recycle, Toxics Use Reduction, RCRA, asbestos, woodstoves, underground storage tanks, construction grants, and groundwater. It is taking on more complex financial programs, such as in the Underground Storage Tank program and the Water Quality Revolving Loan fund, and DEQ also has a labor union, which gives the Director new negotiation responsibilities. The Department is working closely with other agencies and with neighboring states to protect the environment. Interagency and interstate activities are demanding more time, and thus require higher levels of coordination than they did before.

The nationwide focus on environmental protection makes it likely that DEQ will continue to be asked to assume more responsibilities. In light of the current growth of the Department, it is prudent to create the position of Deputy Director to help guide and coordinate the agency.

The deputy position will dovetail with the director's. The deputy will have the authority to act on my behalf when I am absent. This person will assist in managing the Department and will coordinate efforts within the Department, as well as with other Federal and State agencies. Division Administrators, as well as staff in the Office of the Director will have direct access to me, but I expect that the Director and Deputy will speak with one voice.

The Deputy will have oversight of the support function of the Office of the Director. In this capacity, the Deputy will ensure that the staff support for the EQC is complete.

This person will also expand proactive scheduling for the Director and the Deputy with the regulated community, federal, state, and local government officials, interest groups, and the public. The Deputy will be in a position to serve as a spokesperson and representative for the agency to the general public, private organizations and local, state and federal governments. Since the Deputy will have the authority to speak for the agency, creating this position will build on our public outreach program.

The Deputy will manage the administrative functions of staff reviews, and serves as final arbitrator on employee grievances. The Deputy will handle performance appraisals for the Hearings Officer, the Management Assistant, and the Clerical Specialist. I will remain responsible for performance appraisals for the Division Administrators, the Public Affairs Manager, the Inter/Intraprogram Coordinator, the Assistant to the Director, and the Deputy.

The Deputy will serve as the Affirmative Action officer. The Deputy will also rule on all conflict of interest matters regarding Department employees.

The Deputy, as assigned by me, will have overall responsibility to assure that Oregon's environmental quality meets or exceeds standards established by the Environmental Quality Commission, the State legislature, or the federal government. The Deputy will share with me the responsibility of making DEQ an exemplary agency by creating an environment that attracts talented and qualified staff.

Creating the deputy position will fill the management gap that has developed as the agency has grown, and continues to grow. It will enhance my position as director by making me available to tackle complex and innovative environmental policy issues, and it will provide for high quality agency administration.

Position descriptions from other agencies are attached for your information. (Not reproduced for this distribution; available on request.)

The funding for the Deputy position comes from the existing resources of the Department.

POSITION: Deputy Director CLASS NO.:

AGENCY: Department of Environmental Quality DATE:

POSITION PURPOSE:

Assist in the administration of the Department of Environmental Quality. Coordinate efforts within the Department, as well as with other Federal and State agencies, to ensure acceptable standards of air, water, and ground quality, both now and in the future.

DIMENSIONS:

Employees:	450 FTE
Annualized Budget:	$39 million

NATURE AND SCOPE:

The Deputy Director will assist, as assigned by the Director, in managing the Department and will assist in coordinating efforts within the Department, as well as with other Federal and State agencies. Division Administrators, as well as staff in the Office of the Director will have direct access to the Director, but it is expected that the Deputy will speak for the Director. This position reports to the director.

The Deputy manages the Office of the Director by coordinating staff efforts and providing information. The Deputy also has direct oversight of the support function of the Office of the Director. The Deputy will handle performance appraisals for the Hearings Officer, the Management Assistant, and the Clerical Specialist. The Director will remain responsible for performance appraisals for the Division Administrators, the Public Affairs Manager, the Inter/Intraprogram Coordinator, the Assistant to the Director, and the Deputy.

The Deputy, as assigned by the Director, ensures that the divisions work in concert with one another. The Deputy manages the day-to-day operations and administration of the Department, and serves as final arbitrator on employee grievances. The Deputy will serve as the Affirmative Action officer. The Deputy will also rule on all conflict of interest matters regarding Department employees.

In the absence of the Director, the Deputy assumes the authority and acts in the Director's behalf. The Deputy is a spokesperson and representative for the agency with the general public, private organizations and local, state and federal government entities. The Deputy shares with the Director the responsibility to assure that Oregon's environmental quality meets or exceeds standards

established by the Environmental Quality Commission, the State legislature, or the federal government.

Staff reporting to the Director and the Deputy Director are:

DIVISION ADMINISTRATORS

Air Quality Division Administrator: Directs a specialized staff in planning and implementing a program to maintain and enhance air quality. Involved is the enforcement of state and federal air quality standards; and regulation of industrial air contaminant sources through approval of plans and specifications and issuance of permits. this Division also develops and implements noise standards; conducts vehicle emission tests; monitor field burning programs and conducts or contracts for research in air pollution problems.

Hazardous and solid Waste Division Administrator: Directs a specialized staff regulating solid waste and hazardous waste disposal. Division responsibilities include the granting of permits to establish and operate solid waste disposal sites; granting permits to the generators of hazardous wastes, oversees the disposal planning including recycling; and operation of an information clearinghouse to promote recovery and reuse of materials; remedial action (Superfund) and the underground storage tank program.

Water Quality Division Administrator: Directs a specialized staff in planning and implementing a program to maintain and improve water quality. Activities include administering a sewage treatment plant construction grant and loan program; enforcing state and federal water quality standards; regulation of contaminant sources through issuance of operating permits for point sources and approval of plans for reduction of pollutants from diffuse sources; regulation of on-site sewage disposal and development and implementing a program to protect underground water supplies.

Regional Operations Division Administrator: Directs five regional and three branch offices in carrying out agency regulations. regional staff assist in plan reviews; draft operating permits; conduct compliance inspections; respond to complaints; conduct administrative prosecution of violators, recommend civil penalties to the Director; and respond to emergency spills of chemical and petroleum products.

Laboratories and Applied Research Division Administrator: Directs specialized laboratory and technical staff in assisting and supporting the Department's Divisions. The Laboratory maintains a statewide air and water quality monitoring network; organic and inorganic laboratory and quality assurance.

Management Services Division Administrator: Directs staff in providing central management services for the agency in accounting, budgeting, personnel, data processing, word

processing, purchasing, property control, intergovernmental coordination and the pollution bond fund/tax credit program.

OFFICE OF THE DIRECTOR

Assistant to the Director: Represents the Department/Director to the Legislature, State and Federal agencies, DEQ staff, special interest groups and the public. Responsible for policy development and implementation and in securing legislative support for Department budget and legislative proposals.

Public Affairs Manager: Directs and manages the Department's Public Affairs Program, including design and implementation of public information and education programs, involving a variety of extremely sensitive areas of public concern. Acts as the official Department spokesperson.

Hearings Officer: Hears testimony on technically and legally complex matters in appeals from administrative sections of the agency; develops findings and proposed orders for the Commission (in this role acting independently from the Director). Conducts some public hearings for adoption of administrative rules or for permits of large public interest.

Inter/Intraprogram Coordinator: Serves as principal assistant to the Director y providing coordinated interprogram planning and coordination, rules and policy formation and technical environmental expertise and assessment. This position serves as a focal point in the agency for a coordinated approach to addressing environmental problems which pose serious environmental and health hazards and to coordinate special projects and studies among the Department's Divisions.

Management Assistant to the Director: Provides administrative support to the Director.

Clerical Specialist: Provides clerical support to the Office of the Director and support to the Environmental Quality Commission.

ACCOUNTABILITIES:

1. As principal line officer to the Director, assure the carrying out of state policy, subject to statutory authority and to policy direction by the Director, by providing administrative leadership to the Department.

2. Manage the day-to-day operations and administration of the Department.

3. Fulfill the responsibilities of the Director when the Director is absent.

4. Ensure that the agency, as designated by the Director, functions well by coordinating and motivating a qualified staff and by resolving disputes.

5. Represent the Department and the Director by participating in or coordinating interagency committees and task forces.

6. Manage the support staff in the Office of the Director

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: October 26, 1990

TO: EQC Commission Members

FROM: Fred Hansen, Director

SUBJECT: Tax Credit Review Report for November 2 EQC Meeting

At the September 21 EQC meeting, the Commission provided the Department further direction in determining the percent allocable to pollution control of farm tractors. The Department was asked to develop a procedure, within statutory and administrative rule guidelines, which would better identify and define the portion of a tractor that is used for alternative methods to open field burning. This need is premised on the Commission's view that, as an essential general farm implement, only the portion of a tractor utilized as an alternative method should be certified for tax relief.

With assistance from the Department of Agriculture and OSU Agriculture Extension Service, Department staff has developed a methodology which uses a standard average annual operating hours for a farm tractor. This standard of 450 hours was determined based on information from the Extension Service. Using a calculation, the estimated annual hours of operation is determined for each implement used with the tractor as an alternative field sanitation practice. (A table is provided which states the average acres/hour use for various implements using tractors of different horsepower, identified as attachment A in this report.) The total annual use hours for each implement are summed and divided by the standard average annual total of 450 hours. This provides the percent of the tractor that is allocable to pollution control.

It is the Department's position that the new methodology accomplishes the Commission's objective to better document and certify the portion of a tractor that is actually used as an alternative method to open field burning. As a general farm implement, it is reasonable to expect occasional use of tractor to extend beyond the narrowly defined uses as alternative methods, regardless of the purpose for the investment. This approach provides greater accountability from a state budgetary perspective, and provides the farmer a more reasonable basis for obtaining maximum utilization from an investment.

Other changes have been made to the application procedure to facilitate the applicant in completing the application, and to provide the Commission with sufficient information on which to

base certification decisions (see attached application). The application has been tailored specifically for facilities used as alternative methods, which should provide greater ease for the applicant. Additional information is requested so that a description is provided of the applicant's overall plan to reduce open field burning, and to state the relationship of the facility to the plan. This information will also be included in staff review reports.

These new procedures have been applied to one of the eight tractor applications that were deferred at the August Commission meeting. The staff review for this report is attached for Commission action November 2. The remaining seven applications are scheduled for the December meeting.

In applying the new methodology to TC-3262, the percent allocable is 92%. The Department is recommending this percentage be certified by the Commission. In this situation, the applicant has stated that the tractor is solely used for alternative method application. Since the annual use does not constitute total maximization based on the standard annual use, the remaining 8% may be used for purposes unrelated to alternative method practices.

The Department of Agriculture does not concur with the Department's recommendation on TC-3262. When the investment in a tractor is solely for alternative method utilization, the Department of Agriculture believes a credit of 100% is appropriate regardless of the number of hours the tractor is used. In DEQ's view, this is counter to the Commission's intent to better justify the actual use of a tractor because of its broad application in general farming practices. The Department will be prepared to discuss this issue at the November 2 meeting.

TABLE A
Average Machinery Capacity by Tractor Size
(in acres/hour)

75 Horsepower Tractor		120 Horsepower Tractor		190 Horsepower Tractor		260 Horsepower Tractor	
Square Bales	4	Square Bales	4	Square Bales	4		
Stack Loader	3	Stack Loader	3	Stack Loader	3		
Flail Chop	5	Flail Chop	6	Flail Chop	7		
Harrow	7	Harrow	7	Harrow	7		
Propane Burn	10	Propane Burn	10	Propane Burn	10		
Fluff	7	Disc or Plow	6	Disc or Plow	7	Disc or Plow	8
Lely Thatcher	8	Flail & Loaf	5	Flail & Loaf	5		
		Round Bales	4				

Application No. TC-3262

State of Oregon
Department of Agriculture

TAX RELIEF APPLICATION REVIEW REPORT

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1. Applicant

Michael W. Kirk, Secretary
Kirk Century Farms, Inc.
33214 Seefeld Drive
Halsey, Oregon 97348

The applicant owns and operates a grass seed farm operation in Halsey, Oregon.

Application was made for tax credit for air pollution control equipment.

2. Description of Claimed Facility

The equipment described in this application is a used John Deere 2950 tractor with a John Deere 260 loader, located at 33214 Seefeld Drive, Halsey, Oregon. The equipment is owned by the applicant.

Claimed equipment cost: $32,200
(Accountant's Certification was provided.)

3. Description of farm operation plan to reduce open field burning.

The applicant farms approximately 800 acres of perennial grass seed varieties and 400 acres of annual ryegrass. The purchased equipment enables the applicant to treat the perennial fields by baling off the straw and flail chopping the remaining residue, enhancing its decomposition in the fields. Each year some fields are thatched to provide aeration and plant stimulation. The annuals are managed by baling off the straw, plowing under the stubble and preparing the ground for annual re-planting.

The applicant states that previous to the purchase of this tractor and the equipment certified in tax credit 3149, grass seed field sanitation and straw removal was accomplished by open field burning harvested fields. This was accomplished by registering 1200 acres annually, burning approximately 800 acres per year on a rotation to accomodate all fields.

4. Procedural Requirements

The equipment is governed by ORS 468.150 through 468.190, and by OAR Chapter 340, Division 16. The equipment has met all statutory deadlines in that:

Purchase of the equipment was substantially completed in September, 1989, and the application for final certification was found to be complete on October 23, 1990, within two years of substantial purchase of the equipment.

5. Evaluation of Application

a. The equipment is eligible because the principal purpose of the facility is to reduce a substantial quantity of air pollution.

This reduction is accomplished by reduction of air contaminants, defined in ORS 468.275; by reducing the maximum acreage to be open burned in the Willamette Valley as required in OAR 340-26-013; and, the facility's qualification as a "pollution control facility", defined in OAR 340-16-025(2)(f)(A): "Equipment, facilities, and land for gathering, densifying, processing, handling, storing, transporting and incorporating grass straw or straw based products which will result in reduction of open field burning."

b. Eligible Cost Findings

In determining the percent of the pollution control equipment cost allocable to pollution control, the following factors from ORS 468.190 have been considered and analyzed as indicated:

1. The extent to which the equipment is used to recover and convert waste products into a salable or usable commodity.

The equipment promotes the conversion of a waste product (straw) into a salable commodity by providing power to a previously certified round baler and other equipment used to collect and package straw for marketing and preparing the ground for the following growing season.

2. The estimated annual percent return on the investment in the equipment.

There is no annual percent return on the investment as applicant claims a negative average annual cash flow because annual operating costs exceed gross annual income.

3. The alternative methods, equipment and costs for achieving the same pollution control objective.

The method chosen is an accepted method for reduction of air pollution. The method is one of the least costly, most effective methods of reducing air pollution.

4. Any related savings or increase in costs which occur or may occur as a result of the purchase of the equipment.

   There is an increase in operating costs to annually maintain and operate the equipment. These costs were considered in the return on investment calculation.

5. Any other factors which are relevant in establishing the portion of the actual cost of the equipment properly allocable to the prevention, control or reduction of air pollution.

   The established average annual operating hours for tractors is set at 450 hours. To obtain a total percent allocable, the annual operating hours per implement used in reducing acreage open field burned is as follows:

Implement	Acres Worked	Machinery Capacity	annual operating hours
Round baler	1,120	4	280
Flail chopper	125	5	25
Stack loader	150	3	50
Plow	120	6	20
Harrow	140	7	20
Thatcher	160	8	20
Total annual operating hours			415

   The total annual operating hours of 415 divided by the average annual operating hours of 450 produces a percent allocable of 92%.

   The Department of Agriculture recommends that 100% of the actual cost of the tractor be allocated to pollution control because there is no other identified use and 415 hours represents total use of the equipment by the applicant. The applicant states that the tractor was purchased by the farm to be used solely for the removal of straw from fields following grass seed harvest and the subsequent plowing of straw into the soil profile to avoid field burning and the accompanying air pollution.

The actual cost of the equipment properly allocable to pollution control as determined by using these factors is 92%.

6. Summation

a. The equipment was purchased in accordance with all regulatory deadlines.

b. The equipment is eligible for final tax credit certification in that the principal purpose of the facility is to reduce a substantial quantity of air pollution and accomplishes this purpose by the reduction of air contaminants, as defined in ORS 468.275.

c. The equipment complies with DEQ statutes and rules.

d. The portion of the equipment that is properly allocable to pollution control is 92%.

7. Director's Recommendation

Based upon these findings, it is recommended that a Pollution Control Facility Certificate bearing the cost of $32,200, with 92% allocated to pollution control, be issued for the equipment claimed in Tax Credit Application Number TC-3262.

Jim Britton, Manager
Smoke Management Program
Natural Resources Division
Oregon Department of Agriculture
(503) 378-6792

JB:bmTC3262
October 25, 1990

DEPARTMENT OF ENVIRONMENTAL QUALITY
MANAGEMENT SERVICES DIVISION
811 SW Sixth Avenue
Portland, Oregon 97204

For DEQ Use Only

Appl. No. _____
Date Rec'd. _____
Fee Paid _____
Date Determined Complete _____
Air Quality Facilities _____

APPLICATION FOR CERTIFICATION OF A POLLUTION CONTROL FACILITY FOR TAX RELIEF PURSUANT TO ORS 468.155 ET. SEQ.

APPLICATION FOR APPROVED ALTERNATIVE METHODS FOR FIELD SANITATION AND STRAW UTILIZATION AND DISPOSAL

SECTION I. - IDENTIFICATION OF APPLICANT

(1) Name of Applicant:
(If corporation, exact name as specified in charter; if partnership or joint venture the names of all partners or principals):

Name: _____ Names of general partners or principals: –
Address: _____ _____
City, State, Zip Code: _____
_____ _____

(2) Status of Applicant:

__ Lessee __ Owner __ Individual __ Partnership __ Corporation __ Non-profit __ Co-op

(3) Person Authorized to Receive Certification:

Name: _____ Title: _____
Address: _____ Phone: _____
City, State, Zip Code: _____

(4) Person to Contact for Additional Details If Different From (3):

Name: _____ Title: _____
Address: _____ Phone: _____
City, State, Zip Code: _____

(5) Location of Claimed Facility:

Address: _____ City: _____
_____ County: _____

(6) Access Directions:
(Attach map if appropriate)

_____
_____

(7) Applicant's IRS Employer Identification Number: _____

(8) Applicant's Tax Year: Beginning date: _____ Ending date: _____

(9) Provide the Standard Industrial Classification (SIC) for your business. _____

DEPARTMENT OF ENVIRONMENTAL QUALITY
APPLICATION FOR CERTIFICATION OF A POLLUTION CONTROL FACILITY
FOR TAX RELIEF PURSUANT TO ORS 468.155 ET. SEQ.

SECTION II. - DESCRIPTION OF FARM OPERATION

(1) Provide information for the following:

a. Number of acres under grass-seed cultivation: Perennial _____ Annual _____

b. Number of acres registered for open burning for past 3 years:

Year 1 _____ Acres _____; Year 2 _____ Acres _____; Year 3 _____ Acres _____

c. Number of acres open field burned for past 3 years:

Year 1 _____ Acres _____; Year 2 _____ Acres _____; Year 3 _____ Acres _____

d. Number of acres propaned in past three years:

Year 1 _____; Year 2 _____; Year 3 _____

e. How has the straw been disposed of in the past three years. (Identify disposal method and tons)

Year 1 _____

Year 2 _____

Year 3 _____

f. Identify existing facilities/equipment used as alternative methods to field burning:

_____; _____; _____; _____

_____; _____; _____; _____

_____; _____; _____; _____

How many acres have been removed from field burning as a result of the above existing equipment? _____ Acres

(2) Describe in detail, the field sanitation and straw removal operations before the use of the facility subject to this application. Using the information above, identify the use of existing equipment on specific acreage as an alternative method to open burning.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(attach additional sheets if necessary)

III. - DESCRIPTION OF CLAIMED FACILITY

(1) Provide a technical description of the facility claimed for certification and describe its function as an alternative method to field burning for field sanitation, straw utilization and disposal.

(2) Why is this facility necessary to accomplish the stated alternative method to field burning for field sanitation, straw utilization and disposal? (Provide quantitative data).

(3) To be eligible for tax credit certification, a facility must meet a "principal" or "sole" purpose test according to ORS 468.155(1) and OAR 340-16-025(1).

(a) Is the facility's only or sole purpose to provide or apply an approved alternative method to open field burning? Yes ___ No ___ If no, explain other purposes:

(b) Is the facility's principal or primary purpose to comply with DEQ's requirement to reduce the amount of acreage that is open field burned? Yes ___ No ___

SECTION IV. - SIGNIFICANT DATES AND INFORMATION

(1) Does claimed facility replace an existing facility that has been certified as a pollution control facility? _____ Yes _____ No

(2) Identify the starting date of on-going construction of the claimed facility, or purchase date of equipment. _____

(3) Identify the date claimed facility was completed or placed into operation. _____

(4) Identify the useful life of the claimed facility. _____

(5) Has the claimed facility previously been certified by DEQ or the Department of Energy for tax credit? _____ Yes _____ No

SECTION V. - ALLOCATION OF COSTS

(This section must be completed if the claimed facility provides any gross annual income).

(1) Provide the following information regarding costs associated with the claimed facility. Fill out tables as designated.

a. Actual cost of the claimed facility. $_____

b. Salvage value of any facility removed from service as a result of the claimed facility. $_____

c. Calculation of annual cash flows:

YEAR	GROSS ANNUAL INCOME*	ANNUAL OPERATING EXPENSES*	ANNUAL CASH FLOW
1.			
2.			
3.			
4.			
5.			
TOTALS			

d. Average annual cash flow: $_____

Calculate by using the following formula:

$$\frac{\text{Total of Annual Cash Flows}}{5} = \text{Average Annual Cash Flow}$$

SECTION V. - ALLOCATION OF COSTS (continued)

e. Useful life of the claimed facility: _____ years
(Section IV (4))

f. Return on investment factor: $_____
Calculate by using the following formula:

$$\frac{\text{Cost of Facility}}{\text{Average Annual Cash Flow}} = \text{Return on Investment Factor}$$

g. Annual percent return on investment (ROI): _____ %
(Use Table 1, OAR 340-16-030)

h. Reference annual percent return on investment (RROI): _____ %
(Use Table 2, OAR 340-16-030)

i. Portion of actual costs properly allocable to pollution control: _____ %

Calculate by using the following formula:

$$\frac{\text{RROI} - \text{ROI}}{\text{RROI}} \times 100\% = \text{Percent Allocable}$$

* Attach calculations for each of the first five years.

(2) What other methods or facilities were considered for achieving the same objective?
(Other alternative methods to field burning or other types of equipment)

_____

_____

_____

(3) Identify other factors relevant in establishing the portion of the actual cost of the facility allocable to pollution control?

_____

_____

_____

(4) Percent of claimed facility cost allocable to pollution control? _____ %
Explain how percent allocable was determined.
(Please use the calculation formula provided in Section VI for claimed tractors)

_____

_____

_____

_____

SECTION VI. - ALLOCATION OF TRACTOR COST

The percentage of a tractor allocable to pollution control is calculated by dividing the estimated annual average operating hours total by an established average annual operating hours:

PERCENT ALLOCABLE = ESTIMATED ANNUAL OPERATING HOURS ÷ AVERAGE ANNUAL OPERATING HOURS

Step 1: Determine annual operating hours for each implement used with the tractor as an alternative method to field burning. Table A provides the average acre/hours of operation for implements powered by various sized tractors. The averages were provided by the OSU Extension Service. The established average annual operating hours for tractors is set at 450 hours. To obtain a total percent allocable, the annual number of operating hours per implement must be determined as follows:

	Example	
Implement: _____	Implement:	Square Baler
a. Acres per hour from Table A: _____	Acres per hour from Table A:	4
b. Number of acres worked: _____	Number of acres worked:	400
c. b ÷ a = annual operating hours: _____	400 ÷ 4 = annual operating hrs.	100

Repeat this calculation for each implement powered by the tractor.

Step 2: Compute total actual hours of operation. Add the annual operating hour totals calculated in Step 1 for each of the implements powered by the tractor.

Example: (using a 120 hp. tractor)	Square Baler	-	100 hours	(400 acres at 4 hr/acre)
	Stack Loader	-	100 hours	(400 acres at 4 hr/acre)
	Flail Chop	-	67 hours	(400 acres at 6 hr/acre)
			267 Total annual operating hours	

Step 3: Determination of percent allocable. The percent allocable is calculated by the following formula:

TOTAL ANNUAL OPERATING HOURS ÷ AVERAGE ANNUAL OPERATING HOURS = PERCENT ALLOCABLE

Example: 267 ÷ 450 = 59%

Step 4: PERCENT ALLOCABLE x TRACTOR COST = DOLLARS ALLOCABLE TO POLLUTION CONTROL

(Please attach additional worksheets)

TABLE A
Average Machinery Capacity by Tractor Size
(in acres/hour)

75 Horsepower Tractor		120 Horsepower Tractor		190 Horsepower Tractor		260 Horsepower Tractor	
Square Bales	4	Square Bales	4	Square Bales	4		
Stack Loader	3	Stack Loader	3	Stack Loader	3		
Flail Chop	5	Flail Chop	6	Flail Chop	7		
Harrow	7	Harrow	7	Harrow	7		
Propane Burn	10	Propane Burn	10	Propane Burn	10		
Fluff	7	Disc or Plow	6	Disc or Plow	7	Disc or Plow	8
Lely Thatcher	8	Flail & Loaf	5	Flail & Loaf	5		
		Round Bales	4				

SECTION VII. - REQUIRED EXHIBITS

Attach the following exhibits to the application:

(1) As **EXHIBIT A:** attach a site map for storage sheds which shows the facility location in relation to streets, roads and other structures.

(2) As **EXHIBIT B:** attach a listing of the land, material, machinery, and equipment incorporated into the claimed facility together with the associated cost.

(3) As **EXHIBIT C:** attach a statement from an independent public accountant or certified public accountant which gives a breakdown of the actual cost of the claimed facility and certifies that the total cost indicated is a true and correct representation of the actual cost of the facility. Provide reference to the listing of costs in Exhibit B.

NOTE: In cases where the total actual cost of the claimed facility is less than $20,000 and where the cost can be completely and thoroughly documented by copies of invoices, cancelled checks, etc., the Department of Environmental Quality may accept copies of such documentation in lieu of the accountant's certification.

SECTION VIII. - SUBMITTAL INSTRUCTIONS

(1) Each item on the application must be completed. Failure to complete all sections will delay processing time and may constitute a basis for denial of the certification.

(2) Include required fees with submittal.

(3) Submit <u>two</u> copies of application and exhibits to:

Management Services Division
Department of Environmental Quality
811 SW Sixth Avenue
Portland, OR 97204

SECTION IX. - APPLICATION SIGNATURE

I hereby certify that I have completed this application to the best of my ability, and that the information provided herein and in the attached exhibits is true and correct to the best of my knowledge, and that the facility described in this application was erected, constructed, or installed and will be operated to a substantial extent for the purpose of preventing, controlling, or reducing air, noise or water pollution or solid waste, hazardous wastes or used oil.

Signature: _____

Title: _____

Date: _____

NEIL GOLDSCHMIDT
GOVERNOR

Environmental Quality Commission

811 SW SIXTH AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

REQUEST FOR EQC ACTION

Meeting Date: November 2, 1990
Agenda Item: C
Division: Environmental Cleanup
Section: Site Assessment

SUBJECT:

Authorization for Rulemaking Hearing: Ranking Rules for Inventory of Hazardous Substances Sites

PURPOSE:

The proposed rules establish procedures for ranking facilities on the Inventory of hazardous substances sites based on the short- and long-term threats they pose to public health and the environment.

ACTION REQUESTED:

__ Work Session Discussion
- __ General Program Background
- __ Potential Strategy, Policy, or Rules
- __ Agenda Item __ for Current Meeting
- __ Other: (specify)

_X_ Authorize Rulemaking Hearing
__ Adopt Rules

Proposed Rules	Attachment A
Rulemaking Statements	Attachment B
Fiscal and Economic Impact Statement	Attachment B
Public Notice	Attachment C

__ Issue a Contested Case Order
__ Approve a Stipulated Order
__ Enter an Order

Proposed Order	Attachment ___

__ Approve Department Recommendation

__	Variance Request	Attachment ___
__	Exception to Rule	Attachment ___
__	Informational Report	Attachment ___
__	Other: (specify)	Attachment ___

DESCRIPTION OF REQUESTED ACTION:

The Department of Environmental Quality (Department) is requesting authorization to receive comment on the proposed Inventory ranking rules, OAR 340-122-450 and Appendix A, and amendments to the related Inventory listing rule at OAR 340-122-440. These rules will become part of the Department's environmental cleanup rules.

As part of its environmental cleanup program, the Department maintains an Inventory of facilities with confirmed releases of hazardous substances which require further investigation or cleanup to protect public health, safety, welfare, and the environment. Oregon's Environmental Cleanup Law, ORS 465.410, requires the Environmental Quality Commission (Commission, EQC) to develop a procedure for ranking facilities on the Inventory based on the long- and short-term threats they pose to public health and the environment. The proposed Inventory ranking rules will establish this procedure.

(a) The Inventory ranking rule, proposed OAR 340-122-450, establishes a process for scoring facilities using the Inventory Ranking Procedure (IRP), proposed Appendix A of the rule, and for publishing those scores on the Inventory.

The IRP establishes criteria for scoring facilities based on relative threats associated with actual or potential releases of hazardous substances from a facility. The IRP also serves as a users' manual with forms and instructions for assigning values to the factors incorporated in the scoring model and calculating facility scores.

(b) Proposed amendments to the Inventory listing rule, OAR 340-122-440, establish a procedure for notifying owners and operators and providing opportunity for them to comment on their facilities' scores as sites are added to the Inventory.

AUTHORITY/NEED FOR ACTION:

_X_ Required by Statute: ORS 465.410 Attachment ___
Enactment Date: June 28, 1989
__ Statutory Authority: ORS 465.000(1);465.410; Attachment ___
ORS 468.020 Attachment ___
__ Pursuant to Federal Law/Rule: _____ Attachment ___

__ Other: Attachment ___

__ Time Constraints: (explain)

ORS 465.410 directed the Commission to adopt a procedure for ranking facilities on the Inventory by March 28, 1990. The Department was unable to develop a ranking procedure that met its program needs within that timeframe.

DEVELOPMENTAL BACKGROUND:

__ Advisory Committee Report/Recommendation Attachment ___
__ Hearing Officer's Report/Recommendations Attachment ___
__ Response to Testimony/Comments Attachment ___
_X_ Prior EQC Agenda Items: (list)

Confirmed Release and Inventory: Proposed Adoption of Rule Amendments to Implement HB 3235, Agenda Item T, June 29, 1990 EQC meeting.

Discussion of proposed Inventory ranking rules, Special Work Session, Item 1, October 11, 1990, EQC meeting

Attachment ___
__ Other Related Reports/Rules/Statutes:
Attachment ___
_X_ Supplemental Background Information Attachment _D_

Environmental Cleanup Advisory Committee Members

REGULATED/AFFECTED COMMUNITY CONSTRAINTS/CONSIDERATIONS:

1. The proposed Inventory ranking rule and amendments to the Inventory listing rule do not impose new requirements or liabilities on the regulated community. However, a facility's ranking on the Inventory may affect public perception of threats or the timing of cleanup by the Department or other persons. To this extent the proposed

rules may have fiscal and economic impacts on owners and operators of property contaminated by hazardous substances, as well as neighboring property, and on persons liable for the investigation and cleanup of such property. These persons include public and private entities and small and large businesses. See Fiscal and Economic Impact Statement, Attachment B.

2. The Environmental Cleanup Advisory Committee (Committee), appointed by the Director, has assisted the Department in developing the proposed rules. The Committee consists of 19 members representing citizens, local governments, environmental organizations, and industry. Attachment D identifies the members. The Committee has recommended the Department request the Commission to authorize hearing on the Inventory ranking rules as proposed in Attachment A of this report.

PROGRAM CONSIDERATIONS:

1. The Department will use the Inventory ranking information to help determine priorities for further action at facilities placed on the Inventory. Other considerations include availability of funds, availability of Department staff, the potential cost of cleanup, cooperation of the responsible parties, and public concern about contaminated facilities.

   The Inventory will include contaminated facilities addressed by several programs within the Department (e.g., hazardous waste, solid waste, ground water, underground tanks, and environmental cleanup programs). Each of these programs considers threats to public health and the environment in setting individual program priorities. The proposed Inventory ranking process will enable the Department and the public to compare relative threats among Inventory sites Department-wide in establishing priorities for remedial activities.

2. Both the Department and responsible parties typically make key "proceed/don't proceed" decisions at two stages in the cleanup process -- the conclusion of the pre-remedial investigations and the conclusion of the more comprehensive remedial investigation and feasibility studies (RI/FSs). The Department will use the IRP scores to help prioritize sites for further action at the conclusion of the pre-remedial studies only (i.e., the preliminary assessment or its equivalent). The IRP has limited use beyond this stage. The model was designed specifically to assist in comparing

sites following completion of the pre-remedial site assessments and incorporates only the limited data normally developed during these assessments.

Given this limitation, the Department does not intend to use the model to help prioritize sites for cleanup after completion of the RI/FS, but instead will use the extensive risk and other information developed during these remedial studies. As the need arises, the Department will consider adopting or developing a separate ranking system to help prioritize sites for cleanup after the RI/FS has been completed. See further discussion, Preamble, Attachment A.

3. The Department will normally score facilities once, when they are added to the Inventory. In response to comments from some Environmental Cleanup Advisory Committee members, the Department considered rescoring facilities at designated points as they move through the remedial process (e.g., annually, after the remedial investigation, or after partial removal or remedial action) to incorporate new information or changed conditions.

   Rescoring facilities could provide the public with a more current comparison of relative threats among facilities at similar stages in the process. However, as discussed in 2. above, the Department will not use IRP scores to prioritize activities after the remedial investigation and feasibility studies are initiated.

   The Department determined that the costs of routinely rescoring sites significantly outweighed the limited benefits of additional information for the public. Rather than rescoring facilities based on the limited data incorporated in the model, the Department will provide key risk information in the narrative portions of the Inventory and update it quarterly as new information is developed. The Advisory Committee supported this approach. See further discussion in Preamble, Attachment A.

4. The IRP is a modification of the Washington Ranking Method (WARM) used by the Washington Department of Ecology in a similar ranking process. The Department reviewed several existing hazard ranking methods, including simple screening models and the Environmental Protection Agency's much more complex Hazard Ranking System (HRS II), before selecting the WARM to modify for Oregon's program. The considerations involved in adopting this approach are discussed in the Preamble, Appendix A.

ALTERNATIVES CONSIDERED BY THE DEPARTMENT:

1. Submit the Inventory ranking rules for public comment as drafted.

2. Submit an alternative ranking procedure (e.g., a simplified screening model or more complex model such as the proposed federal Hazard Ranking Model (HRS II)).

3. Include in the Inventory ranking rules procedures for rescoring facilities at designated points in the remedial process (e.g., annually, after the remedial investigation, or after partial cleanup).

DEPARTMENT RECOMMENDATION FOR ACTION, WITH RATIONALE:

The Department recommends the Commission authorize hearing on the Inventory ranking rules as drafted -- Alternative 1.

The proposed Inventory ranking rules satisfy the requirements of ORS 465.410. The rules establish a consistent, reproducible, and defensible system for comparing short- and long-term risks facilities pose to public health and the environment. The procedure provides the information the Department needs to help prioritize sites for further action at the conclusion of pre-remedial site assessments. The comparison of relative threats will also inform the public.

In addition to the IRP scores the Department will include a narrative description of threats, a description of substances released, and the status of remedial action on the Inventory, and will update the information quarterly as remedial activities progress. The Department believes this narrative will provide more useful risk information to the public as the remedial process progresses than would a revised IRP score based on the limited data incorporated in the model. In addition, facilities on the Inventory will be organized into categories according to their stage in the remedial process; movement from one category to the next will inform the public of progress toward cleanup.

The Department rejected Alternative 2, recommendation of a different ranking approach. The Department evaluated several hazard ranking systems to identify methods that would meet the ranking objectives for Oregon. The proposed IRP incorporates procedures that have worked in comparable listing and ranking processes. Of the models reviewed, the IRP approach most appropriately discriminates among sites

based on public health and environmental threats using data normally developed during the preliminary site assessments.

The Department rejected Alternative 3, which would add a requirement for periodic rescoring as remedial activities progress, because of its limited usefulness and potentially high costs. Alternative 3 would update IRP scores to reflect new information or changes in site conditions. However, rescoring would be based on the limited data incorporated in the IRP model. As noted above, Alternative 1 will provide updated information regarding actual risks and progress at sites without the additional rescoring costs.

The Department found that given the costs and policy concerns associated with rescoring, EPA and all but one of several states surveyed rank sites only once in comparable listing processes. (The one exception, Michigan, is required to rescore sites every year, but because of the administrative burden, uses a very simple screening model that requires only 10 to 15 minutes to score a site. The screening model did not discriminate sufficiently among sites to satisfy the Department's requirements.)

CONSISTENCY WITH STRATEGIC PLAN, AGENCY POLICY, LEGISLATIVE POLICY:

The proposed new rule and amendments to existing rules are required by statute, and are consistent with the Agency's strategic plan and policies to implement Chapter 465.

ISSUES FOR COMMISSION TO RESOLVE:

1. Do the hazard ranking rules proposed provide a workable procedure for ranking sites on the Inventory based on short- and long-term threat to public health and the environment? (See Preamble, Attachment A).

2. Does the proposed Inventory ranking procedure appropriately weight public health and environmental threats in scoring facilities? (See discussion in Preamble, Attachment A).

INTENDED FOLLOWUP ACTIONS:

1. Publish Notice of Intent to Conduct a Public Hearing and Opportunity to Comment in the December 1, 1990 Secretary of State's Bulletin. Mail notice to interested persons.

2. Conduct a public hearing in Portland on December 19; accept public comment through January 2, 1991.

3. Meet with Environmental Cleanup Advisory Committee to discuss public comments.

4. Prepare a hearing officer's report for final rule adoption by the Commission at its March 1991 meeting.

Approved:

Section: Loretta Pickerell

Division: Michael Downs

Director: Fred Hansen

Report Prepared By: Debbie Bailey and Loretta Pickerell

Phone: 229-6811

Date Prepared: October 16, 1990

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October 16, 1990

ATTACHMENT A
Agenda Item C
November 2, 1990
EQC meeting

TABLE OF CONTENTS

PREAMBLE

I. BACKGROUND

This Inventory ranking rule implements provisions of Oregon's Environmental Cleanup Law, ORS Chapter 465, which establishes a program to identify and cleanup sites contaminated by hazardous substances. The pre-remedial portion of the statute, as amended in 1989, provides for:

(1) a program to identify any release or threat of release of a hazardous substance from a facility that may require remedial action (ORS 465.220);
(2) a process for the evaluation and preliminary assessment of releases identified (ORS 465.245);
(3) a process for publishing a statewide list of confirmed releases (ORS 465.215) and an inventory of sites requiring further investigation, removal or remedial action (ORS 465.225); and
(4) a procedure for ranking facilities on the inventory based on the short-term and long-term risks they pose to present and future public health, safety, welfare, or the environment (ORS 465.410).

In June of 1990, the Environmental Quality Commission adopted rules providing the criteria and procedures necessary to conduct site evaluations and preliminary assessments and to list sites on the Confirmed Release List and Inventory as mandated by this statute. OAR 340-122-410 et seq. The Department is now proposing Inventory ranking rules to establish the procedures required to rank facilities on the Inventory. These rules include the proposed Inventory Ranking Rule, OAR 340-122-450; the proposed Inventory Ranking Procedure (IRP), Appendix A of the rules; and related amendments to the Inventory listing rule, OAR 340-122-440.

The Department is proposing to rank facilities on the Inventory using the IRP. The IRP is a scoring system to assess the relative threat associated with actual or potential releases of hazardous substances from a site. An IRP score is determined for a site by evaluating exposure routes or "pathways", such as surface water, air, ground water, and direct contact. The score for each route is obtained by evaluating a set of data elements or "factors" that characterize the potential of the facility to cause harm via that route. The data elements, such as toxicity of the substances at a site, waste quantity, and population, are each assigned a numerical value according to instructions in the model. The numerical values of data elements are then combined within "data categories" or modules, such as source characteristics, migration potential, and targets; the total scores for the data categories are combined to develop a score for the relevant route. Finally, the route scores are combined according to a mathematical equation to produce a human health

score, an environmental score and an overall IRP score for the site. The overall site score is used to rank facilities on the Inventory.

The IRP was designed to be applied uniformly to each site at the conclusion of the pre-remedial site assessment, enabling sites to be evaluated relative to each other with respect to actual or potential threats using the limited data developed during these pre-remedial studies. It was not designed as a quantitative or qualitative risk assessment to measure actual or absolute risk.

II. IMPLEMENTATION OF RANKING RULE

A. Pre-remedial process

The Department will use the IRP to score facilities placed on the Inventory at the conclusion of its pre-remedial site activities. The pre-remedial program is intended to identify those sites that require further investigation or cleanup. Figure 1 of the Preamble diagrams the typical steps in the cleanup process.

During initial site discovery, the first step in the pre-remedial process, sites are evaluated, and suspected releases of hazardous substances are placed in the Department's site discovery database. If at this stage a release is confirmed, a site is also added to the Department's List of Confirmed Releases.

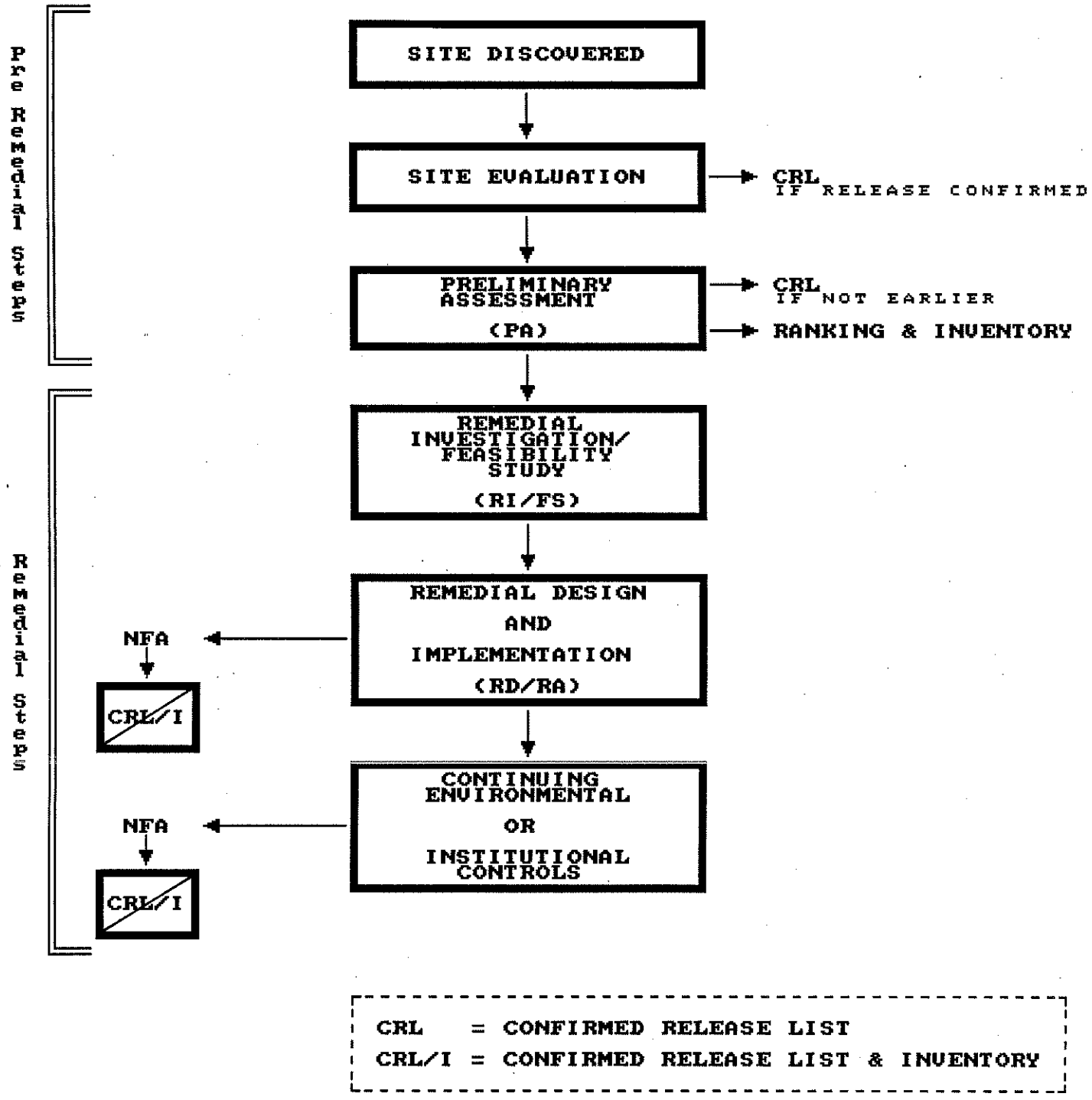
A preliminary site assessment or equivalent is then conducted to develop as complete a picture of the site as possible primarily from existing information (e.g., interviews with owners and operators, facility operations and Department records, maps, site visits). If necessary, a limited number of samples may be collected for chemical analysis to identify the substances present at the site. The purpose of the preliminary assessment is to determine if the site poses a potential threat to public health or the environment and if it poses an immediate threat to people or sensitive environments in the area.

A site is placed on the Inventory if, based on this preliminary assessment, the Department determines the site requires further investigation, removal, remedial action, or continuing environmental or institutional controls to protect public health, safety, welfare, and the environment. Sites are added to the Confirmed Release List at the same time if not listed earlier in the process.

Facilities placed on the Inventory will be scored using IRP to identify the relative risks those sites pose to public health and the environment. The Department will publish the facility scores on the Inventory along with other facility information, including a narrative description of threat, a description of the substances released, and the status of remedial action.

FIGURE 1.

STEPS IN THE CLEANUP PROCESS



Sites are removed from the Inventory when cleanup is completed. Sites requiring continuing environmental and institutional controls to protect public health and the environment must remain on the Inventory.

B. Department use of facility scores

The Department will use the Inventory ranking information to help prioritize facilities for further action at the conclusion of the pre-remedial studies (i.e., the preliminary assessment or equivalent). The IRP has limited usefulness for prioritizing facilities at later stages in the remedial process.

The IRP was designed for scoring facilities at the conclusion of the pre-remedial process and uses only the limited data normally developed during the pre-remedial site assessments. These studies, which are used to screen large numbers of sites to identify the need for further action, are relatively modest in scope and cost compared to the detailed remedial investigation and feasibility studies subsequently performed on sites to characterize the full nature and extent of contamination and projected levels of exposure.

This decision placed certain constraints on the complexity of the IRP. The data required for the IRP is information that, for most sites, is already available or can be collected in a single site visit or with limited sampling. Typically, limited amounts of quantitative data will be available regarding the types, quantities or concentrations of hazardous substances on site, the receptors actually at risk or other factors to measure threats. The IRP also relies on standard references for many data elements in lieu of site specific studies (e.g., populations, sensitive environments, rainfall). In addition, to ensure that sites can be compared among themselves, the model uses data that are available from consistent sources for a wide variety of sites throughout the state. These constraints affected both the data elements selected for the model and the definition of those data elements.

Because of its design limitations, the model cannot accommodate the more extensive risk and other information developed during the detailed remedial investigation and feasibility studies (RI/FS). As a result, although a site can be scored using the model following these remedial studies, the score would be based solely on the limited pre-remedial information incorporated in the model.

Given this limitation, the Department will not use site rankings to prioritize sites for cleanup at the conclusion of the RI/FS. Instead, the Department will use the more extensive information developed during those investigations.

As cleanup resources become more limited, the Department will consider adopting or developing a separate system to help

prioritize sites for cleanup following the RI/FS. The Department of Defense (DOD) has recently developed such a model to help allocate limited remedial action monies among hundreds of DOD facilities. EPA is also considering developing a post-RI/FS model.

C. Rescoring

The Department will normally score facilities once, when they are added to the Inventory. The Department does not plan to rescore facilities as they move through the remedial process (e.g., annually, after the remedial investigation, or after partial removal or remedial action) to incorporate new information or changed conditions. As discussed earlier, the Department will not use IRP scores to prioritize activities at these later stages in the process and found rescoring sites for public information alone too costly and limited in value.

The IRP scores cannot be related to actual risks but are useful for comparing relative threats among sites based on limited pre-remedial data. Rescoring all facilities at the same time (e.g., annually) or at the same stages in the remedial process (e.g., after the RI/FS or partial cleanup) would update the comparison of relative threats among facilities in similar stages. However, the comparison would be based only on the limited pre-remedial data used in the model. In addition, changes in facility scores would not provide a reliable measure of progress at a facility, as some might expect. Scores might well increase during the RI/FS, as new management units or hazardous substances are identified. And even partial cleanups might affect a score only slightly, depending on the management units and substances used to score the facility.

Costs of rescoring facilities would be significant and could reduce the resources available to conduct cleanup activities. The Department currently projects an average of 15 hours to complete and quality assure a scoring package using the IRP. An average of 10 more hours will be required to submit that package to owners and operators, review and respond to comments, and complete administrative tasks. These estimates apply to both the original scoring and the rescoring of a site. Not factored in is the time required to administer the scoring and rescoring, which would hinge on the frequency of any rescoring. Unless the criteria for rescoring sites were clear, resulting disputes over application of those criteria could add significant costs.

The universe of facilities which might require rescoring would include all of the sites on the Inventory where remedial activities were underway (an estimated 65-100 each year). The Environmental Cleanup Division is currently conducting or overseeing approximately 50 such projects each year and expects more as staff are added to oversee voluntary cleanups. Other programs within the Department are also involved in remedial projects, and private parties will continue to conduct remedial

activities on additional facilities without Department involvement.

Given these costs and policy concerns, rather than rescoring facilities based on the limited data used in the IRP, the Department will summarize key risk information in the narrative portions of the Inventory and update it quarterly as new information is developed. In addition, facilities on the Inventory will be organized into categories according to their phase in the remedial process (e.g., pre-RI/FS; RI/FS; remedial design and action; continuing environmental or institutional controls), as described below. Movement from one category to the next will demonstrate progress toward cleanup. This type of procedure has been used successfully by the Minnesota Pollution Control Agency after comparable pre-remedial scoring and listing.

D. Publication of facility rankings on the Inventory

Before publishing a facility score on the Inventory, the Department will notify the owner and operator, if known, and provide an opportunity for comment on the proposed score and supporting documentation. Except for sites added to the Inventory prior to adoption of the ranking rules, the Department will provide this notice and opportunity to comment when sites are added to the Inventory.

The Department will categorize sites on the Inventory according to their current phase in the remedial process. Phase I will include all sites pending initiation of the RI/FS; Phase II, sites where the RI/FS is underway; Phase III, sites where the RI/FS is completed and remedial design, removal, or remedial action are underway; and Phase IV, sites where cleanup has been completed except for continuing operation and maintenance or other environmental or institutional controls needed to protect public health and the environment. Sites will be removed from the Inventory when cleanup is completed. Sites requiring continuing environmental or institutional controls to protect public health and the environment must remain on the Inventory.

Sites in Phases I and II on the Inventory will be organized in order of overall site score. Sites in Phases III and IV will be organized alphabetically, without the IRP scores. Scores will not be used to help prioritize action at these later stages in the remedial process and will not reflect new information or changes in site conditions. As noted above, other risk information will be included on the Inventory.

Sites will be moved from one phase to the next in quarterly updates of the Inventory as remedial activities progress. A narrative description of the status of activities at sites will also appear on the Inventory and describe in more detail the various activities that occur at sites within these major phases.

E. Model Selection

The IRP is a modification of the Washington Ranking Model (WARM) developed by the Washington Department of Ecology for a pre-remedial process similar to Oregon's. The Department reviewed several existing hazard ranking methods before selecting the WARM to adapt for Oregon's program. Oregon's law required a ranking system that considered both short- and long-term risks and public health and environmental threats. The Department also favored a model that could be applied with limited data appropriately developed during the preliminary assessments but incorporated sufficient data elements to adequately discriminate among sites based on relative threat. Of the range of models reviewed, including simple screening models and the much more complex Hazard Ranking System (HRS II) proposed by the Environmental Protection Agency (EPA), the approach in WARM most closely met these objectives.

The much simpler screening models (e.g., the Michigan Site Assessment Model), are usually designed for application prior to completion of pre-remedial site assessments and do not include sufficient data elements to adequately discriminate among sites as required for Oregon. EPA's existing Hazard Ranking System (HRS I) was designed for application based on data developed during the preliminary site assessments, but does not adequately address environmental threats or exposure from direct contact. EPA's proposed HRS II requires substantially more data than would otherwise be developed during a preliminary assessment and significantly more time to score a site.

Although the IRP is modeled after WARM, it includes a number of revisions to incorporate data available for Oregon facilities, to modify the evaluation of toxicity, and to address exposure through direct contact.

F. Relationship to Federal Hazard Ranking System

The federal Hazard Ranking System (HRS) is used to nominate hazardous substances sites with high federal scores for the National Priorities List (NPL). Sites must be on the NPL to qualify for cleanup under the EPA's Superfund program.

The IRP proposed for Oregon is not designed to duplicate the federal HRS model. The IRP will be used to rank all facilities on the State's Inventory, including sites which are or may later be added to the NPL. The Department will use the IRP scores to help prioritize facilities for further action under the state environmental cleanup program.

Scores calculated using the IRP will not be comparable to scores under either version of the federal Hazard Ranking System, the old HRS I or the proposed HRS II. All three hazard ranking models use different data elements and scoring criteria.

III. INVENTORY RANKING PROCEDURE (IRP)

A. Overview of model

The IRP, Appendix A, is essentially a users' manual for scoring sites and includes forms and instructions for assigning values to each of the factors in the model and for calculating route and site scores.

The IRP evaluates the relative threat of a site over six exposure routes:

air-human health
air-environment
surface water-human health
surface water-environment
ground water-human health
direct contact-human health

The first five exposure routes reflect risks to human health and the environment from migration of hazardous substances from a site. The direct contact route reflects risk to human health from direct contact with hazardous substances present on a site.

The IRP uses a structured value analysis approach to scoring sites. This approach assigns values to factors, or data elements, related to or indicative of risk. The basic elements of the IRP within each route are data elements such as source quantity, toxicity, containment, and population. A scale of numerical rating values is provided for each data element and a value is assigned to each data element based on conditions at the site. The data elements within each route are grouped into four data categories, or modules -- source characteristics, migration potential, targets, and release. The data elements within each data category are weighted and assigned a maximum value in the rating scale based on that assigned weight. The data categories are also weighted in calculating the final route score.

The relevant data category scores are combined within each route and normalized to obtain a route score. The scores for the human health air, surface water, ground water and direct contact routes are combined into a human health site score that measures the relative risks a site poses to human health. Similarly, the scores for the environmental air and surface water routes are combined into an environmental site score. Finally, using a separate equation, all six human health and environment route scores are combined into an overall site score that reflects relative risk to human health and the environment.

The overall site score is calculated by adding the maximum score from any of the six routes to the average scores of the other five routes. The human health and environmental scores are calculated similarly using only their respective exposure routes.

Table 1 of the IRP identifies the data elements in each module within each route.

1. Surface Water Pathway

The surface water migration pathway in the IRP evaluates the potential for hazardous substances at a site to migrate from the site, contaminate surface water, and affect both human health and the environment.

The model uses toxicity, containment, and source quantity to evaluate source characteristics in both surface water exposure routes. Toxicity data on adverse effects from ingestion of hazardous substances are used in the human health route. Water quality criteria are used to evaluate toxicity in the environmental route. The same containment and source quantity data are used for each route.

In both the human health and environmental exposure routes the potential for migration is evaluated using four data elements: surface soil permeability; 2-year, 24-hour maximum rainfall event; presence of flood plain; and the terrain slope. Surface water mobility is not evaluated because data on the typical mobility parameters, including persistence, solubility, and bioconcentration factors, are limited and dependent on the form of the compound. In addition, consistent interpretation of the data that are available is difficult. Thus mobility elements, although initially incorporated into the model, were removed.

The data elements used to evaluate the potential impact to human health from a release from a site to surface water include distance to surface water, population served by drinking water intakes, acres irrigated by surface water intakes, and recreational use. The data elements used to evaluate the potential impact to the environment from a release at the site include distance to surface water, distance to the nearest fishery resource, and the distance to the nearest sensitive environment.

2. Air Pathway

The air migration pathway evaluates the potential for hazardous substances at a site to migrate from the site, contaminate the air, and impact human populations and sensitive environments.

Both the human health and environmental exposure routes in this pathway use toxicity, containment, and quantity to evaluate source characteristics. Toxicity data used to evaluate impacts from inhalation of hazardous substances are used in the human health route. Acute inhalation data are used in the environmental route. The same containment and source quantity data are used for both routes.

For both exposure routes the potential for migration is evaluated using gaseous or particulate substance mobility. Other parameters are not evaluated because site-specific data, such as wind speed and direction, are typically not available at the completion of the preliminary assessment.

The data elements used to evaluate the potential impact to human health from a release to air include distance to nearest population, total population within one-half mile, and the predominant non-residential land use to measure the non-resident population. Distance to the closest sensitive environment is used to evaluate the potential impact to the environment.

3. Ground Water Pathway

The ground water route evaluates the potential for hazardous substances at a site to migrate through the ground beneath them and contaminate aquifers. If the hazardous substances reach the aquifer, the substances can potentially be transported through the aquifer and contaminate drinking water wells that draw from that aquifer. If hazardous substances have been released to an aquifer or if the site characteristics make a release likely, the ground water pathway evaluates the impact of releases on the people who draw their drinking water from or who may consume crops irrigated by water drawn from potentially contaminated wells.

The ground water pathway evaluates potential effects on human health. It does not include an environmental exposure route because, in most instances, contamination of ground water is a threat to sensitive environments, as defined in the IRP, only when it reaches surface water or air. The surface water and air routes address threats to the environment from contaminated ground water migrating to those pathways.

As with the surface water and air pathways, the ground water pathway uses toxicity, containment, and source quantity data to evaluate source characteristics. The toxicity data are the same as used to evaluate human health in the surface water pathway -- data on adverse effects from ingestion.

The data elements used to evaluate the potential for migration of hazardous substances from the site through the ground water route include mobility, net annual precipitation, subsurface hydraulic conductivity, and the vertical depth to ground water. The data elements used to evaluate the potential impact to human health from a release from the site to ground water include distance to nearest drinking water well, ground water usage, the population served, and acres irrigated by wells within the section in which the site is located and the adjacent sections.

4. Direct Contact Pathway

The direct contact pathway evaluates the potential for humans and sensitive environments to directly contact hazardous substances, contaminated soil, or contaminated surface water, and for humans to ingest such materials.

Human health exposure through direct contact is managed as a route as in the other pathways. The data elements used to evaluate human exposure from direct contact include toxicity, source quantity, access to the site and targets located on adjacent properties.

Toxicity data used in the human health route address potential adverse effects from soil ingestion and from absorption of a chemical through the skin (systemic effects). The oral toxicity, or ingestion, data are the same as used in the surface water and ground water routes. Bonus points are added to the toxicity score for the presence of chemicals likely to be absorbed through the skin.

The targets for human health exposure include residences and other buildings or facilities indicating that sensitive populations may be present on the site or on adjacent properties (e.g., schools, day care facilities, parks).

Environmental exposure through direct contact is managed differently. Toxicity data to measure the effects of direct contact exposure on sensitive environments, as defined in the IRP, are too limited for use in the model. Examples of these effects would include overall impacts on habitat and dermal contact or uptake by non-human species. Therefore, only one data element is used to address the risk from direct contact to sensitive environments -- the location of a site directly in a sensitive environment. Instead of adding a route, the model simply adds ten bonus points to the overall site score and the environmental score if a site is located in a sensitive environment.

B. Model Development Issues

1. Weighting of data elements, modules, and routes

a. Weighting of data elements and modules

The data elements used to score each route are grouped into four data categories or modules: source characteristics, migration potential, targets, and release. The first module, source characteristics, includes toxicity, containment, and source quantity. The other three modules, migration potential, targets and release, include data to assess exposure potential. Table 1 of the IRP identifies the data elements in each module within each route.

The data elements within each module are assigned a maximum value for scoring purposes. This value is related to the relative importance of that data element in evaluating risk. However, other factors also affect the "weight" or relative importance of each data element, including (1) the equations (including normalization) used to combine the data elements within a module to calculate the module score, (2) the subsequent equations used to combine the module scores for each route score, and (3) the final equations used to combine route scores into the human health, environmental, and overall sites scores. These equations are presented in Table 2 in the IRP.

In developing IRP, the Department assigned weighting to the modules in the following manner:

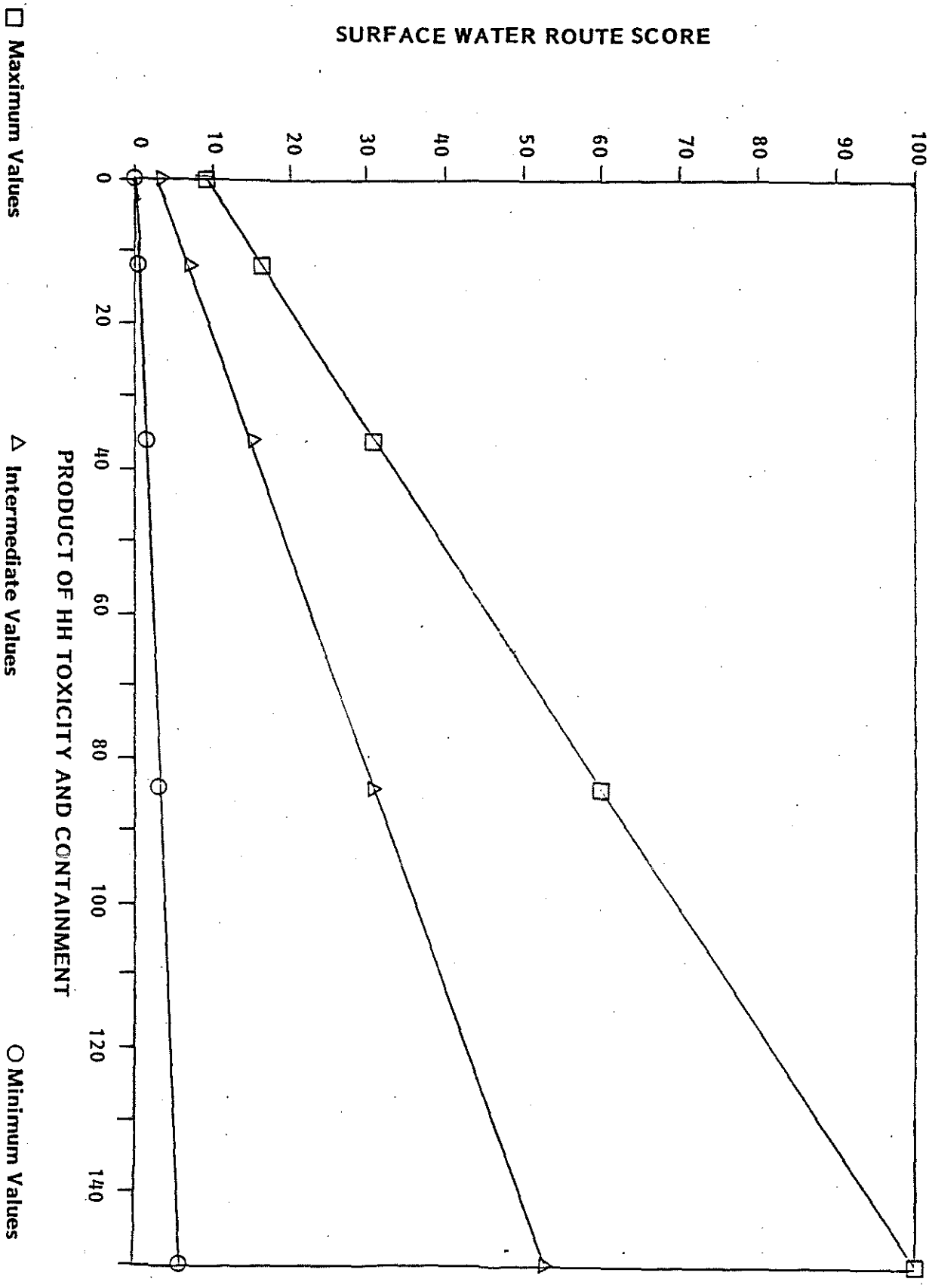
Source Characteristics		50%
Migration Potential	15%----|	
Targets	30%----|--	50%
Release	5%----|	

The Source Characteristics Module is weighted equally with the summation of the Migration Potential, Targets, and Release Modules. This weighting is similar to the weighting of toxicity and exposure potential in quantitative risk assessment. The Migration Potential, Targets, and Release Modules are roughly weighted 15%, 30% and 5% respectively. The exact percentages vary primarily depending on the number of data elements in each module.

The model assigns the greatest weight to the Toxicity data element. Two other data elements, Containment and Population potentially exposed, are assigned less weight than toxicity, but more weight compared to other data elements. Both Toxicity and Containment are given high maximum values, are multiplied together in calculating the module score, and are incorporated into the Source Characteristics Module, the module with the highest weighting. Population is also given a high maximum value and is incorporated into the Targets Module, which is weighted second highest.

The relative importance of the various data elements in each route is most readily explained through a sensitivity analysis of the effects each data element has on route and site scores. Figure 2 of this Preamble provides an example of the sensitivity analysis for the toxicity/containment product in the surface water route. The graph demonstrates the effect on the route score resulting from changes in the toxicity and containment product. The changes are most pronounced when the other data elements are at maximum values (the line represented by boxes). Because they are weighted lower, changes in other data elements affect the route score less dramatically.

FIGURE 2


SURFACE WATER ROUTE SCORE
0
10
20
30
40
50
60
70
80
90
100
PRODUCT OF HH TOXICITY AND CONTAINMENT
0
20
40
60
80
100
120
140
Maximum Values
Intermediate Values
Minimum Values

b. Weighting of route scores

The IRP assigns a maximum value of 100 to four of the six routes: surface water-human health, surface water-environment, air-human health, and ground water-human health. The other two routes receive a maximum value of 50: air-environment, and direct contact-human health. The equation used to combine route scores into overall site scores further determines the weighting given each route in the site score.

The Department considered several equations for combining these route scores into the human health, environmental, and overall site scores. The following general equation was selected as the one which most appropriately described relative risk among sites tested during model development:

Site score = Maximum Route Score + Average of other route scores

This equation weights the route with the maximum score equally with the average of all other routes. This allows sites with a high score in any one route to achieve a higher score than sites with all moderate or low scores, and still allows a site with multiple high route scores to achieve an even higher overall score, reflecting the greater risk posed by that site. The same approach is used to generate separate human health and environmental scores for sites.

c. Weighting of the air-environment and direct contact-human health routes

Of the six routes in the model, the air-environment and direct contact-human health routes have maximum values of 50; the other four have maximum values of 100. These two routes are weighted less than the other four routes based on two considerations.

First, the air-environmental and direct contact-human health routes are the least well defined in the model and the least reliable as indicators of risk. In particular, toxicity data available for both routes was more difficult to identify than for the other routes. Toxicity data for impacts on sensitive environments from exposure through air are not readily available for the air-environment route; acute inhalation toxicity for rats and mice is used as a surrogate. Data on absorption of chemicals through the skin are also limited for the direct contact route. The model uses American Conference of Governmental Industrial Hygienists (ACGIH) designation of chemicals likely to be absorbed via the skin to identify chemicals of concern for dermal contact. Only a small number of contaminants are classified as such. The model also uses ingestion toxicity data for the direct contact route.

Second, two of the modules in both routes (migration potential and targets) each include only one data element. Each of these individual data elements would have more potential for impacting the route score than would equivalent data elements in other routes containing more data elements. The Department reduced the maximum score for both routes to 50 to eliminate the potential for high scores on these individual data elements to disproportionately dominate the scores for the site. If the other route scores are lower than 50, however, it is still possible for the air environmental or direct contact human health routes to dominate the overall site scores as the maximum route score.

d. Weighting of human health and environmental exposure

Because of the lesser availability of reliable measures of environmental threats, the IRP overall is somewhat biased toward human health versus environmental threats. The model addresses threats to human health in all of the exposure pathways considered: air, surface water, ground water, and direct contact. Environmental threats are addressed in only three of those four pathways; the ground water pathway does not address environmental exposure. In two of the three pathways addressing environmental exposure (air and direct contact), environmental exposure is weighted less than human health exposure. In the air pathway, environmental exposure is allowed a maximum of 50 points versus 100 for human health exposure. In the direct contact pathway, environmental exposure may receive 10 bonus points per site versus incorporation as a route worth up to 50 points, as with human health exposure. Environmental exposure is weighted lower in these routes largely because less data is available to reliably measure environmental threats. The limited data that is available is given less weight so that it does not disproportionately influence the site score. See related discussions, III.B.1.c. above.

On the other hand, in routes where environmental data are more readily available (i.e., with the surface water pathway), environmental exposure is weighted equally with human health exposure (i.e., the environmental targets in the surface water pathway are valued collectively the same as the human health targets in this pathway.) Moreover, the model allows the highest scoring exposure route, whether human health or the environment, to dominate in calculating the overall site score (e.g., site score = highest scoring route + [average of other five routes]).

2. Scope of direct contact route

Potential threats from direct contact with hazardous substances range from immediate threats from fire and explosion to longer term exposure through ingestion or skin contact with hazardous substances. The model addresses only the longer term potential exposure through dermal contact and ingestion quantitatively in the model. Other threats, such as immediate threats from fire,

explosions or highly corrosive materials, may be addressed qualitatively in the narrative Special Considerations section of the IRP. Many of these threats will require immediate response prior to a facility's listing and ranking on the Inventory.

The direct contact pathway also does not address the potential for exposure of employees to hazardous substances present at or near the workplace. The Oregon Occupational Health and Safety Administration (OR-OSHA) has primary jurisdiction for protecting worker health and safety under ORS Chapter 654 and implementing regulations. These authorities require employers to provide a safe workplace for employees, including notification of on- and off-site hazards associated with the workplace, and authorize OR-OSHA to enforce those requirements. The Department will provide OR-OSHA with updates of the Inventory for use in enforcing these worker protection requirements.

3. Consistency in application

The Department has designed the model so that it can be applied consistently to the wide variety of sites on the Inventory. The model uses the same set of data elements to score all sites. The data elements selected require information normally developed during a preliminary assessment and available from common sources for sites throughout the state. The model instructions require the use of standard references for many data elements (e.g., the Department of Water Resources, Water Rights Information Database, and the Oregon Department of Energy's Oregon Rivers Database), and allow defaults (in lieu of data) to be used for only a few data elements (e.g., toxicity and source quantity).

Nevertheless, several of the data elements still require the exercise of professional judgment (e.g., the estimate of source quantity and containment and the evaluation of ground water migration potential). The Department intends to provide a quality assurance review of draft scoring packages to help maintain consistency where professional judgement is required.

In addition, to ensure that sites are scored using comparable criteria and assumptions, scoring under the model is based solely on the information required to apply each data element. More detailed information regarding the data elements in the model or other factors affecting risk not addressed in the model are not used in scoring. These other factors may be addressed as special considerations in the narrative portion of the scoring package.

4. Human toxicity data element

The model evaluates five measures of toxicity: acute and chronic toxicity, carcinogenicity, developmental and reproductive toxicity, and toxicity through dermal contact. Each contaminant of concern is assigned a toxicity rating for acute toxicity, chronic toxicity and carcinogenicity using standard reference

sources. Those three ratings are used to assign a single toxicity value to each contaminant for use in scoring. Contaminants that exhibit higher levels of toxicity in more than one measure of toxicity are given higher values than those that exhibit a high level in only one measure. Contaminants that are classified as A carcinogens or B1 and B2 carcinogens, using the U.S. Environmental Protection Agency's weight of evidence classification for human carcinogenicity, contaminants that are determined to be developmental or reproductive toxicants, and contaminants that are likely to be absorbed through the skin are given bonus points. Sites that have several contaminants receiving high overall toxicity values are given an additional bonus point.

5. Toxicity/mobility linkage

Toxicity and mobility are used in the ground water and air pathways as measures of risk and the potential for exposure. For those routes, the contaminant used to assign both the toxicity and the mobility values is determined by multiplying the toxicity and mobility for each contaminant of concern and selecting the contaminant with the highest toxicity/mobility product. This method identifies for scoring purposes the contaminants which present the greatest risk because of their combined toxicity and likelihood of exposure, or mobility.

This linkage is not incorporated into the surface water or direct contact routes because mobility is not a data element in those routes.

6. Source quantity vs. hazardous substance quantity

The model uses the quantity of the material contaminated by hazardous substances (i.e., the source quantity), which includes nontoxic substances, as the measure of the hazardous substances at a site. Determining the amount of the hazardous constituents in the source material would be preferable. However, this determination would require concentration data that are costly to generate and usually not available at the conclusion of the preliminary assessment.

7. Direction of targets

The ground water pathway counts all targets present in the township, range and section in which a site is located and those in adjacent sections for scoring purposes. The direction of ground water flow is not considered because direction usually cannot be accurately determined for sites based on information available at the completion of the preliminary assessment. Even where ground water flow direction is known at a site, the location of receptors upgradient may not preclude exposure. Factors such as seasonal fluctuations in ground water flow direction, the presence of ground water divides, interconnections of aquifers, and effects of pumping wells may lead to contaminant

migration in directions not predicted by generalized determinations of ground water flow direction.

Targets in the air pathway are similarly identified without considering prevailing wind direction. Wind roses are not readily available for most sites and require sophisticated modeling which is not appropriate for the preliminary assessment.

Inventory Ranking Rule

Inventory Ranking

340-122-450(1)(a) The Department will score facilities placed on the Inventory in accordance with the Inventory Ranking Procedure (IRP) set forth in Appendix A of these rules. The IRP provides criteria for scoring facilities based on the short-term and long-term risks they pose to present and future public health, safety, welfare or the environment.

(1)(b) The Department will place facilities in the following categories on the Inventory based on their status in the remedial process:

Phase I: Facilities where remedial investigation and feasibility studies have not been initiated.

Phase II: Facilities where remedial investigation or feasibility studies are underway.

Phase III: Facilities where the remedial investigation and feasibility studies have been completed and remedial design, removal or remedial action is underway.

Phase IV: Facilities where all necessary removal and remedial action have been completed except for continuing operation and maintenance or other environmental or institutional controls necessary to protect public health, safety, welfare, and the environment.

The Department will move facilities from one category to the next in quarterly updates of the Inventory as remedial activities progress.

(2) Prior to publishing a facility's score on the Inventory, the Department will notify the owners and operators of the facility, if known, and provide an opportunity for them to comment on the facility score and supporting documentation as described in OAR 340-122-440(4).

(3) The Department will consider facility scores, among other factors, in prioritizing sites for further investigation, removal, or remedial action at the conclusion of the preliminary assessment or its equivalent. Prior to initiating such action, the Department may rescore a facility if the Department receives additional information that may significantly change a facility's score.

Draft Amendments to Inventory Listing Rule

Development of Inventory

340-122-440(3)(a) At least sixty (60) days before a facility is added to the Inventory the Director shall notify the owner and operator, if known, of all or any part of the [proposed] facility of the proposed listing by certified mail or personal service. The notice shall include a copy of the preliminary assessment[,] on which the listing is based, and the documentation used to calculate a hazard ranking score for the facility in accordance with OAR 340-122-450(1)(a). The notice may reference these documents if they have been previously provided. [and t] The notice shall inform the owner and operator of the opportunity to comment on the information contained in the preliminary assessment and on the proposed hazard ranking score within forty-five (45) days after receiving the notice. For good cause shown, the Department may grant an extension of up to forty-five (45) days for comment.

ATTACHMENT B
Agenda Item C
November 2, 1990
EQC Meeting

STATEMENT OF NEED FOR RULEMAKING

Pursuant to ORS 183.335(7), this statement provides information on the Environmental Quality Commission's intended action to adopt a rule.

(1) Legal Authority

ORS 465.410, as amended by House Bill 3235 (Section 12, Chapter 485, Oregon Laws 1989) requires the Environmental Quality Commission to adopt rules to implement a site discovery program, including a procedure for ranking facilities on an Inventory of hazardous substances sites.

ORS 465.400(1) authorizes the Environmental Quality Commission to adopt rules, in accordance with the applicable provisions of ORS 183.310 to 183.550, necessary to carry out the provisions of ORS Chapter 465. In addition, ORS 468.020 authorizes the Commission to adopt such rules and standards as it considers necessary and proper in performing the functions vested by law in the Commission.

(2) Need for the Rule

ORS Chapter 465.410 requires the Environmental Quality Commission to adopt a procedure for ranking facilities on the Inventory of hazardous substances sites based on the short- and long-term threats they pose to public health and the environment.

(3) Principal Documents Relied Upon in this Rulemaking

ORS Chapter 465.

This document is available for review during normal business hours at the Department's office, 811 S. W. Sixth, 9th Floor, Portland, Oregon.

ATTACHMENT B
Agenda Item C
November 2, 1990

LAND USE CONSISTENCY

The proposed rules may affect land use; they are consistent with the Statewide Planning Goals.

The proposed rules are consistent with Goal 6. The rules provide a comparison of relative threats posed by sites on the Inventory. The publication of the facility rankings may indirectly improve the quality of the air, water and land resources by providing information to owners and operators and the public concerning relative threats posed by releases of hazardous substances and the need for further action to protect public health, safety, welfare, and the environment.

The rules do not appear to conflict with the other Goals.

Public comment on any land use issue involved is welcome and may be submitted in the same manner as indicated for testimony in this notice.

The Department of Environmental Quality requests that local, state, and federal agencies review the proposed action and comment on possible conflicts with their programs affecting land use and with Statewide Planning Goals within their expertise and jurisdiction.

The Department of Environmental Quality intends to ask the Department of Land Conservation and Development to mediate any appropriate conflicts brought to our attention by local, state or federal authorities.

FISCAL AND ECONOMIC IMPACT

Proposed Actions:

The Department of Environmental Quality (Department) maintains an Inventory of facilities with confirmed releases of hazardous substances which require further investigation or cleanup to protect public health, safety, welfare, and the environment. The proposed rules establish procedures for ranking facilities on the Inventory based on the short- and long-term threats they pose to public health and the environment.

The ranking procedure evaluates the relative threats to public health and the environment associated with actual or potential releases of hazardous substances from a facility. The Department will use facility scores to help prioritize sites for further action at the conclusion of preliminary site assessments. The

facility scores will also be published on the Inventory for public information.

Overall Economic Impacts:

The Department lists facilities on the Inventory at the conclusion of preliminary site assessments if they require further investigation or cleanup to protect public health and the environment. All facilities will be scored when added to the Inventory using the proposed ranking procedure. A facility score does not affect the decision to place a site on the Inventory.

Nor does the facility ranking affect either the authority of the Department to respond to a release or the liability of any person for investigation or cleanup of a release. The existence of contamination at a facility, not its ranking, creates the need for investigation and cleanup -- or the "cloud" over the property that may affect property values and the ability to transfer or develop property or use it as collateral.

Nevertheless, facility rankings, whether high or low, may affect public perception of risk and thus property values. In addition, facility rankings may affect the timing of investigation or cleanup of the listed or neighboring property. To the extent that facility rankings have these effects, the rules will have fiscal or economic impacts on owners and operators of affected property and on the parties responsible for its investigation and cleanup. These persons may include public and private entities, large and small businesses, and local, state, or federal agencies.

ATTACHMENT C
Agenda Item C
November 2, 1990
EQC Meeting

Oregon Department of Environmental Quality

A CHANCE TO COMMENT ON...

Public Hearing on Proposed Hazard Ranking Rules

Hearing Dates: December 19, 1990
Comments Due: January 2, 1991

WHAT IS PROPOSED: The Department of Environmental Quality (Department) maintains an Inventory of facilities with confirmed releases of hazardous substances which require further investigation or cleanup to protect public health, safety, welfare, and the environment. The proposed Inventory ranking rules establish a procedure for ranking facilities on the Inventory based on the short- and long-term threats they pose to public health and the environment.

WHO IS AFFECTED: Owners and operators of property contaminated by hazardous substances, and other persons, including public and private entities, responsible for investigation and cleanup of releases of hazardous substances; and persons living near sites contaminated by hazardous substances.

WHAT ARE THE HIGHLIGHTS:

(a) The Inventory ranking rule, proposed OAR 340-122-450, establishes a process for scoring facilities using the Inventory Ranking Procedure (IRP), proposed Appendix A of the rule, and for publishing those scores on the Inventory.

The IRP establishes criteria for scoring facilities based on relative threats associated with actual or potential releases of hazardous substances from a facility. The IRP also serves as a users' manual with forms and instructions for assigning values to the factors incorporated in the scoring model and calculating facility scores.

(b) Proposed amendments to the Inventory listing rule, OAR 340-122-440, establish a procedure for notifying owners and operators and providing opportunity for them to comment on their facility scores as sites are added to the Inventory.

WHAT IS THE NEXT STEP: The Environmental Quality Commission may adopt the proposed rules, modify those rules in response to comment, or decline to adopt rules. The Commission will consider the proposed new rule and rule revisions at its meeting in March, 1991.

HOW TO COMMENT: Public Hearings are scheduled for:

9:00 AM - Noon, Wednesday, December 19, 1990
DEQ's Portland Office - Executive Building
811 S. W. Sixth Avenue, Room 3A
Portland, Oregon 97204

Written comments should be sent to Debbie Bailey, Environmental Cleanup Division, Executive Building, 811 S. W. 6th Avenue, 9th Floor, Portland, Oregon 97204. Written comments should be received by January 2, 1991.

For more information, or to receive a copy of the proposed rules, call Dan Crouse at (503) 229-6821, or toll-free in Oregon, 1-800-452-4011.

SA\SM3261

811 S.W. 6th Avenue
Portland, OR 97204

11/1/86

FOR FURTHER INFORMATION:

Contact the person or division identified in the public notice by calling 229-5696 in the Portland area. To avoid long distance charges from other parts of the state, call 1-800-452-4011.

ATTACHMENT D
Agenda Item C
November 2, 1990
EQC Meeting

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PPD\SM3183 (10/16/90)

D

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: October 17, 1990

TO: Environmental Quality Commission

FROM: for Fred Hansen

SUBJECT: Water Quality Standards Staff Report

The Commission deferred granting authorization for conducting public hearings on proposed water quality standards until the November 2, 1990 Commission meeting. The Department has taken the opportunity to organize and conduct two additional public meetings to discuss the clarity of the proposed water quality rules. These meetings were held on October 5 and 19. Since the Department wishes to incorporate the public comments received during these meetings into the staff report, it will be necessary to delay sending the report to you until the latter part of next week. In order to package all the background information that has led up to the proposed rule language, copies of the issue papers, responses to the issue papers, and comments from the public meetings will be included in the next staff report.

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: October 24, 1990

TO: Interested Parties

FROM: Julie Schmitt, Director's Office

SUBJECT: EQC Packets

You will note that items D and G are missing from your packet. Those items are late in coming and will be sent to you upon availability.

Items K, L, and M are oral reports; no written materials will be available on those items.

NEIL GOLDSCHMIDT
GOVERNOR

Environmental Quality Commission

811 SW SIXTH AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

REQUEST FOR EQC ACTION

Meeting Date: November 2, 1990
Agenda Item: D
Division: Water Quality
Section: Standards & Assessmnt

SUBJECT:

Authorization for Rulemaking Hearing: Proposed Amendments to Water Quality Standards as Part of the Triennial Review Required by the Clean Water Act.

PURPOSE:

Every three years the Department reviews water quality standards, in fulfillment of the requirements of the Clean Water Act, to determine if revisions are needed to current rules to more fully protect water quality and beneficial uses. After reviewing the most recent scientific information and Environmental Protection Agency (EPA) criteria and policies related to water quality, the Department of Environmental Quality (Department) is proposing amendments to the Antidegradation Policy, definition of wetlands as waters of the state, dissolved oxygen, bacteria, toxics, mixing zones, turbidity and particulate matter, and biological criteria. The Department is also proposing changes in the definition section to support the proposed rule changes.

ACTION REQUESTED:

___ Work Session Discussion
___ General Program Background
___ Potential Strategy, Policy, or Rules
___ Agenda Item ___ for Current Meeting
___ Other: (specify)

_x_ Authorize Rulemaking Hearing
___ Adopt Rules

Proposed Rules	Attachment A
Rulemaking Statements	Attachment B
Fiscal and Economic Impact Statement	Attachment C
Public Notice for Hearings	Attachment D
Issue Papers	Attachment E
Public Notice Chronology	Attachment F

___ Issue a Contested Case Order
___ Approve a Stipulated Order
___ Enter an Order

Proposed Order	Attachment ___

___ Approve Department Recommendation

___ Variance Request	Attachment ___
___ Exception to Rule	Attachment ___
___ Informational Report	Attachment ___
___ Other: (specify)	Attachment ___

DESCRIPTION OF REQUESTED ACTION:

The current water quality standards described in Oregon Administrative Rules Chapter 340, Division 41, were reviewed by the Department and the public during December 1989 through March 1990 (See Attachment F). Based on comments from the public, staff, and EPA as to which water quality standards may need revision, the Department identified fourteen issues, related to either existing or new rules, and prepared water quality standards issue papers to discuss possible rule revision concepts. The fourteen issue papers include: 1) Definition of wetlands as Waters of the State; 2) Antidegradation Policy; 3) Dissolved Oxygen; 4) Temperature; 5) Bacteria; 6) Total Dissolved Solids; 7) Toxic Pollutants; 8) Toxic Equivalency Factors; 9) 2,3,7,8-TCDD; 10) Mixing Zones; 11) Sediment Quality Criteria; 12) Interim Sediment Quality Guidelines; 13) Biological Criteria; and 14) Turbidity and Particulate Matter.

The water quality issue papers were sent to the Commission and made available for public review and comment from May 11 through June 29, 1990. In addition, four workshops were held in Portland, Salem, Eugene and Bend, and several special presentations to organizations were made, to discuss the issue papers and solicit public comment and ideas for possible revisions to the existing rule language.

The Department considered the written and oral public comments and is proposing rule amendments for the following: Definition of Waters of the State, Antidegradation Policy, Dissolved Oxygen, Bacteria, Toxic Substances, Mixing Zones, Particulate Matter and Turbidity, and Biological Criteria. The Department will not propose any changes to the 2,3,7,8-TCDD standard adopted in 1987 because information to justify a change was insufficient.

The Department is postponing development of rules for Toxicity Equivalency Factors, Sediment Quality Standards, Interim Sediment Quality Guidelines, Temperature, and Total Dissolved Solids until further work can be done to define the needed changes. Many of the public comments emphasized the prematurity of developing rule language for these, and requested more opportunity to work with the Department in development of proposed language for these rules. The Department will appoint a technical water quality standards advisory committee with representatives from several scientific disciplines to begin compiling background information and evaluating potential changes. Copies of the issue papers, the public comments and the Department's response are included in Attachment E.

The proposed rule language presented in Attachment A clarifies definitions and policies, and incorporates consideration of natural variations of water quality as well as the most recent EPA criteria for toxic substances. A summary of the need for rule revisions and the issues involved in the proposed revisions follows:

1. Waters of the State: The current definition for waters of the state includes lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, estuaries, marshes, inlets, etc. The term "marshes" intended to represent all forms of wetlands. Technically, however, marshes refers to a specific type of wetland. The Department is proposing to add "wetlands" to be more inclusive about protection for all types of marsh and wetlands. In addition, the Department is proposing to adopt the definitions of "wetlands" in the definition section as defined by Senate Bill 3, Wetlands Protection Act of 1989 to assure consistency with state wetland management programs. This rule revision does not change the Department's regulatory authority for wetlands.

2. Antidegradation Policy: The Antidegradation Policy describes the conditions under which water quality may be lowered and when it must be maintained or enhanced. The Antidegradation Policy is designed to ensure that the chemical, physical and ecological values of water are fully evaluated; any economic growth and development that will lower water quality is necessary and important, all reasonable alternatives to degradation have been exhausted, and the public has been given an opportunity to comment on actions that may degrade water quality.

   The current antidegradation policy rule is not consistent with the federal antidegradation policy and must be revised to incorporate protection for all waters of the state, not just high quality waters as the current rule describes, and to add an Outstanding Resource Waters category to protect waters with exceptional water quality values. The Department is proposing to revise the policy to incorporate the EPA requested changes, criteria for the Commission to follow for lowering water quality, and to establish an Outstanding Resource Waters category. The Department also identifies an implementation plan for the antidegradation policy to meet the federal policy requirements.

3. Dissolved Oxygen: Dissolved oxygen must be high enough to support fisheries and aquatic life, both coldwater and warmwater species. The current freshwater standards specify minimum dissolved oxygen levels to protect salmonid and other coldwater fisheries, including higher dissolved oxygen requirements for spawning areas during the spawning season, and minimum levels to protect nonsalmonid (warmwater) fish and aquatic life.

   The current standards for most waters of the state are expressed in terms of a minimum percent saturation of dissolved oxygen. Because temperature and elevation determine the amount of oxygen which is soluble in water at 100 percent saturation, the percent saturation standard actually may be higher (unduly restrictive) or lower (not adequately protective) than concentration values which reflect acceptable long term and short term exposure concentrations. Thus changes are proposed to express all dissolved oxygen standards in terms of concentration and to specify both average and minima values which will assure full protection of the uses.

Additionally, language would be added to the standard that states where natural environmental conditions (such as water temperature and elevation) alone would limit dissolved oxygen concentrations to less than 110 percent of the applicable numerical value, 90 percent of the natural dissolved oxygen concentration would be the standard. This additional language provides that either the numerical concentration limit or 90 percent of the natural concentration, whichever is lower, is the standard. This language for dissolved oxygen would supersede existing rule language which makes the natural quality the standard where it is outside the numerical limits. Also, some streams and segments with the same designated beneficial uses currently have different standards (eg. 5 mg/l or 6 mg/l where the most sensitive uses with respect to dissolved oxygen requirements are salmonid passage and rearing). The proposed rules would establish the same dissolved oxygen numerical values for the same designated use, resulting in a higher numerical standard for some stream segments and a lower standard for others.

The Department has prepared two alternate dissolved oxygen standards proposals for public comment. Both options propose dissolved oxygen concentration values based on U.S. EPA criteria for "no production impairment" at constant exposure levels. The options differ, however, in the values proposed as 1-day minima. For soem uses, Option 2 proposes higher instantaneous minima to provide better assurance that even with limited monitoring data, uses will be protected. Also under Option 2, dissolved oxygen values proposed for waters designated solely as warmwater fisheries do not differentiate between spawning areas and seasons, and non-spawning areas and seasons. Option 2 proposes to establish a 5.5 mg/l instantaneous 1-day minima for all nonsalmonid waters throughout the year. A 7-day average of 6.5 mg/l also would apply throughout the year where warmwater fish/aquatic life are the most sensitive uses. The dissolved oxygen standard for the mainstem Klamath from Klamath Lake to Keno Dam would increase from a 1-day minima of 5.0 mg/l to 5.5 mg/l.

4. Bacteria: Bacteriological indicator organisms are used for monitoring water quality and pollution levels, and for evaluating the human health risks associated with contact recreation or shellfish consumption. Fecal coliform bacteria have been used as an indicator organisms to determine human health risks from exposure to pathogens. The current rule states that the log mean of 200 fecal coliform per 100 milliliters cannot be exceeded to protect for contact

recreation, and 14 organisms per 100 milliliters to protect for consumption of shellfish. Many tests have been conducted by the Department as well as other states to compare fecal coliform and Enterococcus data and determine if fecal coliform is the best indicator organism. Studies have shown that Enterococcus provides a more rigorous test and a better indication of human health risk for water contact recreation. The Department is proposing to substitute Enterococcus as the indicator organism for water contact recreation to better protect against illness.

However, the Department will retain fecal coliform for consumption of shellfish since adequate studies to determine whether Enterococcus or fecal coliform are better indicator organisms for consumption have not yet been completed. The Food and Drug Administration and the Interstate Shellfish Sanitation Conference have the authority to change the fecal coliform standard for commercial shellfish growing areas after the indicator studies are completed.

5. Toxic Pollutants: Control of toxic pollutants is critical for the protection of all beneficial uses. The current standards include both numeric and narrative limits for the control of priority pollutants and complex mixtures of toxic substances. The numeric values are listed in Table 20 of the water quality standards regulations. EPA has adopted new criteria for aluminum, chloride and ammonia. The Department is proposing to amend Table 20 to include new limits for aluminum, chloride and ammonia. The Department is also proposing to add a standard for 2,3,7,8-TCDD to protect aquatic life from acute and chronic toxicity. In addition, the Department is revising the narrative part of the toxics rule to include protection from toxics that may accumulate in sediments or bioaccumulate in aquatic life, and to include reference to wildlife protection. Finally, the Department is proposing to include the use level of contaminants in fish tissue as an indication of water quality standards violations. Table 21 describes the levels of toxics not to be exceeded in fish tissues.

8. Mixing Zones: Mixing zones are designated areas that are used for wastewater and receiving waters to mix. Water quality standards may be suspended in this area, but must be met at the edge of the mixing zone. Acute toxicity may not occur within the mixing zone, and chronic toxicity is prohibited outside the mixing zone. The current rule describes the conditions that must be met within and outside the mixing zone. It specifies the duration of acute toxicity tests, that are not necessarily applicable given the new test

methodologies that have been developed in the last several years since the current rule was adopted. Under some conditions, the requirement for "no acute toxicity within the mixing zone" cannot be met at the end of the pipe, (due to chlorine) but can be met after initial rapid mixing with receiving waters a short distance from the discharge point within a mixing zone. The Department is proposing to designate a zone of immediate dilution, to delete reference to a specific testing period needed in order to have flexibility with the types of applicable tests to be used, and to add the use of 100% effluent for acute toxicity testing requirements.

7. Biological Criteria: Water quality standards are set to protect beneficial uses such as fish and aquatic life, and wildlife. However, the rules do not specifically address protection of indigenous aquatic life communities and ecological integrity. The Department is proposing to add a narrative standard that specifically protects indigenous aquatic life species and health of the resident biological community. Biological criteria are useful because they help identify impairment of beneficial uses and directly measure the conditions of the resource at risk and detect problems that other methods miss. The Department will also be defining biological terms.

8. Particulate Matter and Turbidity: Particulate matter may affect aquatic life if present in high concentrations. Parameters used to measure particulates are turbidity, total suspended solids, settleable solids, and percent accumulated fines. The current rule measures turbidity in Jackson Turbidity Units. These units are not being used any longer and have been replaced with Nephelometric Turbidity Units. The Department is not proposing to change the standard but rather is proposing to use a more sensitive measurement to change from Jackson Turbidity Units to Nephelometric Turbidity Units. The remainder of the existing rule remains as written.

AUTHORITY/NEED FOR ACTION:

___ Required by Statute: _____ Attachment ___
Enactment Date: _____
___ Statutory Authority: _____ Attachment ___
___ Pursuant to Rule: _____ Attachment ___
___ Pursuant to Federal Law/Rule: _____ Attachment ___

___ Other: Attachment ___

_x_ Time Constraints: The Department must complete its triennial water quality standards review in early 1991 to meet commitments made in the State/EPA Agreement.

DEVELOPMENTAL BACKGROUND:

___ Advisory Committee Report/Recommendation	Attachment ___
___ Hearing Officer's Report/Recommendations	Attachment ___
___ Response to Testimony/Comments	Attachment ___
___ Prior EQC Agenda Items:	Attachment ___
___ Other Related Reports/Rules/Statutes:	Attachment ___
___ Supplemental Background Information	Attachment ___

REGULATED/AFFECTED COMMUNITY CONSTRAINTS/CONSIDERATIONS:

Any entity that discharges wastewater to waters of the state, or conducts activities that may add pollutants, particulates, or change the character of the water may be affected by the proposed rules, particularly if they are located upstream of a designated "Outstanding Resource Water", as described in the Antidegradation Policy. The most significant impact may be on wastewater treatment plants that will need to add an Enterococcus testing procedure. Additionally, based on the Department's analytical data of sewage treatment plant effluents, some municipalities may have to upgrade their effluent disinfection systems to ensure water quality standards are met.

PROGRAM CONSIDERATIONS:

Some of the current rules are not consistent with recent EPA policies and criteria, do not fully protect all of the most sensitive beneficial uses, or do not account for natural diurnal or seasonal variations in water quality parameters. The current standards are established to protect beneficial uses and used as the basis for establishing permit limits. Without statistical tests that take into consideration the natural variability of water quality, one sample taken that would violate water quality standards or a permit limit, may subject wastewater discharge facilities to warnings or possible penalties. One violation may not affect a beneficial use. Using statistically-based standards, and sampling methodology in certain cases, should provide a better indicator of beneficial use protection.

The Antidegradation Policy is intended to protect existing water quality in all waters of the state, and to establish guidelines for how decisions to lower water quality, or establish additional protection for waters are to be made. Any activities or decisions made that affect water quality are subject to the provisions of the Antidegradation Policy. This policy identifies the criteria for the Commission to consider in making determinations that may significantly affect water quality.

The proposed rules are intended to provide better definitions and a clearer technical basis for some of the water quality standards.

ALTERNATIVES CONSIDERED BY THE DEPARTMENT:

1. Maintain the existing rules.

2. Propose rule amendments to the following, based on public comments on the water quality issue papers at the public workshops: Wetlands as Waters of the State, Antidegradation, Dissolved Oxygen, Bacteria, Mixing Zones, Toxic Pollutants, Biological Criteria, and Particulate Matter and Turbidity. The proposed rule amendments would clarify the definition of waters of the state, establish a category of protection for outstanding resource waters, use a statistical approach to evaluating water quality variations for dissolved oxygen, and incorporate the newest criteria for toxic substances into the water quality standards.

DEPARTMENT RECOMMENDATION FOR ACTION, WITH RATIONALE:

The Department recommends that the Commission authorize the Department to conduct public rulemaking hearings on the eight proposed rule amendments for OAR 340-41. The proposed rules would assist the Department with more fully protecting beneficial uses and maintaining the essential, unique character of many of Oregon's waterbodies.

CONSISTENCY WITH STRATEGIC PLAN, AGENCY POLICY, LEGISLATIVE POLICY:

The proposed rules are consistent with the strategic plan, agency policy and legislative policy since they were developed to more fully protect beneficial uses.

ISSUES FOR COMMISSION TO RESOLVE:

1. Antidegradation: Should all Wild and Scenic Rivers, State Scenic Waterways, Wildlife Refuges, State Parks, and National Parks be automatically designated as Outstanding Resource Waters for special water quality protection? Or should applicants file for outstanding resource waters status for waterbodies with exceptional water quality values?

2. Bacteria: Should the Department have two separate indicator organisms, Enterococcus for public recreation protection, and fecal coliform for shellfish consumption in estuarine areas, requiring that both organisms be used and tested routinely in areas where both shellfish and recreational uses occur?

3. Toxic Pollutants: Should contaminant levels in fish tissue serve as indicators of water quality standards violations or should exceeding contaminant levels in fish tissue be a violation of the water quality standards?

4. Dissolved Oxygen: Two options for dissolved oxygen standards have been prepared. Both options would decrease the dissolved oxygen standard for some waters and increase it for a few other stream segments. The revisions under both options also propose standards as concentration limits instead of percent saturation; include 30 day, 7 day means or mean minima, and 1-day (instaneous) limits; and establish 90 percent of the natural dissolved oxygen concentration as the standard when natural environmental conditions alone limit concentrations to less than 110 percent of the applicable numerical standard. Under both options, the waters designated the same sensitive uses would have the same numerical standards. This corrects anomalies in the current standards where different numerical values apply to stream segments with the same most sensitive use.

   Should both options for Dissolved Oxygen standards be taken to hearing? Both options specify numerical averages based on U.S. EPA criteria for "no production impairment" at constant exposure levels and vary primarily in the values proposed as 1-day minima. Should the Department instead propose standards which do not provide for this level of beneficial use protection (eg. values based on EPA's criteria for slight, moderate or severe production impairment at constant exposure levels?)

INTENDED FOLLOWUP ACTIONS:

Hold public hearings, evaluate public testimony, and propose final action on the proposed rules.

Approved:

Section: _____

Division: _____

Director: _____

Report Prepared By: Krystyna Wolniakowski
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Date Prepared: September 4, 1990

(KUW:crw)
(SW\WC7069)
(October 25, 1990)

Attachment A

PROPOSED RULE LANGUAGE

A1 Wetland as Waters of the State

A2 Antidegradation Policy

A3 Dissolved Oxygen

A4 Bacteria

A5 Toxic Substances

A6 Mixing Zones

A7 Biological Criteria

A8 Particulate Matter and Turbidity

PROPOSED RULE AMENDMENTS

NOTE:

The underlined portions of text represent proposed additions made to the rules.

The ~~[bracketed]~~ portions of text represent proposed deletions made to the rules.

Wetlands

The following changes are recommended for the definition of Waters of the State. These recommended changes are based on recent changes to the state statutes regarding wetlands protection.

340-41-006

(14) "Waters of the State" include lakes, bays ,ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon, and all other bodies of surface and underground waters, natural or artifical, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters, and constructed wetlands and other constructed waterbodies used as wastewater treatment facilities), which are wholly or partially within or bordering the state within its jurisdiction.

340-41-006

(32) "Wetlands" means those areas that are inundated or saturated by surface or ground waters at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

PROPOSED RULE AMENDMENTS

340-41-006 & 340-41-026

NOTE:

The underlined portions of text represent proposed additions made to the rules.

The ~~[bracketed]~~ portions of text represent proposed deletions made to the rules.

Antidegradation Policy

The following changes are recommended for the antidegradation policy. These recommendations are based on recent EPA changes to the federal antidegradation policy, and public comments received during water quality standards hearings held in 1986, and recent public comment on the issue papers. Proposed deletions are bracketed and new language is underlined.

POLICIES AND GUIDELINES GENERALLY APPLICABLE TO ALL BASINS

340-41-026

(1) In order to maintain the quality of waters in the State of Oregon, ~~[it is]~~ the following is the general policy of the EQC ~~[that]~~:

(a) Antidegradation Policy for Surface Waters: The purpose of the Antidegradation Policy is to guide decisions that affect water quality such that unnecessary degradation is prevented, and to protect, maintain, and enhance existing surface water quality to protect all designated beneficial uses. The standards and policies set forth in OAR 340-41-120 through 962 are intended to implement the Antidegradation Policy.

(A) Where ~~[E]~~existing ~~[high quality]~~ water quality ~~[which]~~ meets or exceeds those levels necessary to support the propagation of fish, shellfish, and wildlife and recreation in and on the water, and other designated beneficial uses that level of water quality shall be maintained and protected. ~~[unless it]~~ The Commission ~~[chooses]~~, after full

satisfaction of the intergovernmental coordination and public participation provisions of the continued planning process, and with full consideration of OAR 340-41-026(2), (3), (5), and (6), however, may [~~to~~] lower water quality [~~for~~] in these high quality waters if they find:

i No other reasonable alternatives exist except to lower water quality; and

ii The action is necessary, important and justifiable for economic or social development[~~.~~] benefits and takes into consideration the costs of lowered water quality; and

iii All water quality standards will be met and beneficial uses protected.

(B) For water quality limited waterbodies, the water quality shall be managed as described in OAR 340-41-026(3).

(C) The Director or [~~his~~] a designee may allow lower water quality on a short-term basis in order to respond to emergencies or to otherwise protect human health and welfare.

(D) [~~In no event, however, may degradation of water quality interfere or become injurious to the beneficial use of water within surface waters of the following areas:~~]

[~~(A) National Parks;~~
~~(B) National Wild and Scenic Rivers;~~
~~(C) National Wildlife Refuges;~~
~~(D) State Parks.~~]

Where existing high quality waters constitute an outstanding state or national resource such as those waters designated as extraordinary resource waters, or as critical habitat areas, the existing water quality and water quality values shall be maintained and protected, and classified as "Outstanding Resource Waters of Oregon". The Commission may specially designate high quality

waterbodies to be classified as Outstanding Resource Waters in order to protect the water quality parameters that affect ecological integrity of critical habitat or special water quality values that are vital to the unique character of those waterbodies. The Commission, either on their own initiative or through nominations from the Department or other applicants, shall consider designating these waters based upon receiving the following information:

i. An application must provide notification to affected parties and provide sufficient information to the Department as described in the petition for rulemaking (OAR 137-01-070);

ii. An application must describe the existing water quality, beneficial uses and ecological resource values of the waterbody they are nominating as Outstanding Resource Waters;

iii. An application must define the outstandingly remarkable values related to water quality of the waterbody and describe why they need additional protection;

iv. An applicant must describe the level of water quality needed to protect those values and beneficial uses.

If the application is determined to be complete, the Commission will make their decision based on the need to provide higher protection than that provided for high quality waters. If the Commission receives an incomplete application, they may request additional information to be supplied within 90 days. In designating Outstanding Resource Waters, the Commission shall establish the water quality levels and values to be protected, in a management plan, and shall provide for what activities are allowed that would not affect the outstanding resource values. After the designation, the Commission shall not

allow activities that may lower water quality below the level established in the management plan except on a short term basis to respond to emergencies or to otherwise protect human health and welfare.

(b) Point source discharges shall follow policies and guidelines (2), (5) and (6), and nonpoint source activities shall follow guidelines (7), (8), (9), (10), and (11).

(2) In order to maintain the quality of waters in the State of Oregon, it is the general policy of the EQC to require that growth and development be accommodated by increased efficiency and effectiveness of waste treatment and control such that measurable future discharged waste loads from existing sources do not exceed presently allowed discharged loads except as provided in section (3) of this rule.

(3) The Commission or Department may grant exceptions to sections (2) and (6) and approvals to section (5) for major dischargers and other dischargers, respectively. Major dischargers include those industrial and domestic sources that are classified as major sources for permit fee purposes in OAR 340-45-075(2).

(a) In allowing new or increased discharged loads, the Commission or Department shall make the following findings:

(A) The new or increased discharged load would not cause water quality standards to be violated;

(B) The new or increased discharged load would not unacceptably threaten or impair any recognized beneficial uses. In making this determination, the Commission or Department may rely upon the presumption that if the numeric criteria established to protect specific uses are met the beneficial uses they were designed to protect are protected. In making this determination the Commission or Department may also evaluate other state and federal agency data that would provide information on potential impacts to beneficial uses for

which the numeric criteria have not been set;

(C) The new or increased discharged load shall not be granted if the receiving stream is classified as being water quality limited under OAR 340-41-006(30)(a), unless:

(i) The pollutant parameters associated with the proposed discharge are unrelated either directly or indirectly to the parameter(s) causing the receiving stream to violate water quality standards and being designated water quality limited; or

(ii) Total maximum daily loads (TMDLs), waste load allocations (WLAs) load allocations (LAs), and the reserve capacity have been established for the water quality limited receiving stream; and compliance plans under which enforcement action can be taken have been established; and there will be sufficient reserve capacity to assimilate the increased load under the established TMDL at the time of discharge; or

(iii) Under extraordinary circumstances to solve an existing, immediate, and critical environmental problem that the Commission or Department may consider a waste load increase for an existing source on a receiving stream designated water quality limited under OAR 340-41-006(30)(a) during the period between the establishment of TMDLs, WLAs and LAs and their achievement based on the following conditions:

(I) That TMDLs, WLAs and LAs have been set; and

(II) That a compliance plan under

which enforcement actions can be taken has been established and is being implemented on schedule; and

(III) That an evaluation of the requested increased load shows that this increment of load will not have an unacceptable temporary or permanent adverse effect on beneficial uses; and

(IV) That any waste load increase granted under subsection (iii) of this rule is temporary and does not extend beyond the TMDL compliance deadline established for the waterbody. If this action will result in a permanent load increase, the action has to comply with subsections (i) or (ii) of this rule.

(D) The activity, expansion, or growth necessitating a new or increased discharge load is consistent with the acknowledged local land use plans as evidenced by a statement of land use compatibility from the appropriate local planning agency.

(b) Oregon's water quality management policies and programs recognize that Oregon's water bodies have a finite capacity to assimilate waste. Unused assimilative capacity is an exceedingly valuable resource that enhances in-stream values specifically, and environmental quality generally. Allocation of any unused assimilative capacity should be based on explicit criteria. In addition to the conditions in subsection (a) of this section, the Commission or Department shall consider the following:

(A) Environmental Effects Criteria.

(i) Adverse Out-of-Stream Effects. There may be instances where the non-discharge or limited

discharge alternatives may cause greater adverse environmental effects than the increased discharge alternative. An example may be the potential degradation of groundwater from land application of wastes.

(ii) Instream Effects. Total stream loading may be reduced through elimination or reduction of other source discharges or through a reduction in seasonal discharge. A source that replaces other sources, accepts additional waste from less efficient treatment units or systems, or reduces discharge loadings during periods of low stream flow may be permitted an increased discharge load year-round or during seasons of high flow, as appropriate.

(iii) Beneficial Effects. Land application, upland wetlands application, or other non-discharge alternatives for appropriately treated wastewater may replenish groundwater levels and increase streamflow and assimilative capacity during otherwise low streamflow periods.

(B) Economic Effects Criteria. When assimilative capacity exists in a stream, and when it is judged that increased loadings will not have significantly greater adverse environmental effects than other alternatives to increased discharge, the economic effect of increased loading will be considered. Economic effects will be of two general types:

(i) Value of Assimilative Capacity. The assimilative capacity of Oregon's streams are finite, but the potential uses of this capacity are virtually unlimited. Thus it is important that priority be given to those beneficial uses that promise the greatest return (beneficial use) relative to the

unused assimilative capacity that might be utilized. In-stream uses that will benefit from reserve assimilative capacity, as well as potential future beneficial use, will be weighed against the economic benefit associated with increased loading.

(ii) Cost of Treatment Technology. The cost of improved treatment technology, non-discharge and limited discharge alternatives shall be evaluated.

(4) (a) A receiving stream shall be designated as water quality limited through the biennial water quality status assessment report prepared to meet the requirements of Section 305(b) of the Water Quality Act. Appendix A of the Status Assessment report shall identify: what waterbodies are water quality limited, the time of year the water quality standards violations occur, the segment of stream or area of waterbody limited, the parameter(s) of concern, whether it is water quality limited under OAR 340-41-006(30)(a) or (b) or (c). Appendix B and C of the status assessment report shall identify the specific evaluation process for designating waterbodies limited.

(b) The WQL list contained in Appendix A of the Status Assessment report shall be placed on public notice and reviewed through the public hearing process. At the conclusion of the hearing process and the evaluation of the testimony received and the evaluation of the testimony received, Appendix A will become the official water quality limited list. The Department may add a waterbody to the water quality limited list between status assessment reports after placing that action out on public notice and conducting a public hearing.

(c) For interstate waterbodies, the state shall be responsible for completing the requirements of Section (3) of this rule for that portion of the interstate waterbody within the boundary of the state.

(d) For waterbodies designated WQL under OAR 340-41-006(30)(c), the Department shall establish

a priority list and schedule for future water quality monitoring activities to determine: if the waterbody should be designated WQL under OAR 340-41-006(30)(a) or (b), if estimated TMDLs need to be prepared, and if an implementation plan needs to be developed and implemented.

(e) For waterbodies designated WQL under OAR 340-41-006(30)(b), requests for load increases shall be considered following subsection (3)(b) of this rule.

(5) For any new waste sources, alternatives which utilize reuse or disposal with no discharge to public waters shall be given highest priority for use wherever practicable. New source discharges may be approved subject to the criteria in Section 3 of this rule.

(6) No discharges of wastes to lakes or reservoirs shall be allowed except as provided in Section 3 of this rule.

(7) Log handling in public waters shall conform to current EQC policies and guidelines.

(8) Sand and gravel removal operations shall be conducted pursuant to a permit from the Division of State Lands and separated from the active flowing stream by a water-tight berm wherever physically practicable. Recirculation and reuse of process water shall be required wherever practicable. Discharges, when allowed, or seepage or leakage losses to public waters shall not cause a violation of water quality standards or adversely affect legitimate beneficial uses.

(9) Logging and forest management activities shall be conducted in accordance with the Oregon Forest Practices Act so as to minimize adverse effects on water quality.

(10) Road building and maintenance activities shall be conducted in a manner so as to keep waste materials out of public waters and minimize erosion of cut banks, fills, and road surfaces.

(11) In order to improve controls over nonpoint sources of pollution, federal, state, and local resource management agencies will be encouraged and assisted to coordinate planning and implementation of programs to regulate or control runoff, erosion,

turbidity, stream temperature, stream flow, and the withdrawal and use of irrigation water on a basin-wide approach so as to protect the quality and beneficial uses of water and related resources. Such programs may include, but not be limited to, the following:

(a) Development of projects for storage and release of suitable quality waters to augment low stream flow;

(b) Urban runoff control to reduce erosion;

(c) Possible modification of irrigation practices to reduce or minimize adverse impacts from irrigation return flows;

(d) Stream bank erosion reduction projects.

340-41-006

(33) "Critical Habitat" means specific areas which have physical, biological, or chemical conditions essential to a species, that if diminished in quality or quantity, would seriously threaten the survival of a species or group of species that need special protection.

(34) "High Quality Waters" means those waters which meet or exceed those levels that are necessary to support the propagation of fish, shellfish, and wildlife and recreation in and on the water, and other designated beneficial uses.

(35) "Outstanding Resource Waters" means those waters designated by the Environmental Quality Commission where existing high quality waters constitute an outstanding state or national resource based on their extraordinary water quality values, or where special water quality protection is needed to maintain critical habitat areas.

(36) "Short-Term Disturbance" means a temporary disturbance where water quality standards may be violated briefly, but not of sufficient duration to cause acute, unacceptable chronic, or cumulative effects on beneficial uses.

PROPOSED RULE AMENDMENTS

NOTE:

The underlined portions of text represent proposed additions made to the rules.

The ~~[bracketed]~~ portions of text represent proposed deletions made to the rules.

OPTION 1 - Dissolved Oxygen

The following presents the first of two alternate dissolved oxygen standards proposals for which the Department is requesting public comment. The numerical values proposed as the 30-day average for salmonid waters and the 7-day averages for salmonid spawning and nonsalmonid waters are based upon U.S. EPA criteria for "No Production Impairment" to the specific fisheries at constant exposure values. Option 1 differs from Option 2 primarily in the 1-day (instaneous) minima values proposed to protect the uses. Also, proposed dissolved oxygen values for nonsalmonid producing waters (warmwater fisheries) differentiate between nonspawning areas and periods and spawning areas and periods under Option 1.

Existing rule language proposed to be deleted is bracketed and proposed new language is underlined. Specific basin standards, or rules, which are affected by each recommendation are identified following the proposed new language.

340-41-___(2)(a) Dissolved Oxygen (DO):

(A)(i) Salmonid producing waters:

~~[Fresh waters: DO concentrations shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].~~ Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(A)	340-41-205-(2)(a)(A)(i)
Mid Coast	340-41-245(2)(a)(A)	340-41-245-(2)(a)(A)(i)
Umpqua	340-41-285(2)(a)(A)	340-41-285-(2)(a)(A)(i)
South Coast	340-41-325(2)(a)(A)	340-41-325-(2)(a)(A)(i)
Roque	340-41-365(2)(a)(A)	340-41-365-(2)(a)(A)(i)
Willamette	340-41-445(2)(a)(E)(i)	340-41-445-(2)(a)(A)(i)
Sandy	340-41-485(2)(a)(B)	340-41-485-(2)(a)(A)(i)
Hood	340-41-525(2)(a)(B)(i)	340-41-525-(2)(a)(A)(i)
Deschutes	340-41-565(2)(a)(B)	340-41-565-(2)(a)(A)(i)
Klamath	340-41-965(2)(a)(C)(i)	340-41-965-(2)(a)(A)(i)

340-41-___(2)(a)

(A)(i) Salmonid producing waters:

~~[DO concentrations shall not be less than 75% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].~~ Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
John Day	340-41-605(2)(a)(B)	340-41-605(2)(a)(A)(i)
Umatilla	340-41-645(2)(a)(B)	340-41-645(2)(a)(A)(i)
Walla Walla	340-41-685(2)(a)	340-41-685(2)(a)(A)(i)
Grande Ronde	340-41-725(2)(a)	340-41-725(2)(a)(A)(i)
Powder	340-41-765(2)(a)	340-41-765(2)(a)(A)(i)
Malheur	340-41-805(2)(a)	340-41-805(2)(a)(A)(i)
Owyhee	340-41-845(2)(a)	340-41-845(2)(a)(A)(i)
Malheur Lake	340-41-885(2)(a)	340-41-885(2)(a)(A)(i)
Goose and Summer Lakes	340-41-925(2)(a)(A)	340-41-925(2)(a)(A)(i)

340-41-___(2)(a)

(A)(ii) Non-salmonid fish producing waters:

~~[The DO concentration shall not be less than 6 mg/l].~~ The 30 day mean dissolved oxygen concentrations shall be 6.0 mg/l or greater with one day minimum concentrations of not less than 4.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 5.0 mg/l. Dissolved oxygen concentrations in spawning areas shall have seven day mean water column concentrations of 6.5 mg/l or greater and one day minimum concentrations of 5.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
Willamette	340-41-445(2)(a)(E)(ii)	340-41-445(2)(a)(A)(ii)
Hood	340-41-525(2)(a)(B)(ii)	340-41-525(2)(a)(A)(ii)
Klamath	340-41-965(2)(a)(C)(ii)	340-41-965(2)(a)(A)(ii)
North Coast		340-41-205(2)(a)(A)(ii)
Mid Coast		340-41-225(2)(a)(A)(ii)
Umpqua		340-41-285(2)(a)(A)(ii)
South Coast		340-41-325(2)(a)(A)(ii)
Roque		340-41-365(2)(a)(A)(ii)
Sandy		340-41-485(2)(a)(A)(ii)
Deschutes		340-41-565(2)(a)(A)(ii)
John Day		340-41-605(2)(a)(A)(ii)
Umatilla		340-41-645(2)(a)(A)(ii)
Walla Walla		340-41-685(2)(a)(A)(ii)
Grande Ronde		340-41-725(2)(a)(A)(ii)
Powder		340-41-765(2)(a)(A)(ii)
Malheur		340-41-805(2)(a)(A)(ii)
Owyhee		340-41-845(2)(a)(A)(ii)
Malheur Lake		340-41-885(2)(a)(A)(ii)
Goose and Summer Lakes		340-41-925(2)(a)(A)(ii)

340-41-___ (2)(a)

(B) Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(B)	340-41-205-(2)(a)(B)
Mid Coast	340-41-225(2)(a)(B)	340-41-225-(2)(a)(B)
Umpqua	340-41-285(2)(a)(B)	340-41-285-(2)(a)(B)
South Coast	340-41-325(2)(a)(B)	340-41-325-(2)(a)(B)
Roque	340-41-365(2)(a)(B)	340-41-365-(2)(a)(B)

340-41-___(2)(a)

(C) When natural environmental conditions limit dissolved oxygen concentrations to less than 110 percent of the applicable numerical standard, 90 percent of the natural dissolved oxygen concentration shall be the standard.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast		340-41-205(2)(a)(C)
Mid Coast		340-41-225(2)(a)(C)
Umpqua		340-41-285(2)(a)(C)
South Coast		340-41-325(2)(a)(C)
Roque		340-41-365(2)(a)(C)
Willamette		340-41-445(2)(a)(B)
Sandy		340-41-485(2)(a)(B)
Hood		340-41-525(2)(a)(B)
Deschutes		340-41-565(2)(a)(B)
John Day		340-41-605(2)(a)(B)
Umatilla		340-41-645(2)(a)(B)
Walla Walla		340-41-685(2)(a)(B)
Grande Ronde		340-41-725(2)(a)(B)
Powder		340-41-765(2)(a)(B)
Malheur		340-41-805(2)(a)(B)
Owyhee		340-41-845(2)(a)(B)
Malheur Lake		340-41-885(2)(a)(B)
Goose and Summer Lakes		340-41-925(2)(a)(B)
Klamath		340-41-965(2)(a)(B)

Additional Proposed Deletions:

340-41-___(2)(a)

~~[(c) Columbia River: DO concentrations shall not be less than 90 percent of saturation].~~

RULE REFERENCES BY BASIN

Basin	Old Rule
North Coast	340-41-205(2)(a)(C)
Willamette	340-41-445(2)(a)(F)
Sandy	340-41-485(2)(a)(A)
Hood	340-41-525(2)(a)(A)
Deschutes	340-41-565(2)(a)(A)
John Day	340-41-605(2)(a)(A)
Umatilla	340-41-645(2)(a)(A)

340-41-445(2)(a)

~~[(A) Multnomah Channel and Main stem Willamette River from mouth to the Willamette Falls at Oregon City, river mile 26.6: The DO concentration shall not be less than 5 mg/l.~~

~~(B) Main stem Willamette River from the Willamette Falls to Newberg, river mile 50: The DO concentration shall not be less than 6 mg/l.~~

~~(C) Main stem Willamette River from Newberg to Salem, river mile 85: The DO concentration shall not be less than 7 mg/l.~~

~~(D) Main stem Willamette River from Salem to the confluence of the Coast and Middle Forks, river mile 187: The DO concentration shall not be less than 90% of saturation.]~~

340-41-925(2)(a)

~~[(B) Goose Lake: DO concentrations shall not be less than 7 milligrams per liter.]~~

340-41-965(2)(a)

~~[(A) Main stem Klamath River from Klamath Lake to Keno Dam, (river miles 255 to 232.5): DO concentrations shall not be less than 5 mg/l.~~

~~(B) Main stem Klamath River from Keno dam to Oregon-California Border (river miles 232.5 to 208.5): DO concentrations shall not be less than 7 mg/l.]~~

New standards proposed above are also applicable to these water bodies.

OPTION 2 - Dissolved Oxygen

The following presents the second of two alternate dissolved oxygen standards proposals for which the Department is requesting public comment. The numerical values proposed as the 30-day average for salmonid waters and the 7-day averages for salmonid spawning and nonsalmonid waters are based upon U.S. EPA criteria for "No Production Impairment" of the specific fisheries at constant exposure values. Some of the 1-day (instaneous) minima values proposed to protect the uses are higher under Option 2. Also, Option 2 proposes to establish the warmwater fisheries criteria for spawning on a year round basis.

Existing rule language proposed to be deleted is bracketed and proposed new language is underlined. Specific basin standards, or rules, which are affected by each recommendation are identified following the proposed new language.

340-41-___(2)(a) Dissolved Oxygen (DO):

(A)(i) Salmonid producing waters:

~~[Fresh waters: DO concentrations shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes]~~. Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(A)	340-41-205-(2)(a)(A)(i)
Mid Coast	340-41-245(2)(a)(A)	340-41-245-(2)(a)(A)(i)
Umpqua	340-41-285(2)(a)(A)	340-41-285-(2)(a)(A)(i)
South Coast	340-41-325(2)(a)(A)	340-41-325-(2)(a)(A)(i)
Roque	340-41-365(2)(a)(A)	340-41-365-(2)(a)(A)(i)
Willamette	340-41-445(2)(a)(E)(i)	340-41-445-(2)(a)(A)(i)
Sandy	340-41-485(2)(a)(B)	340-41-485-(2)(a)(A)(i)
Hood	340-41-525(2)(a)(B)(i)	340-41-525-(2)(a)(A)(i)
Deschutes	340-41-565(2)(a)(B)	340-41-565-(2)(a)(A)(i)
Klamath	340-41-965(2)(a)(C)(i)	340-41-965-(2)(a)(A)(i)

340-411-___(2)(a)

(A)(i) Salmonid producing waters:

~~[DO concentrations shall not be less than 75% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].~~ Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
John Day	340-41-605(2)(a)(B)	340-41-605(2)(a)(A)(i)
Umatilla	340-41-645(2)(a)(B)	340-41-645(2)(a)(A)(i)
Walla Walla	340-41-685(2)(a)	340-41-685(2)(a)(A)(i)
Grande Ronde	340-41-725(2)(a)	340-41-725(2)(a)(A)(i)
Powder	340-41-765(2)(a)	340-41-765(2)(a)(A)(i)
Malheur	340-41-805(2)(a)	340-41-805(2)(a)(A)(i)
Owyhee	340-41-845(2)(a)	340-41-845(2)(a)(A)(i)
Malheur Lake	340-41-885(2)(a)	340-41-885(2)(a)(A)(i)
Goose and Summer Lakes	340-41-925(2)(a)(A)	340-41-925(2)(a)(A)(i)

340-41-___(2)(a)

(A)(ii) Non-salmonid fish producing waters:

~~[The DO concentration shall not be less than 6 mg/l].~~ Dissolved oxygen concentrations in spawning areas shall have seven day mean water column concentrations of 6.5 mg/l or greater and one day minimum concentrations of 5.5 mg/l or greater.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
Willamette	340-41-445(2)(a)(E)(ii)	340-41-445(2)(a)(A)(ii)
Hood	340-41-525(2)(a)(B)(ii)	340-41-525(2)(a)(A)(ii)
Klamath	340-41-965(2)(a)(C)(ii)	340-41-965(2)(a)(A)(ii)
North Coast		340-41-205(2)(a)(A)(ii)
Mid Coast		340-41-225(2)(a)(A)(ii)
Umpqua		340-41-285(2)(a)(A)(ii)

South Coast	340-41-325(2)(a)(A)(ii)
Roque	340-41-365(2)(a)(A)(ii)
Sandy	340-41-485(2)(a)(A)(ii)
Deschutes	340-41-565(2)(a)(A)(ii)
John Day	340-41-605(2)(a)(A)(ii)
Umatilla	340-41-645(2)(a)(A)(ii)
Walla Walla	340-41-685(2)(a)(A)(ii)
Grande Ronde	340-41-725(2)(a)(A)(ii)
Powder	340-41-765(2)(a)(A)(ii)
Malheur	340-41-805(2)(a)(A)(ii)
Owyhee	340-41-845(2)(a)(A)(ii)
Malheur Lake	340-41-885(2)(a)(A)(ii)
Goose and Summer Lakes	340-41-925(2)(a)(A)(ii)

340-41-___ (2)(a)

(B) Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(B)	340-41-205-(2)(a)(B)
Mid Coast	340-41-225(2)(a)(B)	340-41-225-(2)(a)(B)
Umpqua	340-41-285(2)(a)(B)	340-41-285-(2)(a)(B)
South Coast	340-41-325(2)(a)(B)	340-41-325-(2)(a)(B)
Roque	340-41-365(2)(a)(B)	340-41-365-(2)(a)(B)

340-41-___(2)(a)

(C) **When natural environmental conditions limit dissolved oxygen concentrations to less than 110 percent of the applicable numerical standard, 90 percent of the natural dissolved oxygen concentration shall be the standard.**

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast		340-41-205(2)(a)(C)
Mid Coast		340-41-225(2)(a)(C)
Umpqua		340-41-285(2)(a)(C)
South Coast		340-41-325(2)(a)(C)
Roque		340-41-365(2)(a)(C)

Willamette	340-41-445(2)(a)(B)
Sandy	340-41-485(2)(a)(B)
Hood	340-41-525(2)(a)(B)
Deschutes	340-41-565(2)(a)(B)
John Day	340-41-605(2)(a)(B)
Umatilla	340-41-645(2)(a)(B)
Walla Walla	340-41-685(2)(a)(B)
Grande Ronde	340-41-725(2)(a)(B)
Powder	340-41-765(2)(a)(B)
Malheur	340-41-805(2)(a)(B)
Owyhee	340-41-845(2)(a)(B)
Malheur Lake	340-41-885(2)(a)(B)
Goose and Summer Lakes	340-41-925(2)(a)(B)
Klamath	340-41-965(2)(a)(B)

Additional Proposed Deletions:

340-41-___(2)(a)

~~[(C) Columbia River: DO concentrations shall not be less than 90 percent of saturation].~~

RULE REFERENCES BY BASIN

Basin	Old Rule
North Coast	340-41-205(2)(a)(C)
Willamette	340-41-445(2)(a)(F)
Sandy	340-41-485(2)(a)(A)
Hood	340-41-525(2)(a)(A)
Deschutes	340-41-565(2)(a)(A)
John Day	340-41-605(2)(a)(A)
Umatilla	340-41-645(2)(a)(A)

340-41-445(2)(a)

~~[(A) Multnomah Channel and Main stem Willamette River from mouth to the Willamette Falls at Oregon City, river mile 26.6: The DO concentration shall not be less than 5 mg/l.~~

~~(B) Main stem Willamette River from the Willamette Falls to Newberg, river mile 50: The DO concentration shall not be less than 6 mg/l.~~

~~(C) Main stem Willamette River from Newberg to Salem, river mile 85: The DO concentration shall not be less than 7 mg/l.~~

~~(B) Main-stem-Willamette-River-from-Salem-to-the confluence-of-the-Coast-and-Middle-Forks,-river-mile 187:--The-DO-concentration-shall-not-be-less-than-90% of-saturation.]~~

340-41-925(2)(a)

~~[(B) Goose-Lake:DO-concentrations-shall-not-be-less-than-7 milligrams-per-liter.]~~

340-41-965(2)(a)

~~[(A) Main-stem-Klamath-River-from-Klamath-Lake-to-Keno Dam,-(river-miles-255-to-232.5):-DO-concentrations shall-not-be-less-than-5-mg/l.~~

~~(B) Main-stem-Klamath-River-from-Keno-dam-to-Oregon-California-Border-(river-miles-232.5-to-208.5):-DO concentrations-shall-not-be-less-than-7-mg/l.]~~

New standards proposed above are also applicable to these water bodies.

PROPOSED RULE AMENDMENTS

NOTE:

The underlined portions of text represent proposed additions made to the rules.

The ~~[bracketed]~~ portions of text represent proposed deletions made to the rules.

Bacteria

The following changes are recommended for the bacteria water quality standard. These recommendations are based upon recent EPA guidance which indicates that selection of a new indicator organism is necessary for the protection of human health from swimming-associated illnesses. Rules for each basin are affected by these recommendations and are identified following the proposed new language.

340-41-___(2)(e)

~~[Organisms]~~ Bacteria of the coliform group ~~[where]~~ associated with fecal sources and bacteria of the enterococci group (MPN or equivalent ~~[MF]~~ membrane filtration using a representative number of samples) ~~[:]~~ shall not exceed the criteria values described in A-C. However, the Department may designate site-specific bacteria criteria on a case by case basis to protect beneficial uses. Site specific values shall be described in and included as part of a water quality management plan.

(A) ... ~~[A log mean of 200 fecal coliform]~~ Freshwaters: A geometric mean of 33 enterococci per 100 milliliters based on ~~[a minimum of 5 samples in a 30 day period with no more than 10 percent of the samples in the 30 day period exceeding 400 per 100 ml]~~ no fewer than five equally spaced samples collected over a period of at least 30 days. No single sample should exceed 61 enterococci per 100 ml.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(e)(A)	340-41-05(2)(e)(A)
Mid Coast		340-41-245(2)(e)(A)

Umpqua	340-41-285(2)(e)(C),(D)	340-41-285(2)(e)(A)
South Coast		340-41-325(2)(e)(A)
Roque	340-41-365(2)(e)(C),(D)	340-41-365(2)(e)(A)
Willamette	340-41-445(2)(e)(A), (B),(C)(i),(C)(ii)	340-41-445(2)(e)(A)
Sandy	340-41-485(2)(e)	340-41-485(2)(e)(A)
Hood	340-41-525(2)(e)	340-41-525(2)(e)(A)
Deschutes	340-41-565(2)(e)(A),(B)	340-41-565(2)(e)(A)
John Day	340-41-605(2)(e)	340-41-605(2)(e)(A)
Umatilla	340-41-645(2)(e)	340-41-645(2)(e)(A)
Walla	340-41-685(2)(d)	340-41-685(2)(d)(A)
Grande Ronde	340-41-725(2)(e)	340-41-725(2)(e)(A)
Powder	340-41-765(2)(e)	340-41-765(2)(e)(A)
Malheur	340-41-805(2)(e)	340-41-805(2)(e)(A)
Owyhee	340-41-845(2)(e)	340-41-845(2)(e)(A)
Malheur Lake		340-41-885(2)(e)(A)
Goose and Summer Lakes	340-41-925(2)(e)	340-41-925(2)(e)(A)
Klamath	340-41-965(2)(e)	340-41-965(2)(e)(A)

340-41-___(2)(e)

(B) Marine waters and estuarine shellfish growing waters: A fecal coliform median concentration of 14 organisms per 100 milliliters, with not more than 10 percent of the samples exceeding 43 organisms per 100 ml.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(e)(B)	340-41-205(2)(e)(B)
Mid Coast	340-41-245(2)(e)(A)	340-41-245(2)(e)(B)
Umpqua	340-41-285(2)(e)(B)	340-41-285(2)(e)(B)
South Coast	340-41-325(2)(e)(A)	340-41-325(2)(e)(B)
Roque	340-41-365(2)(e)(B)	340-41-365(2)(e)(B)

340-41-___(2)(e)

(C) Estuarine waters other than shellfish growing waters: ~~[A log-mean-of-200-fecal-coliform]~~ A geometric mean of 35 enterococci per 100 milliliters based on ~~[a-minimum-of-5 samples-in-a-30-day-period-with-no-more-than-10-percent of-the-samples-in-the-30-day-period-exceeding-400-per 100-ml]~~ no fewer than five equally spaced samples collected over a period of at least 30 days. No single sample should exceed 61 enterococci per 100 ml.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(e)(C)	340-41-205(2)(e)(C)
Mid Coast	340-41-245(2)(e)(B)	340-41-245(2)(e)(C)
Umpqua	340-41-285(2)(e)(A)	340-41-285(2)(e)(C)
South Coast	340-41-325(2)(e)(B)	340-41-325(2)(e)(C)
Roque	340-41-365(2)(e)(B)	340-41-365(2)(e)(C)

PROPOSED RULE AMENDMENTS

NOTE:

The underlined portions of text represent proposed additions made to the rules.

The ~~[bracketed]~~ portions of text represent proposed deletions made to the rules.

Toxic Substances

The following changes are recommended for the toxic substances standards. These recommendations are based on recent EPA guidance.

340-41-__(2) (p) Toxic Substances:

(A) Toxic substances shall not be introduced above natural background levels in waters of the state in amounts, concentrations, or combinations which may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bioaccumulate in aquatic life or wildlife to levels that adversely affect public health, safety, or welfare; aquatic life; wildlife; or other designated beneficial uses.

(B) Levels of toxic substances shall not exceed the ~~[most recent]~~ criteria values for organic and inorganic pollutants established by EPA and published in **Quality Criteria for Water** (1986). A list of the criteria is presented in Table 20. The fish tissue residue concentrations used in calculating criteria values in Table 20 may be used as indicators for determining exceedances of the water quality criteria value. A list of the fish tissue residue concentrations used in calculating criteria values in Table 20 can be found in Table 21. The Department may use appropriate guidelines for the use of fish tissue residue as indicators for determining exceedances of the water quality criteria.

(C) The criteria in paragraph (B) of this subsection shall apply unless data from scientifically valid studies demonstrate that the most sensitive designated beneficial uses will not be adversely affected by exceeding a criterion or that a more restrictive criterion is warranted to protect beneficial uses, as accepted by the Department on a

site specific basis. Where no published EPA criteria exists for a toxic substance, public health advisories and other published scientific literature may be considered and used, if appropriate, to set guidance values.

(D) Bio-assessment studies such as laboratory bioassays or in-stream measurements of indigenous biological communities, shall be conducted, as the Department deems necessary, to monitor the toxicity of complex effluents, other suspected discharges or chemical substances without numeric criteria, to aquatic life. These studies, properly conducted in accordance with standard testing procedures, may be considered as scientifically valid data for the purposes if paragraph (C) of this subsection. If toxicity occurs, the Department shall evaluate and implement measures necessary to reduce toxicity on a case-by-case basis.

Table 21

Fish Tissue Residue Concentrations used in Water Quality Criteria Development

Parameter	mg/kg
Antimony	4.31
Arsenic	0.0062
Beryllium	0.0022
Cadmium	10.77
Chromium III	10769
Chromium IV	54928
Mercury	1.0 (FDA)
Nickel	215.4
Selenium	5.4
Silver	2.48
Thallium	5.71
Cyanide	215.4
2,3,7,8-TCDD	0.00000007
Acrylonitrile	0.02
Benzene	0.37
Bromoform	1.77
Carbon Tetrachloride	0.083
Chlorobenzene	155.1
Chlorodibromomethane	1.77
2-Chloroethylvinyl Ether	0.0098
Chloroform	1.77
Dichlorobromomethane	1.77
1,2-Dichloroethane	0.118

1,1-Dichloroethylene	0.018
1,3-Dichloropropylene (cis)	3.23
1,3-Dichloropropylene (trans)	3.23
Ethylbenzene	1077
Methyl Bromide	1.77
Methyl Chloride	1.77
Methylene Chloride	1.44
1,1,2,2-Tetrachloroethane	0.054
Tetrachloroethylene	0.27
Toluene	3231
1,2-trans-Dichloroethylene	215.4
1,1,1-Trichloroethane	969.2
1,1,2-Trichloroethane	0.189
Trichloroethylene	0.855
Vinyl Chloride	0.614

2-Chlorophenol	53.8
2,4-Dichlorophenol	32.3
2-methyl-4,6-Dinitrophenol	4.2
2,4-Dinitrophenol	21.4
Pentachlorophenol	323
Phenol	6462
2,4,6-Trichlorophenol	0.54

Acenaphthylene	0.000933
Anthracene	0.000933
Benzidine	0.0000468
Benzo(a)anthracene	0.000933
Benzo(a)pyrene	0.000933
3,4-Benzofluoranthene	0.000933
Benzo(ghi)perylene	0.000933
Benzo(k)fluoranthene	0.000933
Bis(2-choroethyl)ether	0.0098
Bis(2-chloroisopropyl)ether	431
Bis(2-ethylhexyl)phthalate	0.77
Butylbenzyl phthalate	2154
Chrysene	0.00093
Dibenz(a,h)anthracene	0.00093
1,2-Dichlorobenzene	969
1,3-Dichlorobenzene	145
1,4-Dichlorobenzene	145
3,3'-Dichlorobenzidine	0.00624
Diethyl phthalate	8615
Dimethyl phthalate	104400
Di-n-butyl phthalate	1077
2,4-Dinitrotoluene	0.0346
1,2-Diphenylhydrazine	0.013
Fluoranthene	62.1
Fluorene	0.000933
Hexachlorobenzene	0.00643
Hexachlorobutadiene	0.138
Hexachlorocyclopentadiene	75.4
Hexachloroethane	0.77

Indeno(1,2,3-cd)pyrene	0.000933
Isophorone	2154
Nitrobenzene	5.38
n-Nirosodimethylamine	0.000211
n-Nitrosodi-n-ptopylamine	0.00154
n-Nitrosodiphenylamine	2.2
Phenanthrene	0.000933
Pyrene	0.000933
Aldrin	0.00635
a-BHC	0.0017
b-BHC	0.006
g-BHC	0.0081
Chlordane	0.0083
4,4'-DDT	0.0316
4,4'-DDE	0.0316
4,4'-DDD	0.0449
Dieldrin	0.00067
a-Endosulfan	0.54
b-Endosulfan	0.54
Endrin	3.23
Heptachlor	0.0024
Heptachlor Epoxide	0.0012
PCB-1242	0.0014
PCB-1254	0.0014
PCB-1221	0.0014
PCB-1232	0.0014
PCB-1248	0.0014
PCB-1260	0.0014
PCB-1016	0.0014
Toxaphene	0.0098
Bis(chloromethyl) ether	0.000049
1,2,4,5-Tetrachlorobenzene	54

Basin	Rule
North Coast	340-41-205(2)(p)
Mid Coast	340-41-245(2)(p)
Umpqua	340-41-285(2)(p)
South Coast	340-41-325(2)(p)
Rogue	340-41-365(2)(p)
Willamette	340-41-445(2)(p)
Sandy	340-41-485(2)(p)
Hood	340-41-525(2)(p)
Deschutes	340-41-565(2)(p)
John Day	340-41-605(2)(p)
Umatilla	340-41-645(2)(p)
Walla Walla	340-41-685(2)(p)
Grande Ronde	340-41-725(2)(p)
Powder	340-41-765(2)(p)
Malheur	340-41-805(2)(p)

Owyhee	340-41-845(2)(p)
Malheur Lake	340-41-885(2)(p)
Goose and Summer Lakes	340-41-925(2)(p)
Klamath	340-41-965(2)(p)

Amend Table 20 to include the following compounds:

Table 20
Water Quality Criteria Summary

Compound Name	Fresh Acute Criteria	Fresh Chronic Criteria
Aluminum	750	87
Chloride	860 mg/l	230 mg/l
Dioxin (2,3,7,8-TCDD)	3.8 pg/l	0.38 pg/l

Compound Name	Marine Acute Criteria	Marine Chronic Criteria
Ammonia	CRITERIA ARE pH AND TEMPERATURE DEPENDENT - SEE DOCUMENT U.S. EPA APRIL 1989	

Basin	Rule
North Coast	340-41-205(2)(p)
Mid Coast	340-41-245(2)(p)
Umpqua	340-41-285(2)(p)
South Coast	340-41-325(2)(p)
Rogue	340-41-365(2)(p)
Willamette	340-41-445(2)(p)
Sandy	340-41-485(2)(p)
Hood	340-41-525(2)(p)
Deschutes	340-41-565(2)(p)
John Day	340-41-605(2)(p)
Umatilla	340-41-645(2)(p)
Walla Walla	340-41-685(2)(p)
Grande Ronde	340-41-725(2)(p)
Powder	340-41-765(2)(p)
Malheur	340-41-805(2)(p)
Owyhee	340-41-845(2)(p)
Malheur Lake	340-41-885(2)(p)
Goose and Summer Lakes	340-41-925(2)(p)
Klamath	340-41-965(2)(p)

PROPOSED RULE AMENDMENTS

NOTE:

The underlined portions of text represent proposed additions made to the rules.

The ~~[bracketed]~~ portions of text represent proposed deletions made to the rules.

Mixing Zones

The following changes are recommended for the mixing zone standards. These recommendations are based on recent EPA guidance.

340-41-__(4) Mixing zones:

(a) The Department may allow a designated portion of a receiving water to serve as an area ~~[a zone of initial dilution]~~ for ~~[waste waters]~~ wastewater and receiving waters to mix thoroughly and this zone will be defined as a mixing zone.

(b) The Department may suspend all or part of the water quality standards, or set less restrictive standards, in the defined mixing zone, provided the following conditions are met:

(A) The water within the mixing zone shall be free of:

(i) Materials in concentrations that will cause acute ~~[(96HrLc-50)]~~ toxicity to aquatic life. Acute toxicity is measured as the lethal concentration of one hundred percent (100%) effluent that causes 50 percent mortality of organisms within a ~~[96-hour]~~ test period. Acute toxicity test methods will be established by the Department on a case-by-case basis and will be consistent with established methods and procedures. The Department may allow exceptions to the acute toxicity criteria on a case-by-case basis by allowing acute toxicity within a designated portion of the established mixing zone. This designated portion shall be defined as a zone of immediate

dilution (ZID). The size of the zone of immediate dilution will be determined by the Department on a case-by-case basis. The Department may use appropriate guidance documents, such as Technical Support Document for Water Quality-based Toxics Control, USEPA April 1990, for establishment of the zone of immediate dilution.

(ii) Materials that will settle to form objectionable deposits.

(iii) Floating debris, oil, scum, or other materials that cause nuisance conditions.

(iv) Substances in concentrations that produce deleterious amounts of fungal or bacterial growths.

(B) The water outside the boundary of the mixing zone shall:

(i) Be free of materials in concentrations that will cause chronic (sublethal) toxicity. Chronic toxicity is measured as the concentration that causes long-term sublethal effects, such as significantly impaired growth or reproduction in aquatic organisms, during a testing period based on test species life cycles. Procedures and end points will be specified by the Department in ~~[waste-water]~~ wastewater discharge permits.

(ii) Meet all other water quality standards under normal annual low flow conditions.

(c) The limits of the mixing zone shall be described in the ~~[waste-water]~~ wastewater discharge permit. In determining the location, surface area, and volume of a mixing zone area, the Department may use appropriate mixing zone guidelines to assess the biological, physical, and chemical character of receiving waters, and effluent, and the most appropriate placement of the outfall, to protect instream water quality, public health, and other beneficial uses. Based on receiving water and effluent characterisitics, the Department shall define a mixing zone in the immediate area of a ~~[waste-water]~~ wastewater discharge to:

(A) Be as small as feasible;

(B) Avoid overlap with any other mixing zones to the extent possible and be less than the total stream width as necessary to allow passage of fish and other aquatic organisms;

(C) Minimize adverse effects on the indigenous biological community especially when species are present that warrant special protection for their economic importance, tribal significance, ecological uniqueness, or for other similar reasons as determined by the Department;

(D) Not threaten public health;

(E) Minimize adverse effects on other designated beneficial uses outside the mixing zone.

(d) The Department may request the applicant of a permitted discharge for which a mixing zone is required, to submit all information necessary to define a mixing zone, such as:

(A) Type of operation to be conducted;

(B) Characteristics of effluent flow rates and composition;

(C) Characteristics of low flows of receiving waters;

(D) Description of potential environmental effects;

(E) Proposed design for outfall structures.

(e) The Department may, as necessary, require mixing zone monitoring studies and/or bioassays to be conducted to evaluate water quality or biological status within and outside the mixing zone boundary.

(f) The Department may change mixing zone limits or require the relocation of an outfall if it determines that the water quality within the mixing zone adversely affects any existing beneficial uses in the receiving waters.

Basin	Rule
North Coast	340-41-205(4)
Mid Coast	340-41-245(4)
Umpqua	340-41-285(4)

South Coast	340-41-325(4)
Rogue	340-41-365(4)
Willamette	340-41-445(4)
Sandy	340-41-485(4)
Hood	340-41-525(4)
Deschutes	340-41-565(4)
John Day	340-41-605(4)
Umatilla	340-41-645(4)
Walla Walla	340-41-685(4)
Grande Ronde	340-41-725(4)
Powder	340-41-765(4)
Malheur	340-41-805(4)
Owyhee	340-41-845(4)
Malheur Lake	340-41-885(4)
Goose and Summer Lakes	340-41-925(4)
Klamath	340-41-965(4)

PROPOSED RULE AMENDMENTS

NOTE:

The underlined portions of text represent proposed additions made to the rules.

The ~~[bracketed]~~ portions of text represent proposed deletions made to the rules.

Biological Criteria

The proposed rule language is underlined. Since this is a new rule, no deletions to existing language is needed. The language is consistent with other references to aquatic life protection in the rules.

340-41-027 Biological Criteria:

(1) Waters of the State designated as "Outstanding Resource Waters" shall be maintained such that resident biological communities are to remain as they naturally occur and all indigenous aquatic species are protected and preserved.

(2) Other waters of the state, including waters outside designated mixing zones, shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

Add to the Definitions:

340-41-006

(37) "Aquatic life/species" means any plants or animals which live at least part of their life cycle in waters of the State.

(38) "As naturally occurs" means that the same species and numbers of organisms should be found in similar habitats that are free of human influence.

(39) "Biological criteria" means numerical values or narrative expressions that describe the biological integrity of aquatic communities inhabiting waters of a given designated aquatic life use.

(40) "Ecological integrity" means the condition of an aquatic community as measured by the structural and functional characteristics of an aquatic community of organisms living in the unimpaired waters of a specified ecological habitat.

(41) "Designated beneficial use" means the purpose or benefit to be derived from a water body, as designated by the Water Resources Department or the Commission.

(42) "Indigenous" means supported in a reach of water or known to have been supported according to historical records compiled by State and Federal agencies or published scientific literature.

(43) "Resident biological community" means aquatic life expected to exist in a particular habitat when water quality standards are met. This shall be established by accepted biomonitoring techniques.

(44) "Without detrimental changes in the resident biological community" means no significant loss of species or excessive dominance by any species or group of species, when compared to an appropriate reference site or region.

(45) "Appropriate reference site or region" means a site on the same stream, or within the same basin or ecoregion that has similar aquatic habitat and riparian conditions, and represents the water quality and biological community attainable without the effects of significant human perturbations.

PROPOSED RULE AMENDMENTS

NOTE:

The underlined portions of text represent proposed additions made to the rules.

The ~~[bracketed]~~ portions of text represent proposed deletions made to the rules.

Particulate Matter

(Turbidity, Total Suspended Solids, Settleable Solids, and % Embeddedness)

The following changes are recommended for the particulate matter standards. These recommendations are based on the recent changes in units of measurement.

340-41-__(2)(c)

(c) Turbidity ~~[(Jackson Turbidity Units, JTU)]~~ (Nephelometric Turbidity Units, NTU): No more than a 10 percent cumulative increase in natural stream turbidities shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity. However, limited duration activities necessary to address an emergency or to accommodate essential dredging, construction or other legitimate activities and which cause the standard to be exceeded may be authorized provided all practicable turbidity control techniques have been applied and one of the following has been granted:

(A) Emergency activities: Approval coordinated by DEQ with the Department of Fish and Wildlife under conditions they may prescribe to accommodate response to emergencies or to protect public health and welfare.

(B) Dredging, Construction or other Legitimate Activities: Permit or certification authorized under terms of Section 401 or 404 (Permits and Licenses, Federal Water Pollution Control Act) or OAR 141-85-100 et seq. (Removal and Fill Permits, Division of State Lands), with limitations and conditions governing the activity set forth in the permit or certificate.

Basin	Rule
North Coast	340-41-205(2)(c)
Mid Coast	340-41-245(2)(c)
Umpqua	340-41-285(2)(c)
South Coast	340-41-325(2)(c)
Rogue	340-41-365(2)(c)
Willamette	340-41-445(2)(c)
Sandy	340-41-485(2)(c)
Hood	340-41-525(2)(c)
Deschutes	340-41-565(2)(c)
John Day	340-41-605(2)(c)
Umatilla	340-41-645(2)(c)
Walla Walla	340-41-685(2)(c)
Grande Ronde	340-41-725(2)(c)
Powder	340-41-765(2)(c)
Malheur	340-41-805(2)(c)
Owyhee	340-41-845(2)(c)
Malheur Lake	340-41-885(2)(c)
Goose and Summer Lakes	340-41-925(2)(c)
Klamath	340-41-965(2)(c)

STATEMENT OF THE NEED FOR RULEMAKING

Pursuant to ORS 183.335(7), this statement provides information on the Environmental Quality Commission's intended action to adopt rules.

1. Legal Authority

ORS 468.735 provides the Commission by rule may establish standards of quality and purity for waters of the state in accordance with public policy set forth in ORS 468.710. ORS 183.545 requires a review every three years of state agency administrative rules to minimize the economic effect these rules may have on businesses. ORS 193.550 requires, among other factors, that public comments be considered in the review and evaluation of these rules.

2. Need for Rules

The Department reviews the water quality rules in Oregon Administrative Rules (OAR) Chapter 340 Division 41 every three years to incorporate the newest scientific information available and assure that water quality policies and standards are fully protecting beneficial uses. The Department requested public review of the water quality rules to determine if the public was concerned about particular rules and solicited suggestions as to which rules should be considered for revision. Based on public comments and staff review, the Department prepared fourteen issue papers discussing concerns with the rules and proposed rule concepts. Further public comment on the issue papers narrowed the water quality revisions to eight rules. The proposed rules will assist in clarifying certain rules, and provide consistency between state and federal policies, where needed.

3. Principal Documents Relied Upon in this Rulemaking

Oregon Administrative Rules Chapter 340 Division 41

The Clean Water Act and 1987 Amendments

Federal Register, Volume 48, No. 217, November 8, 1983, Water Quality Standards Regulation

Federal Register, Volume 45, No. 231, November 28, 1980, Water Quality Criteria Documents; Availability

Federal Register, Volume 50, No. 145, July 29, 1985, Water Quality Criteria, Availability of Documents

Water Quality Standards Handbook, December 1983

Introduction to Water Quality Standards, September 1988

EPA Quality Criteria for Water, 1986, and Supplements

Technical Support Document for Water Quality Based Toxics Control, September 1985 and revised April 1990

ORS 468.735, 468.710, 183.545, and 183.550

FISCAL AND ECONOMIC IMPACTS

Adoption and implementation of the proposed revisions to water quality standards could result in increased costs to local governments, small businesses and individuals for treatment and control of point and nonpoint source wastes. Specific costs for specific industries cannot be determined at this time, and must be done on a case-by-case basis, because cost estimates are based on the type of industry, type of waste and loads discharged, conditions of a wastewater treatment plant, and the type of receiving waterbody. However, general potential economic impacts are discussed for the following proposed rule changes:

Wetlands: The Department already regulates activities that may affect water quality in wetlands. The proposed rule change does not expand the Department's regulatory authority. Consequently, the Department does not anticipate additional economic impacts resulting from the proposed rule change.

Antidegradation Policy: As the population of Oregon increases, and demands for use of water increases, additional costs associated with maintaining the existing levels of water quality through implementing best management practices, or improved treatment, may occur. Existing or new communities located in high quality waters, or upstream of areas designated as Outstanding Resource Waters may need to increase treatment levels in order to assure that special water quality values are not significantly affected within those areas. The provisions for the current antidegradation policy already require this approach, so the Department does not anticipate additional costs of the proposed rule for high quality waters. In Outstanding Resource Waters, where water quality may not be lowered, costs for maintaining existing water quality will be identified during both the designation process and in the development of the specific management plans for the designated waterbodies.

Dissolved Oxygen: The proposed Dissolved Oxygen Standards change the expression of the exisiting standards from percent saturation to concentration values represented as milligrams/l. The changes are proposed to better reflect the dissolved oxygen requirements of the designated beneficial uses-- coldwater and warmwater fisheries and aquatic life. Two Options are proposed for comment. Under both Options, some streams, such in eastern Oregon, may require some limited additional protection and reduction of discharge of oxygen-consuming substances to provide full protection of waters designated as salmonid (trout) producing waters. In some areas of Western Oregon, the changes may result in more lenient standards being applied to some streams. Overall, the Department does not anticipate the need to require more stringent effluent treatment to meet the proposed standards than otherwise would be required under the existing standards and policies.

Option 2 is similar to Option 1 in many respects, but it establishes higher minimum values to be achieved and specifies higher dissolved oxygen for nonsalmonid growing waters compared to Option 2. Option 2 provides better assurance that even with limited monitoring data uses will be protected. Consequently, higher levels of treatment and thus higher costs may be incurred by wastewater treatment facilities under Option 2 compared to Option 1.

Bacteria: Some costs would be associated with changing from fecal coliform testing procedures to Enterococcus testing procedures, which would require additional supplies for wastewater treatment plants that discharge to fresh waters. For estuarine discharges near shellfish growing areas, wastewater treatment plants may be required to conduct both the Enterococcus and fecal coliform tests. Costs associated with increased treatment efficiency, additional chlorination needed for disinfection as well as dechlorination to reduce chlorine toxicity effect in treated effluent, and reduced loading may also be necessary to meet the Enterococcus standards proposed. Some costs may also be associated with improved management practices to control bacterial pollution and improving nonpoint source runoff controls to prevent degradation of water quality and protect beneficial uses in agricultural and urban areas.

Toxic Substances: The Department does not anticipate additional costs from the proposed rule changes, since the current narrative and numeric standards already include provisions for reducing the discharge of toxic substances into waters of the state. However, some increased costs for additional wastewater treatment may be incurred by municipalities, private utilities, and industries to test for and reduce toxic substances loading to surface waters, or to provide specific, better outfall designs to minimize impacts on beneficial uses as monitoring shows problem areas. These costs could break down into three categories: (1) capital construction costs for advance wastewater treatment facilities to improve toxic substances removal, or build and extend outfalls into areas of minimal impact; and (2) increased operating costs for meeting permit limits or best management practices to reduce toxics loading into the waters of the state and (3) additional toxicity testing for water and fish tissues. Impacts are contingent on the receiving waterbody as well as season of discharge.

Mixing Zones: The proposed rule language clarifies but does not require more stringent mixing zone provisions than the current rules. Some additional costs in increased treatment may occur with existing or proposed rules if a mixing zone must be reduced to protect beneficial uses and receiving water quality or an outfall must be rebuilt or redesigned to assure proper mixing and dilution. However, the proposed rules do allow the Department to provide a zone of immediate dilution (a rapid mixing area within

a mixing zone near the outfall) where acute toxicity may occur for example due to chlorination or ammonia. This provision may reduce treatment costs somewhat since acute toxicity requirements will not need to be met at the end of the pipe in certain cases.

Particulate Matter and Turbidity: The Department does not anticipate additional costs to be incurred as a result of changing units of measuring turbidity from JTU to NTU.

Oregon Department of Environmental Quality

A CHANCE TO COMMENT ON...

A CHANCE TO COMMENT ON WATER QUALITY STANDARDS

Hearing Dates: Noted below
Comments Due: 1-25-91

WHO IS AFFECTED: All businesses, residents, industries and local governments in the state of Oregon.

WHAT IS PROPOSED: The Department proposes to amend water quality standards in Oregon Administrative Rules Chapter 340 Division 41 for definition of waters of the state, antidegradation policy, dissolved oxygen, bacteria, toxic substances, mixing zones, biological criteria, particulate matter and turbidity.

HIGHLIGHTS: The Department is conducting its triennial review of water quality standards. During this review the Department solicited comments from the public regarding rules that the public may have concerns. The public suggested several rule revisions, which the Department then used as the basis for developing issue papers. Issue papers were prepared and again reviewed by the public. The following proposed rule revisions incorporate public comments on the issue papers:

1. Waters of the State: The Department proposes to add "wetlands" to the definition of waters of the state to be more inclusive of protecting all kinds of marshes and wetlands. A specific definition is also included.

811 S.W. 6th Avenue
Portland, OR 97204

11/1/86

FOR FURTHER INFORMATION:

Contact the person or division identified in the public notice by calling 229-5696 in the Portland area. To avoid long distance charges from other parts of the state, call 1-800-452-4011.

2. Antidegradation Policy: The Department proposes including protection for all waters of the state, criteria for lowering water quality, and establishing a category for Outstanding Resource Waters for those waters needing additional protection.

3. Dissolved Oxygen: The Department proposes two options for statistically based dissolved oxygen criteria, to fully protect sensitive life stages of all aquatic life.

4. Bacteria: The Department proposes using Enterococcus as the indicator organism to protect for public water contact recreation rather than the fecal coliform bacteria that is currently used as an indicator organism. However, the fecal coliform standard will remain the same for shellfish growing waters.

5. Toxic Substances: The Department proposes adding standards for ammonia, chlorides and aluminum, adding a provision for wildlife protection, and adding a water quality standard for 2,3,7,8-TCDD to protect aquatic life. Use of contamination levels in fish tissue as an indicator of water quality standard violations is also proposed.

6. Mixing Zones: The Department proposes to remove reference to a specific test length for acute toxicity bioassays to provide flexibility in testing procedures, and to add a zone of immediate dilution within the mixing zone.

7. Biological Criteria: The Department proposes language to assure the protection of indigenous aquatic life communities and ecological integrity.

8. Particulate Matter and Turbidity: The Department proposes to change reference from Jackson Turbidity Units to Nephelometric Turbidity Units.

HOW TO COMMENT:

PUBLIC HEARING SCHEDULE

City	Location	Date	Time
Portland	DEQ, 3A 811 SW Sixth Avenue	1-14-91	9:00 am
Eugene	Public Serv. Bldg S. Basement Rm 125 E. 8th	1-14-91	7:00 pm
Medford	City Hall 411 SW 8th Counsel Chamber	1-15-91	1:00 pm
Bend	Central Oregon Community College 2600 NW College Way Boyle Center Room 154	1-16-91	1:00 pm
Pendleton	DEQ 700 SE Emigrant Suite 330	1-17-91	1:00 pm
Baker	City Hall 1665 First St.	1-17-91	7:00 pm
Salem	Pringle Hall 606 Church St., SE	1-22-90	1:00 pm
Newport	Hatfield Marine Science Center 2030 S. Marine Science Dr.	1-22-90	7:00 pm

A Department staff member will be appointed to preside over and conduct the hearings. Written comments should be sent to:

Oregon Department of Environmental Quality
Water Quality Division Attn: Mary Halliburton
811 Southwest Sixth Avenue
Portland, Oregon 97204

The comment period will end January 25, 1991 at 5:00 PM

For more information or copies of the Department's issue papers or proposed rules, contact Mary Halliburton at 229-6978 or toll free at 1-800-452-4011

WHAT IS THE NEXT STEP:

After the public testimony has been received and evaluated, the proposed rule amendments will be revised as appropriate, and will be presented to the Environmental Quality Commission in early 1991 for their consideration. The Commission may adopt rule amendments as proposed, adopt modified rule amendments, or decline to adopt rule amendments and take no further action.

Fourteen Water Quality Standards Issue Papers with Public Comments, Department's Response, and Proposed Rule Language

1. Wetlands as Waters of the State
2. Antidegradation
3. Dissolved Oxygen
4. Temperature
5. Bacteria
6. Total Dissolved Solids
7. Toxics Pollutants
8. Toxic Equivalency Factors
9. 2,3,7,8-TCDD (Dioxin)
10. Mixing Zone
11. Sediment Quality Standards
12. Sediment Guidelines
13. Biological Criteria
14. Particulate Matter

ISSUE PAPER #1
WETLANDS AS WATERS OF THE STATE
Revised as of 10/22/90

I. INTRODUCTION

The Department of Environmental Quality is responsible for protecting water quality in all "waters of the state". The current definition of "waters of the state" consists of a list of the kinds of water bodies found in Oregon and qualifying as "waters of the state". The definition includes the term "marshes", which was originally intended to represent all forms of wetlands occurring in the state. However, since this definition was written, wetlands have received a great deal of scientific and regulatory attention, and the terminology associated with wetlands issues has been correspondingly refined. Technically, the term "marsh" refers only to wetlands dominated by emergent herbaceous vegetation. Since other forms of wetlands occur in Oregon, and since the Department is responsible for water quality protection in wetlands, the definition of "waters of the state" should be changed to reflect current terminology and usage. This will also bring the state definition into line with federal terminology.

Recent developments in wastewater treatment technology that use constructed wetlands for accomplishing treatment objectives will necessitate accommodation in the definition of "waters of the state". In accordance with the federal definition of "waters of the United States" (40 CFR Sec. 232.2(q)(7)), these facilities should be excluded from the definition of "waters of the state".

II. CURRENT RULE

"Waters of the state" include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon, and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

III. CONCERNS WITH THE RULE

A. Mandates and Commitments

The Department's responsibility for protecting water quality in all waters of the state is mandated in several sources:

Clean Water Act (CWA) Sec. 303 directs the Department to adopt water quality standards as necessary to protect the beneficial uses of the waters of the state. Under this section, the Department must periodically review its water quality standards and beneficial uses, identify any water quality limited bodies of water, and set total maximum daily loads on these water quality limited bodies of water.

CWA Sec. 305 directs the Department to report biennially to the Environmental Protection Agency (EPA) on the condition of waters of the state. The EPA guidelines for preparation of the 1990 report specifically direct the Department to include wetlands in its report.

CWA Sec. 319 directs the Department to develop a management program for the control of nonpoint sources of pollution to the waters of the state. This section further directs the Department to identify bodies of water requiring protection from nonpoint sources of pollution.

CWA Sec. 401 requires the Department to evaluate proposed Sec. 404 activities for construction and land management projects and certify that they will not violate applicable water quality standards. Federal projects must obtain a 401 certification before a 404 permit may be granted.

CWA Titles II and IV directs the Department to issue National Pollution Discharge Elimination System permits, offer grants and loans for construction of waste water treatment facilities (including constructed wetlands), evaluate proposed facilities for adequacy, and monitor existing facilities for performance.

In addition to these mandates, the Department is committed to cooperating with and advising other agencies in their programs involving conservation and protection of water quality in the waters of the state. These programs include the Oregon Water Management Program; Goals 5, 15,16, and 17 of the Oregon Department of Land Conservation and Development;

Wetlands Conservation Program ("Swampbuster" provisions) of the Food Security Act as administered by the Soil Conservation Service; wetlands acquisition provisions of the Emergency Wetlands Resources Act as administered by the Division of State Lands; land management planning efforts of the US Forest Service and Bureau of Land Management; and wetlands management plans soon to be developed by local governments in compliance with Senate Bill 3.

B. Structure and Function of Wetlands, and their Beneficial Contributions to Water Quality

Wetlands represent the transition zones between aquatic and terrestrial habitats. Typically, they form extended shorelines associated with bodies of deep water, gradually rising to terrestrial uplands. These wetlands may be permanently flooded shallows, but more commonly they are flooded periodically, either tidally or seasonally. In their flooded condition, they develop hydric soils and specially adapted biological communities, which persist through the periods of drought. When wetlands are adjacent to or physically associated with deep water habitats, the biological communities of wetlands interact ecologically with these deep water habitats and facilitate optimal overall ecosystem function.

Many of these interactions, or ecological functions of wetlands, contribute positively to the water quality of the open water habitats. Specifically, as substrates for the wetland biological communities, wetlands act as filters of suspended solids, including any associated bacteria. By slowing the current of flowing water, wetlands allow other sediments to settle out and allow potentially toxic dissolved organic substances more time to degrade naturally. Wetland substrates and plants, along with adhering algae and bacteria, remove dissolved nutrients such as nitrogen and phosphorus species as well as heavy metals. This ability of wetlands to remove dissolved nutrients and utilize them in net primary productivity is a function at which marshes particularly excel, rivalling the most intensively managed of the world's agricultural systems. Submerged vegetation and algae contribute to the concentrations of dissolved oxygen.

Wetlands also contribute to several hydrological benefits. Wetlands absorb flood waters and serve to damp out storm surges in rivers. Wetland vegetation serves to protect shorelines from erosion. Wetlands may also contribute to recharge of groundwater reserves.

The biological communities in wetlands contribute further to optimal ecological function by recycling nutrients and facilitating the transformation of nutrients into more ecologically benign or even useful forms. Benthic invertebrates and larval fishes consume and break down detritus and convert it to forms utilizable by higher level consumers. These higher level consumers often constitute wildlife of high value, ecologically, recreationally, and commercially. Wetlands often represent critical habitat for threatened and endangered wildlife species and contribute to overall biotic diversity. Wetlands offer habitat resources for migratory waterfowl as well as for anadromous fishes, both as emigrating juveniles as well as returning adults. Other species of commercially and recreationally valuable fishes use estuarine wetlands as spawning and rearing areas.

C. Implications of Mandates and Commitments

CWA Sec. 303, in requiring that the Department develop standards for protection of beneficial uses of all waters of the state, requires also that beneficial uses be designated and that standards be written that reflect the unique characteristics and ecological functions of all bodies of water. Wetlands' distinctive ecological characteristics, especially their ability to contribute to the water quality of associated bodies of water, constitute beneficial uses which need to be recognized and protected. The parameters used for assessment of water quality in wetlands are not necessarily the same as those currently being used for bodies of open water. The unique ecological contributions of wetlands need to be recognized as beneficial uses, and standards need to be developed for their protection. In requiring the identification of water quality limited bodies of water and setting total maximum daily load allocations for these bodies of water, Sec. 303 also implies that the Department must develop the ability to inventory and assess the status of water quality functions of wetlands.

CWA Sec. 305, in requiring that the Department report on the condition of waters of the state, will also require the development of the ability to inventory and assess the status of water quality functions of wetlands.

CWA Sec. 319 also requires the development of the ability to inventory and assess the status of wetlands but from the perspective of nonpoint sources of pollution. In addition, this section also requires the development of a management plan for nonpoint sources of pollution in wetlands. The Department's nonpoint source management plan calls for the

development of assessment and inventorying capability for the state's wetlands. This assessment and inventorying capability is vital to the Department's fulfillment of its advisory role on water quality and best management practices to other government agencies. The nonpoint source management plan, however, does not yet contain a management strategy for nonpoint sources of pollution in wetlands. This will first require the development of assessment and inventorying capability of water quality in wetlands.

CWA Sec. 401, in granting certification authority to the Department, assumes that the Department has the capability of identifying wetland boundaries and assessing wetland water quality functions. The present lack of delineation capability impairs the Department's ability to determine water quality function and values. Lack of information on wetland water quality functions, impairs the Department's ability to reliably verify site descriptions and evaluate mitigation plans. Lack of water quality inventorying capability impairs the Department's ability to evaluate cumulative, basinwide effects, and its lack of assessment and monitoring capabilities further impair its ability to evaluate the effectiveness of mitigation measures following construction.

Titles II and IV, in requiring that the Department evaluate proposed wastewater treatment facilities and monitor existing facilities for performance, will require that the Department have the capability for wetlands assessment. The ability of wetlands to contribute to water quality and reduction of pollutants is being utilized more and more frequently in the design of wastewater treatment facilities. This trend will require that the Department be able to evaluate the functioning of wetlands and advise interested organizations on their design and maintenance.

These mandates as well as the Department's commitments to providing advice and guidance, require that the Department develop water quality standards relative to the beneficial uses of wetlands, and that it develop the capability to evaluate these standards and thereby to assess wetlands water quality functions and status. The first step in developing this capability is the adoption of a definition of waters of the state that explicitly encompasses all forms of wetlands.

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

The Department recommends substitution of the term "wetlands" for "marshes" in the current definition, and adding an exemption of constructed wetlands and water bodies used as wastewater treatment facilities. OAR 340-41-006(14) should be changed to read:

"Waters of the state" include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, **wetlands**, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon, and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters, **and except constructed wetlands and other constructed water bodies used as wastewater treatment facilities**), which are wholly or partially within or bordering the state or within its jurisdiction.

Wetlands would be defined using the wetlands definition of the Environmental Protection Agency (40 CFR 230.3), the US Army Corps of Engineers (33 CFR 328.3), and also adopted in Senate Bill 3, Oregon's Wetland Protection Bill (ORS 196.800(14) (OAR 141-85-010(20). The following definition should be added to OAR 340-41-006:

"Wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

This definition will enable recognition of all types of vegetated wetlands occurring in Oregon. However, non-vegetated wetlands such as tide flats, rocky shores, gravel bars, etc., also occur in the state of Oregon and require water quality protection. The wetlands definition of the US Fish and Wildlife Service includes a provision to cover these types of wetlands (Cowardin, L. M., et al. 1979. Classification of wetlands and deepwater habitats of the United States. US Fish and Wildlife Service. Washington, D. C.). This definition states:

"Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For the purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year."

The Department proposes adding the following provision, modelled after the US Fish and Wildlife definition, to the Department's definition of wetlands to include nonvegetated wetlands:

> **"Wetlands" also means those areas with a substrate of predominantly undrained hydric soil or a substrate of nonsoil material and inundated by water at some time during the growing season of each year.**

With this added provision, the revised definition of "waters of the state" would explicitly recognize all forms of wetlands occurring in Oregon. This would enable the development of standards to protect the beneficial uses and specialized functional values found in the various forms of wetlands. It would provide greater certainty in delimiting areas of jurisdiction and improve the Department's ability to fulfill its mandates under CWA Sec's. 303, 305, 319, and 401. It would also improve the Department's ability to fulfill its commitments to provide advice and guidance to other agencies and organizations in the protection of water quality.

V. PUBLIC COMMENTS RECEIVED ON THE ISSUE PAPER

Following is a summary of the comments received on the issue paper:

Senate Bill 3 definition: Most respondents favored the adoption of the definition of wetlands as appears in Senate Bill 3. Although some respondents favored the adoption of the additional requirements under the U.S. Fish and Wildlife Service definition which went beyond Senate Bill 3 to include non-vegetated wetlands, most respondents did not support it.

Authority to regulate water quality in wetlands: Some respondents believed that the Department did not have the authority to regulate water quality in wetlands and should not add the word wetlands to "waters of the state", or its definition. They questioned where the Clean Water Act mandates water quality standards for wetlands, and how instream water quality standards could apply to wetlands. They stated that the Department's role should be limited to consultation with the appropriate regulating agencies. By adding wetlands to the Department's rules, they believed that it will also severely restrict development.

Statutory changes: Some respondents stated that replacing "marshes" with "wetlands" was a statutory change that could not be legally accomplished by amending the rule.

Constructed wetlands: Some respondents requested clarification of whether constructed wetlands for wastewater treatment were exempt from the definition of natural wetlands, and how they should be regulated. They recommended that constructed wetlands be exempt from definitions of waters of the state.

VI. DEPARTMENT RESPONSE TO ISSUE PAPER COMMENTS

Statutory changes: In response to public comments and an analysis of the statutory definition of waters of the state, the Department proposes to add the word "wetlands" to administrative rules that define waters of the state, rather than replacing the word "marshes". This would not require a statutory change since the administrative and statutory definitions of waters of the state already include "...and all other bodies of surface and ground waters...". Wetlands are considered waters of the state and the Department does have the responsibility of maintaining the biological, chemical and physical integrity of those water bodies. Water quality standards do apply for the protection of beneficial uses in wetlands.

Senate Bill 3: In addition, the Department will add the definition of "wetlands" included in Senate Bill 3, and not include the U.S. Fish and Wildlife Service definition of non-vegetated tidelands.

Constructed wetlands exempt: The Department will also include language that exempts "constructed wetlands" from the definition and same level of protection as for natural wetlands.

VII. PROPOSED RULE AMENDMENTS: Wetlands

The following changes are recommended for the definition of Waters of the State. These recommended changes are based on recent changes to the state statutes regarding wetlands protection. Proposed new language is underlined and proposed deletions are bracketed.

340-41-006 (14)
"Waters of the State" include lakes, bays ,ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, wetlands, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon, and all other bodies of surface and underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters, and constructed wetlands and other constructed waterbodies used as wastewater treatment facilities), which are wholly or partially within or bordering the state within its jurisdiction.

340-41-006 (32)
"Wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

ISSUE PAPER #2
ANTIDEGRADATION POLICY
Revised 10/22/90

I. Introduction

A. Background

The following background provides a discussion of terms and federal requirements for an antidegradation policy.

"Degradation" can be defined as a permanent measurable change in the existing chemical, physical, or biological parameters of water that results in the statistically significant lowering of water quality. "Nondegradation" means that existing water quality must be maintained and protected and that no permanent water quality degradation will be allowed under any circumstances. Nondegradation could be applied to waters that are water quality limited (do not meet standards), in order to eventually improve water quality to meet standards. It could also be applied to outstanding state and federal resource waters where it may be desired to maintain water quality at its highest level to protect exceptional resource values.

"Antidegradation", however, means that limited water quality degradation would be allowed under certain circumstances. It is usually applied to high quality waters (those that meet or exceed standards), and assumes that high quality waters should not be allowed to degrade to the standard without a conscious decision. Currently, lowering of water quality would only be allowed if highest and best practicable control of wastes is provided, if beneficial uses are still fully protected and water quality standards are met, and only after extensive public review and Commission approval. The goal is to prevent unnecessary degradation of water quality.

Previous Reviews of Antidegradation Policy

On July 19, 1985, The Environmental Quality Commission directed the Department to review water quality standards for the antidegradation, mixing zones, and toxic substances, develop issue papers, and prepare amendments to the rules. The Department prepared an issue papers on the rules and received approval from the Commission to conduct public hearings on July 13, 1986. The hearings were held July 21-24, 1986. Oral and written testimony was reviewed and evaluated by staff.

Final rule language was drafted to address public testimony concerns and to incorporate staff recommendations.

On August 28, 1987, the Commission adopted final rule language for toxic substances and mixing zones. However, the Department decided to postpone proposing final rule language for the antidegradation policy to the Commission until an implementation plan could be developed concurrently with policy language. Development of an implementation plan for antidegradation has been controversial, and has required more staff time for analysis than was originally estimated.

This discussion draft will present the federal requirements for antidegradation, state interpretation of the requirements, proposed amendments to the rule language, a discussion of some of the issues concerning implementation, and an outline for a possible implementation plan.

General Purpose of the Antidegradation Policy

The purpose of an antidegradation policy is to limit activities or discharges to those that will not significantly affect water quality and not threaten or impair beneficial uses of all waters of the state. The policy should allow for some water quality degradation to accommodate necessary growth and development in high quality waters, with the provision that beneficial uses must always be protected. Special protection should be provided for water quality limited and outstanding resource waters to improve, maintain and protect water quality at the highest level possible and to preserve the value of the resources. Water quality limited waters are those waters that do not currently meet standards. High quality waters are defined as those waters that meet or exceed water quality standards. Outstanding resource waters are specially designated state or federal waters which are recognized for their exceptional resources values regardless of whether they meet or exceed water quality standards.

Federal Requirements

Section 101(a) of the Clean Water Act defines the national goal of restoring and maintaining the chemical, physical and biological integrity of the Nation's waters. Section 303(a)(4) explicitly refers to satisfaction of the antidegradation requirements of 40 CFR 131.12 (Water Quality Standards Regulations) prior to taking various actions that may lower water quality. 40 CFR 131.12 requires that all states must have antidegradation policy language that is consistent with and at least as stringent as the federal policy language and adopted as part of the state water quality standards. In addition, the federal regulation requires that each state should develop appropriate implementation procedures.

The federal antidegradation policy represents a three tiered approach to maintaining and protecting various levels of water quality and uses:

- The first tier protects all existing uses and the level of water quality necessary to protect those uses must be maintained and protected. thus, any actions that would lower water quality below that necessary to protect uses, especially where water quality is already limited, are prohibited.

- The second tier provides protection for high quality waters that exceed standards. Limited water quality degradation is allowed in high quality waters, but only if beneficial uses are still protected fully, and only after extensive public involvement.

- The third tier provides special protection for outstanding resource waters, such as Wild and Scenic Rivers, National and State Parks, wildlife Refuges, and other waters of exceptional recreational or ecological significant. Although limited activities that may cause temporary or short-term water quality disturbance are allowed, any actions that would permanently lower water quality in these waters are prohibited.

Oregon State Statutes

ORS 468.710 states that:

Whereas pollution of the waters of the state constitutes a menace to public health and welfare, creates public nuisances, is harmful to wildlife, fish and aquatic life and impairs domestic, agricultural, industrial,

recreational and other legitimate beneficial uses of the water, and whereas the problem of water pollution in this state is closely related to the problem of water pollution in adjoining states, it is hereby declared to be public policy of the state: (1) To conserve the waters of the state; (2) To protect, maintain and improve the waters of the state for public water supplies, for the propagation of wildlife, fish and aquatic life for domestic, agricultural, industrial municipal, recreational, and other legitimate beneficial uses; (3) To provide that no waste be discharged into any waters of the state without first receiving the necessary treatment or other corrective action to protect the legitimate uses of such waters; (4) To provide for the prevention, abatement and control of new or existing water pollution; and (5) To cooperate with other agencies of the state and Federal Government in carrying out these objectives.

II. CURRENT RULE

The water quality standards contained in Oregon Administrative Rule Chapter 340, Division 41 were created to fulfill the requirements of this statute. However, the current antidegradation policy in Section 340-41-026(1)(a) was adopted in 1979, and is not consistent with the 1983 revision of the federal antidegradation policy (CFR 131.12). The Environmental Protection Agency, several state agencies, and several members of the public requested that the Department revise the policy and provide better consistency with the federal language.

III. CONCERNS THE CURRENT RULE

The current antidegradation policy (OAR 340-41-0261(a)) from unnecessary degradation in order to protect beneficial uses. Lowering of water quality can only occur if the Commission approves the action after extensive public review, and after finding that lowering of water quality is necessary and justifiable. However, the current rule revision in order to address several problems.

The application of the policy to high quality waters has often been confusing for several reasons:

- No clear guidelines exist to assist with deciding when water quality degradation is necessary and justifiable. Decisions have been made on a case-by-case basis, primarily for point source discharges.

- o No definition exists to determine how much water quality can be lowered before it becomes significant degradation.

- o No method is described that assists with predicting or measuring water quality degradation in high quality waters, especially degradation that may occur from nonpoint sources.

- o No recognition exists for protection of other quality waters of the state such as water quality limited waters, and outstanding resource waters.

The current numeric and narrative water quality standards are intended to protect beneficial uses of all quality waters of the state. However, many waterbodies have water quality that is better than the standards, or have unique characteristics that need recognition or protection beyond the existing standards. Since the beneficial uses are broadly defined for nineteen river basins, and not for specific stream segments, the existing water quality standards may not adequately protect some of the more sensitive, less defined beneficial uses (i.e., recreation, aesthetics), or the biological integrity of unique waters of the state.

With the absence of water quality standards specific for high quality waters, activities that may lower water quality in high quality waters have been regulated through application of the current antidegradation policy. However, the current antidegradation policy is not consistent with federal water quality regulations, does not protect all waters of the state, only high quality waters, does not include a clear decision-making mechanism to lower water quality, and does not recognize special protection for outstanding resource waters.

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

Application of Antidegradation Policy

To date, the Department has utilized the antidegradation policy as a guide for setting water quality standards for protection of beneficial uses, and for controlling activities that may cause degradation. The antidegradation policy should be implemented through the enforcement of numerical and narrative water quality standards in permits for point sources, and best management practices for nonpoint sources. Any actions which would result in lowering water quality is subject to antidegradation policy implementation.

Actions covered by antidegradation provisions include, but are not limited to, the following:

A. Permit Actions

1. Issuance/re-issuance/modification of NPDES permits
2. Issuance of variance (e.g., 301(h), etc)
3. Issuance of permits for urban runoff
4. Adoption or alteration of mixing zones
5. Relocation of a discharge
6. New discharge source
7. Increases in the discharge of pollutants from point sources due to:

    a. Industrial production increases
    b. Municipal growth
    c. New sources

B. Standards/Load Allocation Actions

1. Water quality standards revision
2. Revision of wasteload allocation
3. Reallocation of abandoned loads
4. Section 410 certifications
5. Section 208 or 303(e) approvals
6. Water Quality Management Plan approvals

C. Nonpoint Source Actions

1. Changes in regulated agricultural activities
2. Changes in regulated silvicultural activities
3. Changes in regulated mining activities
4. Changes in best management practices
5. Resource management plan approvals
6. Land management (e.g., Forest) plan adoptions, certifications or approvals
7. Discharge of dredged and fill material
8. Construction and operation of roads, dams, etc.
9. RCRA/CERCLA actions
10. Construction grant activities
11. Water quantity/water rights actions which affect water quality
12. Development of water quality management plans for specially designated waterbodies (Wild and Scenic Waterways, State Scenic Waterways)

Key Issues

In attempting to apply the Antidegradation Policy to many different activities, several key issues and concerns emerge that need to be resolved with clearer policy language.

A. Point vs Nonpoint Sources:

Point sources of pollution can be evaluated for compliance with the antidegradation policy through the permit process. Essentially no extra work is involved in fulfilling the antidegradation public participation requirements since they are met as part of the NPDES permitting process. In addition, pollutant loadings are easier to calculate, and waste load allocations assigned, since the permittee must supply most of the data that is needed for the Department to issue the permit.

There is no analogous framework for nonpoint source activities. It is unrealistic that antidegradation could be considered for each silvicultural or agricultural activity that may contribute nonpoint sources of pollutants, since these activities do not require individual permits from the Department. Nonpoint sources have been controlled to some degree by implementing Best Management Practices, but predicting or quantifying water quality degradation from nonpoint sources has been hampered by lack of routine baseline monitoring data collected on a regular basis.

The Department has recently completed an update of its Statewide Nonpoint Source Assessment to identify problem areas, and will be evaluating the effectiveness of BMP's in protecting water quality. A monitoring strategy is being developed to quantify existing habitat and water quality conditions in key areas. An implementation plan for nonpoint sources will most likely develop in conjunction with the NPS assessment process. The plan will also address the development of a public notification process for nonpoint source activities that would lower water quality but which do not currently have public notification requirements.

Most recently, the Department was involved in applying the antidegradation policy to a nonpoint source project, the logging of the Silver Complex Fire. The Department examined all the management alternatives to determine if any long-term water quality degradation might occur from increased turbidities and temperatures due to the proposed logging and road building activities. The extent, duration, and impact of turbidity and temperature on fisheries were calculated, and it was determined that if all practicable measures were incorporated to minimize the effects, then beneficial uses should be protected. However, to ensure that water quality standards are not violated, the Department has

required extensive monitoring during the project, and the development of a cumulative effects model that describes the uncertainties involved. A high level of effort was required for this project review, which is not feasible for every nonpoint source project. However, this project can serve as a model for how to approach other nonpoint source assessments and consistency with antidegradation provisions.

The EPA recognizes that implementation for NPS is still in the planning stages, and is encouraging, but not requiring the development of implementation plans at this time.

B. Designation of Outstanding Resource Waters:

The designation of outstanding resource waters can be done in several ways. The Department can recognize and list these waters that are state or federally designated for their special value. Such waters would include : National Wild and Scenic Rivers, National Parks, National Wildlife Refuges, State Parks and State Scenic Waterways. Other specially protected waters should include those waters designated by state or federal agencies as exceptional waters of ecological or recreational significance. These waters could be special because of the presence of unique, threatened or endangered aquatic life. Unique rangelands, estuarine sanctuaries, tribal fishing grounds, or Research Natural Areas, are administered under a federal program, whereas "wild trout" sanctuaries streams would be administered by state, federal or tribal agencies. The Department would review proposed activities that were under our jurisdiction that could cause permanent water quality degradation with those unique resource values in mind. To apply the rule to these waters, however, formal recognition and action would be needed by the Environmental Quality Commission to recognize the waters as "outstanding resource waters" and resolve any conflicts between development and preservation based on that designation.

C. Measuring cumulative impacts:

Although temporary degradation of water quality is permitted to accommodate short-term activity, cumulative impacts need to be considered. Several methodologies are published to determine how to calculate cumulative effects from a series of proposed actions. This has to be done on a site-specific basis. Since cumulative effects occur from a gradual nibbling away of the resources, reference sites with a baseline of information are vital to judge and predict where impacts

are, or may become, a threat to beneficial uses and habitat integrity. An analysis of the structure and function of the biological system, and an understanding of its ability to recover from the disturbance is necessary. The scale and types of proposed disturbance are important to consider. The scale of an effect might range from a localized stream, up to the size of a watershed. The type of cumulative impact expected will be the result of several activities occurring in time without enough time for the waterbody to recover. This may cause direct or indirect, additive or synergistic effects. Just how much impact is acceptable, must be determined on a site specific basis.

Amending the Antidegradation Policy

Before appropriate amendments to the antidegradation policy can be designed to protect water quality and beneficial uses in all waters of the state, a framework for an implementation plan needs to be developed. The framework needs to recognize the different levels of water quality for waterbodies of the state, establish standards to protect those levels, and develop a clear decision-making mechanism address activities that may lower water quality.

In order to assess the level that water quality is better than standards in the waterbodies of the state, to recognize special resource values in those waters, and to identify the effects of activities that may temporarily or permanently lower water quality, a waterbody classification system is proposed. The classification system would clearly define which waterbodies need special protection, which values need to be preserved, and which waterbodies may be degraded as long as applicable standards are not violated.

The Department could develop a waterbody classification system with general standards that would apply to those classes of waters. This system would provide additional protection for high quality and outstanding resource waters. It would involve the following steps:

a. Identify special values of characteristics of high quality waters and outstanding quality waters.

b. Identify general standards that would assist in preserving the special values or characteristics of these waters.

c. Develop a waterbody classification system for waters of the state that would clearly define levels of water quality protection needed and the general standards that would be applied. The classification system proposes five classes of water, with standards to be set specifically for each class, with categories as follows:

Class A1: OUTSTANDING RESOURCE WATERS

Waters that have a special resources quality which needs to be protected in its existing condition. Specific standards would have to be established to protect the unique qualities. Short-term or temporary disturbance would be allowed, but standards set for this class could not be violated.

A2. HIGH QUALITY WATERS

Waters where existing water quality is higher than the standards (< 50% load capacity), and water quality should be maintained as close to background levels as possible. Specific background conditions need to be established, and specific procedures for lowering water quality need to be defined.

B1: GOOD QUALITY WATERS

Water that are between 50-90% of their loading capacity. These are the "work-horse" or managed rivers that meet existing water quality standards, and can assimilate additional loads under certain circumstances.

B2: MAXIMUM POTENTIAL WATERS

Waters that are within 10% of their loading capacity and cannot have an increase in loads. These waters need estimated TMDLs and may occasionally violate standards. A nonpoint source management plan may need to be developed and implemented.

C1: WATER QUALITY LIMITED WATERS

Waters that are over their loading capacity. These waters routinely violate water quality standards and TMDLs, WLAs, and LAs need to be established.

d. Amend the antidegradation policy to include a decision-making mechanism to protect or lower water quality in all waters of the state, and incorporate reference to the water body classification system.

Public Comments received 1986-1989

Based on public review and testimony from earlier hearings and workshops, and the Department's review, the Department recommended to modify the current Antidegradation Policy as follows:

- Extend water quality protection to all waters of the state, not just the high quality waters;
- Revise language so that lowering water quality had to be important and justifiable for economic or social reasons;
- Recognize State Scenic Waterways and areas of special ecological or recreational significant as waters where the highest level of protection of water quality is needed to protect beneficial uses and special values of those waters; and
- Include a provision to prevent cumulative impacts from a series of water quality disturbances within the same stream system.
- Include an Implementation Plan for point and nonpoint sources, including public comment notification procedures for nonpoint source activities that may lower water quality, and criteria for determining economic and social impact analyses;
- Include a designation process for outstanding resources waters; and
- Identify methods for measurement of cumulative impacts.

Possible Implementation Procedures

Four basic steps should be included in implementing the antidegradation policy:

Task A. The first step is to determine whether the proposed action will require a detailed water quality and economic impact analysis, and what classification the waterbody has.

Task B. The second step is to determine if the proposed action will cause a significant lowering of water quality within the classification. If the predicted change is not "significant", then no further analysis is required. If the change is significant, then proceed to step three.

Task C. The third step involves the demonstration to the Environmental Quality Commission that lower water quality is necessary to accommodate important economic and social development in the area where the waters are located.

Task D. The fourth step is to assure that the intergovernmental coordination and public participation requirements are completed.

Task A

Before any action that might lower water quality is considered, two conditions must be met. First, the waterbody that might be affected must be considered a high quality water where standards are exceeded (A2-B2 waters). If the waterbody is water quality limited or an outstanding resource water (Tier C1 or A1), then proposed actions that may permanently degrade water quality would not be allowed.

Second, the proposed activity will not result in violations of water quality standards. In order to assess this, it is necessary to:

- Document the degree to which water quality exceeds that necessary to protect uses, assess which water quality parameters might be affected, and how beneficial uses are likely to be affected (use ambient monitoring information, or conduct special assessments);
- Quantify the extent to which water quality will be lowered as a result of the proposed action using simple mass balance equations, or mathematical modelling (as appropriate);
- Determine if repeated or multiple small changes in water quality (which individually would not create water quality problems) can result in significant long term permanent water quality degradation.

If the water quality of a A2-B2 waterbody may be affected, and the proposed action will permanently lower water quality, but not below the standards, then an analysis to determine if the lower water quality is significant and acceptable must be conducted.

Task B

The next step is to determine if the proposed action will cause a "significant" permanent lowering of water quality, and to define the degree of water quality change that is acceptable. Water quality change can be based on direct measures such as absolute or percent change in ambient concentrations of the affected parameter, or on indirect changes such as primary productivity cause by nutrients or diurnal dissolved oxygen concentrations.

In order to determine if the lowering of water quality is "significant", a number of factors need to be considered on a site-specific basis. It is impractical to assign definite values for each pollutant that define significant degradation. The factors will be different for different categories of pollutants, and for the type of biological resources and aesthetic values of particular waterbodies, and would not account for additive and synergistic effects. For instance, a small increase in carcinogenic or persistent substances may be more significant due to bioaccumulation potential, or no safe threshold concentration, than an equal increase in conventional pollutants. Consideration of repeated or multiple "insignificant" changes is also necessary since they may cumulatively cause significant changes in water quality (multiple discharges into the same waterbody). In addition, the location of the waterbody in relation to Tier A1 and C1 waters is also important. If a proposed action lowers water quality in a waterbody that is upstream of a Tier A1 or C1 waterbody, additional analyses may be required.

If it is determined that the proposed action will significantly lower water quality, but still protect beneficial uses, then an analysis will be necessary to establish a strong tie between the proposed lower water quality level and "important" economic or social development.

Task C

The next step is to determine that lower water quality is necessary to accommodate important social or economic development in the area in which the waters are located. There have been many questions as to what factors are considered in judging a development to be necessary, justifiable, economically or socially important enough to degrade water quality. No one set of factors apply because of varying environmental, social, and economic conditions throughout the state. Site-specific decisions could be made based on evidence presented by the party proposing the water quality change and the public. The benefits of the project must be weighed against the costs to the community and the environment.

The following criteria may be used as guidance in the decision-making process to demonstrate important social and economic development. First, the party proposing the water quality change must demonstrate that the lowering of water quality is necessary to accommodate a new discharge, increased loading because of community growth, or other activities where a no-discharge option is not feasible. Second, the party proposing the change must describe and analyze the current state of economic and social development in the affected are to identify "baseline" conditions. The area's use dependence on the water resource affected by the proposed action should also be included, so that it can be determined if the lowering of water quality is in the public interest. The following factors should be included in the baseline analysis:

- Population
- Area employment
- Area indirect or direct income, and/or community tax base

Third, the party proposing the change must demonstrate the extent to which the proposed decrease in water quality would create an increase in the rate of economic or social development, and specifically why the water quality change is necessary to achieve such development.

The factors to be included in the analysis of incremental effects expected to result from the water quality degradation include:

- Expected employment growth
- Expected income effects
- Increases in the community tax base

The requirements for a given analysis will be site-specific, depending on factors such as data availability, conditions specific to the affected waterbody, and the boundaries of the affected area (local, city, county or state-wide). The relative costs of all the treatment alternatives, or implementation of best management practices should also be included. In the case where precise or detailed social or economic information is not available, professional judgement must be exercised in accepting demonstrations based on reasonable estimates derived from existing data sources.

If this information is provided, then an opportunity for public comment must follow, with a review and a decision made by the Environmental Quality Commission.

Task D

Public participation and intergovernmental coordination are essential elements of antidegradation policy implementation. Potential participants must be explicitly aware of the antidegradation policy issues and the potential impact of lowering water quality. The public participation requirement can be met by holding public hearings. Intergovernmental coordination consists of reviews of proposed actions by affected local, state and federal agencies.

A public notice related to the potential lowering of water quality should address at least the following topics:

- A description of the antidegradation policy
- Specific identification of substances that may enter the waterbody, and known and suspected environmental effects
- A determination that uses will be maintained and protected
- Description of the current water quality and the level that it exceeds standards
- Description of the impact that the proposed action will have on water quality
- A summary of other actions that have lowered water quality and determination of cumulative impacts
- A determination that lower water quality is necessary to accommodate important social and economic development
- A description of the intergovernmental coordination process that has taken place
- A determination that there has been achieved the highest statutory and regulatory requirements for all new and existing point sources, and all cost-effective and reasonable best management practices for nonpoint sources

Policy Considerations of Waterbody Classification System

The current antidegradation policy in the water quality standards protects high quality waters of the state. The proposed classification system, and a policy that incorporates the system would provide a clearer definition of the waters that need appropriate levels of protection. It is not anticipated that additional restrictions on activities will result. However, if it is found that current permits or best management practices are determined to be insufficient to protect the beneficial uses and values of outstanding resource waters, improved or additional best management practices may be required, or activities more strictly regulated in portions of an upstream area.

The proposed waterbody classification system would require additional staff time to complete, and would require additional reviews of permits and best management practices to assure compliance with the standards. However, the development of an antidegradation policy and implementation plan is part of the regular triennial standards review process.

The development of specific water quality standards for designated waters would be very resource intensive. It would require considerable staff time to develop the necessary information to designate a waterbody and set the standards.

In order to meet the federal antidegradation policy requirements of the Water Quality Act (1987) as amended, and to address protection of water quality in all waters of the state, the Department is evaluating three options. The options are as summarized as follows:

The alternatives considered by the Department include the following:

A. Amend the antidegradation policy language to be consistent with federal regulations, and implement the policy for high quality waters on a case-by-case basis within existing program functions. This alternative would meet the federal requirements for amending the policy, but would not provide clear guidance for implementation.

B. Classify waters of the state into categories according the quality, and develop standards for the high quality and outstanding quality waters category. Amend the antidegradation policy to incorporate reference to these standards. This alternative would require an additional amount of work in classifying the waters of the state, but would more clearly define applicable standards to the different waterbody types, and would recognize special resource values.

C. Develop a specific process for designating high quality and outstanding resource waters and setting standards for these designated waterbodies. Instead of a waterbody classification system, each designated high quality waterbody, or outstanding resource waterbody would have specific standards to protect the unique values of that waterbody. The antidegradation policy would be amended to include reference to protection of specifically designated waterbodies. This alternative would require an extensive amount of staff work to develop the specific standards for each designated waterbody.

V. PUBLIC COMMENTS RECEIVED ON ISSUE PAPER

Following is a summary of the comments the Department received orally or in writing during the public review from May through October 1990.

Classification: Although some respondents supported a waterbody classification system, many did not support the proposed five categories. Instead, they supported a three category classification where waters would be divided into those that did not meet standards as water quality limited waters, and those that met or exceeded standards as high quality waters. Those waters with exceptional protection requirements would be classified as outstanding resource waters.

Outstanding Resource Waters: Several respondents believed that State Scenic Waterways, Wild and Scenic Rivers, and tribal fishing grounds should be non-degradation waterbodies and automatically included in the outstanding resource waters category, and that a nomination process for other waters in the state be established. Others, however, questioned how "non-degradation" of outstanding resource waters could be realistically achieved. One respondent recommended that Division of State Lands be the designating agency for outstanding resource waters.

Definitions: Several respondents requested clarification of the terms "important", "justifiable" , "critical habitat", "short-term", and "high quality waters" as they appear in the proposed rule.

Enforcement: Many respondents emphasized the importance of applying the antidegradation policy for both point and nonpoint source discharges, and to establish a system of public notification for activities that will cause nonpoint source runoff. A few other respondents questioned the reasons for an antidegradation policy applying to water quality limited waterbodies, or outstanding resource waters, and believed that implementation of an antidegradation policy where any actions that lower water quality would be decided on by the EQC is far too stringent. In addition, they questioned applying the antidegradation policy to all high quality waters of the state as well.

Private lands: Comments were made that questioned and did not support the application of antidegradation requirements for activities on private lands that may cause water quality problems.

Cumulative impacts: Several respondents supported the control of a series of short-term impacts that may cause long-term cumulative impacts to water quality or beneficial uses. However, they stated that cumulative impact assessment is a newly developing science and should be developed further before making it a requirement in a policy. In addition, they stated that a policy preventing cumulative impacts would have the EQC as the ultimate decisionmaker for all forest operations.

Costs of polluted water: Several respondents commented that "important economic and social development" should not be the yardstick of importance for lowering water quality and an antidegradation review of activities should also include the social and economic costs of preserving vs. degrading water quality for drinking water supplies, recreation and aquatic life habitat. They stated that allowance of degradation is contrary to the Clean Water Act's goal of "maintaining, enhancing and restoring" water quality.

Costs of implementation: A few respondents stated that implementation of the antidegradation policy will require millions of dollars in increased wastewater treatment requirements, implementation of best management practices, and monitoring. They recommended more complete financial statements were needed on the fiscal impacts of implementing the antidegradation policy.

Best Management Practices: Several respondents pointed out that application of BMP's did not automatically mean compliance with the Clean Water Act and water quality standards. They questioned how DEQ will assure compliance with BMP's and disagreed that BMP's effectively control nonpoint source runoff.

Federal Antidegradation Policy: A few respondents stated that the proposed antidegradation policy far exceeds the requirements set forth by the federal antidegradation policy, introduces sweeping broadscale changes with far-reaching ramifications, and uses a "back-door" approach, and that artificial maintenance of higher water quality above standards is uncalled for. They stated that the federal policy allows all waters to be degraded and assimilative capacity used up, except outstanding resource waters, if water quality standards are met and beneficial uses are protected.

Economic Benefits: A respondent requested that the Department require an annual report by polluters of the actual outcome of their predictions for economic and social development, community income effects, as well as full accounting of the costs borne by others for the pollution generated.

VI. DEPARTMENT RESPONSE TO PUBLIC COMMENTS

Classification: The Department agrees that at this time a three category waterbody classification system may be more effective than the five category system described in the issue paper. The Department proposes that waters be classified as outstanding resource waters, high quality waters, and water quality limited waters. The high quality waters include for the most part all the waters previously identified in the proposed classification categories A2, B1, and B2.

Outstanding Resource Waters: The Department proposes a nomination process for the Commission to designate Outstanding Resource Waters. Since many of the state scenic waterways, or national wild and scenic rivers were not necessarily designated for their outstanding water quality, it may not be appropriate to automatically designate them as outstanding resource waters. If those waters do have outstanding water quality, then they may be nominated and designated based on those remarkable water quality values. It is the responsibility of the Commission to designate these waters, rather than other agencies or commissions since they are specifically charged with implementing the requirements of the Clean Water Act.

Definitions: The Department added definitions for "short-term", "critical habitat", "high quality" and "outstanding resource waters". Terms such as "justifiable" and "important" are not specifically defined because they reflect the judgement of the Commission based on consideration of all the economic and social development factors as compared to the benefits of maintaining water quality and preventing degradation.

Enforcement: The antidegradation policy applies to managing both point source and nonpoint source discharges in all waters of the state.

Private Lands: Antidegradation is applicable to all waters of the state, regardless of whether those waters flow through adjacent public or private lands. Activities that occur on private lands that may affect public waters are controlled by the landowners through implementation of best management practices. However, if those activities adversely affect public waters and impair beneficial uses, then actions to require the control of the water quality degradation to meet the antidegradation requirements must be taken by the Department or the Commission.

Cumulative impacts: In evaluating a series of short-term water quality disturbances, the Department must determine if long-term water quality degradation may apply. This is already part of the overall water quality standards approach, so no specific reference is needed for the prevention of cumulative impacts. This language was deleted from the proposed rules.

Costs of polluted water: When the Commission evaluates proposals to lower water quality, consistent with the rules and policies contained in the Oregon Administrative Rules Chapter 340 Division 41, they determine the economic benefits and weigh those with the beneficial uses to be protected, and the costs associated with lowering water quality. Reference to this consideration is included in the proposed rule language.

Costs of implementation: The proposed antidegradation policy should not have significantly different costs associated with implementation than the current antidegradation policy and implementation plans do, except for those waters that may at some time be designated as outstanding resource waters.

Best Management Practices: The Department agrees that best management practices are a tool to achieve water quality standards, and not the standard itself.

Federal Antidegradation Policy Requirements: The proposed policy reflects the federal requirement for a policy that protects all waters of the state, and establishes an outstanding resource waters category. The proposed policy is consistent with other sections of the current Oregon administrative rules and statutes that describe the need to maintain and enhance water quality, evaluate all reasonable options prior to discharging pollutants to waters of the state, and does not introduce requirements for high quality waters that are stricter than the current state or federal policies.

Economic Benefits: The Commission may seek to obtain follow-up information on the effects of economic development on water quality and the community without needing specific reference to requiring the information as part of the antidegradation policy. The costs of lowering water quality are already referred to in Section 340-41-026(1)(a)(A)(ii).

VII. PROPOSED RULE AMENDMENTS: Antidegradation Policy

The following changes are recommended for the antidegradation policy. These recommendations are based on recent EPA changes to the federal antidegradation policy, and public comments received during water quality standards hearings held in 1986, and recent public comment on the issue papers. Proposed deletions are bracketed and new language is underlined.

340-41-026(1)(a) Antidegradation Policy for Surface Waters. The purpose of the Antidegradation Policy is to guide decisions that affect water quality such that unnecessary degradation is prevented, and to protect, maintain, and enhance existing surface water quality to protect all designated beneficial uses. The standards and policies set forth in OAR 340-41-120 through 962 are intended to implement the Antidegradation Policy.

A. Where [E]existing [high quality] water quality [which] meets or exceeds those levels necessary to support the propagation of fish, shellfish, and wildlife and recreation in and on the water, and other designated beneficial uses, that level of water quality shall be maintained and protected. [unless t] The Environmental Quality Commission [chooses], after full satisfaction of the intergovernmental coordination and public participation provisions of the continued planning process, and with full consideration of OAR 340-41-026 (2), (3), (5) and (6), however, may [to] lower water quality [for] in these high quality waters if they find:

i no other reasonable alternatives exist except to lower water quality; and

ii the action is necessary, important and justifiable for ~~economic or social development~~ benefits and takes into consideration the costs of lowered water quality; and

iii all water quality standards will be met and beneficial uses protected.

B. For water quality limited waterbodies, the water quality shall be managed as described in OAR 340-41-026(3).

C. The Director or [his] a designee may allow lower water quality on a short term basis in order to respond to emergencies or to otherwise protect human health and welfare.

D. [In no event, however, may degradation of water quality interfere or be injurious to the beneficial use of water within surface waters of the following areas: (A) National Parks; (B) National Wild and Scenic Rivers; (C) National Wildlife Refuges; (D) State Parks.] Where existing high quality waters constitute an outstanding state or national resource such as those waters designated as extraordinary resource waters, or as critical habitat areas, the existing water quality and water quality values shall be maintained and protected, and classified as "Outstanding Resource Waters of Oregon". The Commission may specially designate high quality waterbodies to be classified as Outstanding Resource Waters in order to protect the water quality parameters that affect ecological integrity of critical habitat or special water quality values that are vital to the unique character of those waterbodies. The Commission, either on their own initiative or through nominations from the Department or other applicants, shall consider designating these waters based upon receiving the following information:

i. An application must provide notification to affected parties and provide sufficient information to the Department as described in the petition for rulemaking (OAR 137-01-070);

ii. An application must describe the existing water quality, beneficial uses and ecological resource values of the water body they are nominating as Outstanding Resource Waters;

iii. An application must define the outstandingly remarkable values related to water quality of the waterbody and describe why they need additional protection;

iv. An applicant must describe the level of water quality needed to protect those values and beneficial uses.

If the application is determined to be complete, the Commission will make their decision based on the need to provide higher protection than that provided for high quality waters. If the Commission receives an incomplete application, they may request additional information to be supplied within 90 days.

In designating Outstanding Resource Waters, the Commission shall establish the water quality levels and values to be protected, and in a management plan, and shall provide for what activities are allowed that would not affect the outstanding resource values. After the designation, the Commission shall not allow activities that may lower water quality below the level established in the management plan except on a short term basis to respond to emergencies or to otherwise protect human health and welfare.

340-41-006

(33) "Critical Habitat" means specific areas which have physical, chemical and biological conditions essential to a specfies, that if diminished in quality or quantity, would seriously threaten the survival of a species or group of species in need of special protection.

(34) "High Quality Waters" means those waters which meet or exceed those levels that are necessary to support the propagation of fish, shellfish, and wildlife and recreation in and on the water, and other designated beneficial uses.

(35) "Outstanding Resource Waters" means those waters designated by the Environmental Quality Commission where existing high quality waters constitute an outstanding state or national resource based on their extraordinary water quality values, or where special water quality protection is needed to maintain critical habitat areas.

(36) "Short-term disturbance" means a temporary disturbance where water quality standards may be violated briefly, but not of a duration to cause acute, unacceptable chronic or cumulative effects on beneficial uses.

ISSUE PAPER #3
DISSOLVED OXYGEN
Revised as of 10/23/90

I. INTRODUCTION

Dissolved oxygen is an important indicator of water quality and the ability of a waterbody to support a healthy aquatic community. Primary sources of dissolved oxygen include photosynthesis and diffusion from the atmosphere. Oxygen is consumed in normal biological and chemical processes that occur in the water column and benthic sediments. Oxygen may also be bound to benthic sediments or lost to the atmosphere.

II. CURRENT RULE

DEQ has adopted several dissolved oxygen water quality standards to protect designated beneficial uses (OAR 340, Division 41, Tables 2-19). For basins in western Oregon the standards are:

340-41-(river basin) 2(a)(A)

(i) Fresh waters shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes.

(ii) Non-salmonid fish producing waters: The DO concentration shall not be less than 6 mg/l.

340-41-(river basin) 2(a)(B)

Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

340-41-(river basin) 2(a)(C)

Columbia River: DO concentrations shall not be less than 90 percent of saturation.

340-41-(river basin) 3

Where the natural quality parameters of water of the ____ basin are outside the numerical limits of the above assigned water quality standards, the natural water quality shall be the standard.

These standards are applied to the following basins: North Coast-Lower Columbia, Mid Coast, Umpqua, South Coast, Rogue, portions of the Willamette, Sandy, Hood, Deschutes, and portions of the Klamath.

The seasonal low dissolved oxygen standards for the salmonid producing streams (340-41-(river basin) 2(a)(A) in eastern Oregon basins is 75% of saturation. This standard is applicable in the following basins: John Day, Umatilla, Walla, Grande Ronde, Powder, Malheur, Owyhee, Malheur Lake, Goose and Summer Lakes.

The Willamette and Klamath River Basins have several river reach specific dissolved oxygen standards. Specifically, the dissolved oxygen standards for the Willamette River Basin (340-41-445) are:

Multnomah Channel to Willamette Falls...5 mg/l
Willamette Falls to Newberg.....6 mg/l
Newberg to Salem.....7 mg/l
Salem to the confluence of tributaries..90 % saturation
Upper tributaries (spawning areas).....90 or 95% saturation
Non-salmonid producing waters.....6 mg/l

The dissolved oxygen standards for the Klamath River Basin (340-41-965) are:

Mainstem Klamath from Klamath Lake to
Keno Dam.....5 mg/l
Mainstem Klamath Keno Dam to
California Border.....7 mg/l
All other basin waters (spawning).....90 or 95% saturation
Non-salmonid producing waters.....6 mg/l

III. CONCERNS WITH THE CURRENT RULE

Dissolved oxygen standards expressed as a percent of saturation may be unnecessarily stringent during winter months and potentially unprotective during summer months (Chapman, 1986). The U.S. Environmental Protection Agency (EPA) has developed numerical dissolved oxygen criteria for the protection of salmonid and nonsalmonid fisheries (EPA< 1986) that are also specific for the life stage of each fishery and the length of exposure. These criteria are shown below. Early life stage (ELS) refers to all embryonic, larval and juvenile fish to 30 days old, and other life stages (OLS) refers to all older fish.

	Coldwater		Warmwater	
	ELS	OLS	ELS	OLS
30 day mean	NA	6.5	NA	5.5
7 day mean	9.5	NA	6.0	NA
7 day mean min.	NA	5.0	NA	4.0
1 day min.	8.0	5.0	5.0	3.0

30 and 7 day mean values are then calculated from daily means, which are (daily maximum + daily minimum values)/2. The 7 day mean minimum is calculated from seven consecutive daily minimum values.

Included in the EPA Ambient Water Quality Criteria for Dissolved Oxygen document (Chapman, 1986) is a table identifying the level of fishery resource protection offered at various dissolved oxygen concentrations. These impairment values are listed below.

1. Salmonid Waters

   a. Embryo and Larval Stages

   - No Production Impairment (NPI) =11* (8)
   - Slight Production Impairment (SPI) = 9* (6)
   - Moderate Production Impairment = 8* (5)
   - Severe Production Impairment = 7* (4)
   - Limit to Avoid Acute Mortality = 6* (3)

(*Note: These are water column concentrations recommended to achieve the required intergravel dissolved oxygen concentration shown in parentheses. The 3 mg/l difference is discussed in the criteria document).

   b. Other Life States

   - No Production Impairment = 8
   - Slight Production Impairment = 6
   - Moderate Production Impairment = 5
   - Severe Production Impairment = 4
   - Limit to Avoid Acute Mortality = 3

2. Nonsalmonid Waters

   a. Early Life States

   - No Production Impairment =6.5
   - Slight Production Impairment =5.5
   - Moderate Production Impairment = 5
   - Severe Production Impairment =4.5
   - Limit to Avoid Acute Mortality = 4

b. Other Life States

- No Production Impairment = 6
- Slight Production Impairment = 5
- Moderate Production Impairment = 4
- Severe Production Impairment =3.5
- Limit to Avoid Acute Mortality = 3

3. Invertebrates

- No Production Impairment = 8
- Some Production Impairment = 5
- Limit to Avoid Acute Mortality = 4

From: Chapman, 1986, Water Quality Criteria for Dissolved Oxygen

Specific concerns with existing Oregon water quality standards include:

1. The percent of saturation standards, most notably the 75 percent saturation standards, may not fully protect older salmonids exposed to warmer water temperatures. These standards need to be modified to include acceptable mean and minimum dissolved oxygen concentrations and length of exposures for each.

2. Standards for some portions of the Willamette and Klamath Rivers are less than the EPA 30 day mean criterion for nonspawning salmonids. The existing 5 mg/l dissolved oxygen minimum standard is the same as the EPA seven day minimum mean and will protect persisting fish populations, but as written could allow for considerable loss of production. This 5 mg/l standard is also equal to the one day minimum criterion for the early life stages of nonsalmonid populations. Expansion of the standard to include acceptable long-term and short-term exposure concentrations is necessary.

3. The 6 mg/l minimum standard for the Willamette River above Willamette Falls offers a higher level of protection for salmonids and risks only slight impairment of production. This standard also offers more protection to all life stages of warm water fish in the river. Minimum and mean values and acceptable exposure periods should be established.

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

The following proposed revisions to the dissolved oxygen standards were prepared for public comment to address the Department's concerns with the existing rules. Language proposed to be deleted is bracketed and new language is underlined. Specific basin standards, or rules, which are affected by each recommendation are identified following the proposal.

340-41-___(2)(a)

Dissolved Oxygen (DO):

(A)(i) Salmonid producing waters:

[Fresh waters shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(A)	340-41-205-(2)(a)(A)(i)
Mid Coast	340-41-245(2)(a)(A)	340-41-245-(2)(a)(A)(i)
Umpqua	340-41-285(2)(a)(A)	340-41-285-(2)(a)(A)(i)
South Coast	340-41-325(2)(a)(A)	340-41-325-(2)(a)(A)(i)
Roque	340-41-365(2)(a)(A)	340-41-365-(2)(a)(A)(i)
Willamette	340-41-445(2)(a)(E)(i)	340-41-445-(2)(a)(A)(i)
Sandy	340-41-485(2)(a)(B)	340-41-485-(2)(a)(A)(i)
Hood	340-41-525(2)(a)(B)(i)	340-41-525-(2)(a)(A)(i)
Deschutes	340-41-565(2)(a)(B)	340-41-565-(2)(a)(A)(i)
Klamath	340-41-965(2)(a)(C)(i)	340-41-965-(2)(a)(A)(i)

340-41-___(2)(a)

(A)(i) Salmonid producing waters:

[DO concentrations shall not be less than 75% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
John Day	340-41-605(2)(a)(B)	340-41-605(2)(a)(A)(i)
Umatilla	340-41-645(2)(a)(B)	340-41-645(2)(a)(A)(i)
Walla Walla	340-41-685(2)(a)	340-41-685(2)(a)(A)(i)
Grande Ronde	340-41-725(2)(a)	340-41-725(2)(a)(A)(i)
Powder	340-41-765(2)(a)	340-41-765(2)(a)(A)(i)
Malheur	340-41-805(2)(a)	340-41-805(2)(a)(A)(i)
Owyhee	340-41-845(2)(a)	340-41-845(2)(a)(A)(i)
Malheur Lake	340-41-885(2)(a)	340-41-885(2)(a)(A)(i)
Goose and Summer Lakes	340-41-925(2)(a)(A)	340-41-925(2)(a)(A)(i)

340-41-___(2)(a)

(A)(ii) Non-salmonid fish producing waters:

[The DO concentration shall not be less than 6 mg/l].
The 30 day mean dissolved oxygen concentrations shall be 6.0 mg/l or greater with one day minimum concentrations of not less than 4.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 5.0 mg/l. Dissolved oxygen concentrations in spawning areas shall have seven day mean water column concentrations of 6.5 mg/l or greater and one day minimum concentrations of 5.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
Willamette	340-41-445(2)(a)(E)(ii)	340-41-445(2)(a)(A)(ii)
Hood	340-41-525(2)(a)(B)(ii)	340-41-525(2)(a)(A)(ii)
Klamath	340-41-965(2)(a)(C)(ii)	340-41-965(2)(a)(A)(ii)
North Coast		340-41-205(2)(a)(A)(ii)
Mid Coast		340-41-225(2)(a)(A)(ii)
Umpqua		340-41-285(2)(a)(A)(ii)
South Coast		340-41-325(2)(a)(A)(ii)
Roque		340-41-365(2)(a)(A)(ii)
Sandy		340-41-485(2)(a)(A)(ii)
Deschutes		340-41-565(2)(a)(A)(ii)
John Day		340-41-605(2)(a)(A)(ii)
Umatilla		340-41-645(2)(a)(A)(ii)
Walla Walla		340-41-685(2)(a)(A)(ii)
Grande Ronde		340-41-725(2)(a)(A)(ii)
Powder		340-41-765(2)(a)(A)(ii)
Malheur		340-41-805(2)(a)(A)(ii)
Owyhee		340-41-845(2)(a)(A)(ii)
Malheur Lake		340-41-885(2)(a)(A)(ii)
Goose and Summer Lakes		340-41-925(2)(a)(A)(ii)

340-41-___ (2)(a)

(B) Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(B)	340-41-205-(2)(a)(B)
Mid Coast	340-41-225(2)(a)(B)	340-41-225-(2)(a)(B)
Umpqua	340-41-285(2)(a)(B)	340-41-285-(2)(a)(B)
South Coast	340-41-325(2)(a)(B)	340-41-325-(2)(a)(B)
Roque	340-41-365(2)(a)(B)	340-41-365-(2)(a)(B)

340-41-___(2)(a)

(C) When natural environmental conditions limit dissolved oxygen concentrations to less than 110 percent of the applicable numerical standard, 90 percent of the natural dissolved oxygen concentration shall be the standard.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast		340-41-205(2)(a)(C)
Mid Coast		340-41-225(2)(a)(C)
Umpqua		340-41-285(2)(a)(C)
South Coast		340-41-325(2)(a)(C)
Roque		340-41-365(2)(a)(C)
Willamette		340-41-445(2)(a)(B)
Sandy		340-41-485(2)(a)(B)
Hood		340-41-525(2)(a)(B)
Deschutes		340-41-565(2)(a)(B)
John Day		340-41-605(2)(a)(B)
Umatilla		340-41-645(2)(a)(B)
Walla Walla		340-41-685(2)(a)(B)
Grande Ronde		340-41-725(2)(a)(B)
Powder		340-41-765(2)(a)(B)
Malheur		340-41-805(2)(a)(B)
Owyhee		340-41-845(2)(a)(B)
Malheur Lake		340-41-885(2)(a)(B)
Goose and Summer Lakes		340-41-925(2)(a)(B)
Klamath		340-41-965(2)(a)(B)

Additional Proposed Deletions:

340-41-___(2)(a)

(C) [Columbia River: DO concentrations shall not be less than 90 percent of saturation].

RULE REFERENCES BY BASIN

Basin	Old Rule
North Coast	340-41-205(2)(a)(C)
Willamette	340-41-445(2)(a)(F)
Sandy	340-41-485(2)(a)(A)
Hood	340-41-525(2)(a)(A)
Deschutes	340-41-565(2)(a)(A)
John Day	340-41-605(2)(a)(A)
Umatilla	340-41-645(2)(a)(A)

340-41-445(2)(a)

(A) [Multnomah Channel and Main stem Willamette River from mouth to the Willamette Falls at Oregon City, river mile 26.6: The DO concentration shall not be less than 5 mg/l.

(B) Main stem Willamette River from the Willamette Falls to Newberg, river mile 50: The DO concentration shall not be less than 6 mg/l.

(C) Main stem Willamette River from Newberg to Salem, river mile 85: The DO concentration shall not be less than 7 mg/l.

(D) Main stem Willamette River from Salem to the confluence of the Coast and Middle Forks, river mile 187: The DO concentration shall not be less than 90% of saturation.]

340-41-925(2)(a)

(B) [Goose Lake:DO concentrations shall not be less than 7 milligrams per liter.]

340-41-965(2)(a)

(A) Main stem Klamath River from Klamath Lake to Keno Dam, (river miles 255 to 232.5): DO concentrations shall not be less than 5 mg/l.

(B) Main stem Klamath River from Keno dam to Oregon-California Border (river miles 232.5 to 208.5): DO concentrations shall not be less than 7 mg/l.

New standards proposed above are also applicable to these water bodies.

V. PUBLIC COMMENT RECEIVED ON ISSUE PAPER AND AGENCY RESPONSE

DEQ received numerous comments on the proposed dissolved oxygen (DO) standard. The issues will be described and the Department's response will follow each issue. Generally, the questions and comments were related to the following four issues:

1. Need for change: Why are revisions being proposed? Has use impairment been documented under existing standards and what documentation is available to demonstrate that the Willamette River fishery is "under stress" and to show that the stress is related to the current D.O. (dissolved oxygen) standards? Will the proposed revisions maintain, improve or attain the designated use?

RESPONSE

The reasons for proposing revisions to the dissolved oxygen standards are as described in the Issues Paper. They include:

a) Concern that the percent saturation standards, specifically the 75 percent saturation standards which currently apply to many Eastern Oregon streams, may not protect older salmonids exposed to warmer water temperatures. As EPA pointed out to DEQ in their review of Oregon's list of streams identified as potentially water quality limiting and as presented in their 1986 guidance document, D.O. standards expressed as a percent of saturation may be unnecessarily stringent during winter months and potentially not protective during summer months. Also, the current standards do not express an acceptable mean and minimum and length of exposure for each.

b) Some existing standards are less than EPA criteria for no production impairment, and some standards established to protect the same sensitive use differ between some basins and stream segments. Revisions are proposed to address these anomalies.

The proposed revisions are aimed at protecting the designated beneficial uses by identifying the instream quality dissolved oxygen values that provide for "no production impairment" levels of the most sensitive designated uses of the water.

2. <u>EPA Criteria</u>: What beneficial uses are to be protected, what are the proposes values based on, and why weren't EPA national criteria used? Some recommended the EQC direct the DEQ to produce a detailed scientific basis for the proposal or utilize EPA's recommended approach for setting dissolved oxygen standards. Some asked whether EPA had been consulted regarding DEQ's departure from recommended criteria and how DEQ evaluated the factors EPA considered in setting the national criteria's D.O. levels.

RESPONSE

The proposed values are intended to protect the three beneficial uses most sensitive to dissolved oxygen. These include coldwater fish, warmwater fish and aquatic life. Coldwater fisheries are further categorized in the state's Beneficial Use Tables (OAR 340, Division 41) as Anadromous Fish Passage, Anadromous (Shad and Sturgeon) Fish Spawning, Salmonid Fish Rearing and Salmonid Fish Spawning. Coldwater fish include salmonids of the genera Coregonus, Oncorhyncus, Prosopium, Salmo, Salvelinus, Stenodus and Thymallus.

Even though standards are expressed in terms of salmonid and nonsalmonid producing waters, it is intended that the numerical values proposed for salmonid producing waters also apply to other coldwater fish. Oregon Fish and Wildlife may also have suggestions as to other sensitive species that need to be protected under the category of "salmonid producing" waters.

Salmonid producing waters may be identified as spawning and early life stage areas (the early life stage includes egg, embryo, larval and juvenile forms up to 30 days after hatching) where a higher seasonal D.O. standard would be applicable. The lower standard for salmonid producing waters would be applied in spawning areas when spawning adults or early life stages are not present and for rearing areas and migration routes. The salmonid producing waters standard would also apply to coldwater tributaries which support macroinvertebrate communities upon which the young salmonids feed. The warmwater, or nonsalmonid DO standard will not adequately protect these sensitive communities.

The nonsalmonid standard applies to all warmwater environments which support all nonsalmonid fish populations and the plant and animal life characteristic of these communities.

The proposed numerical values are based on EPA qualitative effects level criteria. The 7-day average (mean) values proposed for coldwater and warmwater fisheries spawning areas and seasons and the 30-day average (mean) values for nonspawning areas and seasons are equivalent to EPA's criteria for "no production impairment" at constant exposures levels. EPA recommends a 7-day averaging period for spawning waters and use of the "no production impairment" value as the mean where slight production impairment or a small but undefinable risk of moderate production impairment is unacceptable". They also recommend the "slight production impairment" values as minima to provide this level of protection.

EPA defines slight production impairment as a 10% reduction in productivity and a moderate production impairment as a 20% reduction in productivity. These values were generated primarily with laboratory data corroborated with limited field information.

In comparison and as EPA notes, the "national criteria" present averages which represent conditions **between** no production and slight production impairment. They do not represent an assured no-effect level. In situations where criteria conditions are just maintained for considerable periods, the criteria represent some risk of production impairment according to EPA.

After again reviewing EPA guidance in consideration of the public's comments, the Department has prepared an alternate proposal (Option 2) for public hearing. This proposal is suggested for public hearing comment in addition to the original proposal (Option 1). Under Option 2 all 1-day minima are proposed at the "slight production impairment" level as compared to Option 1 where some are at the "moderate production impairment" level. Under this Option, a return frequency (recurrence interval) of violations of the 1 day minima of once every 10 years would be used to evaluate compliance. In addition, Option 2 proposes to apply the more protective warmwater fisheries values for spawning periods and areas to all nonsalmonid fish producing waters yearround. A comparison of Option 1 (the 9/21/90 proposal) and Option 2 (a new 11/2/90 proposal) and EPA criteria are presented in Tables 1(A) through 1(D). Proposed rule language coinciding with Option 2 is presented in the revised attachment of proposals for public hearing.

3. TMDLs: Are the proposed values achievable in natural waters and how will compliance with the standards be evaluated. Will the change in standards necessitate a change in instream monitoring requirements? Will dynamic or statistical modeling be used to establish TMDLs that maintain dissolved oxygen standards? Will the basin standards for biochemical oxygen demand (for sewage treatment systems) be revised if TMDLs based on proposed standards do not justify as stringent levels of technology?

RESPONSE

Existing ambient data collected during intensive diurnal monitoring efforts on the Willamette River indicate that the proposed standards are attainable. Nevertheless, when natural conditions such as temperature, elevation, and natural allocthonous input limits the solubility of oxygen in water to less than 110% of the numerical standard, 90% of the natural condition would be the minimum standard.

Attainment of water quality standards will continue to be evaluated using ambient monitoring data. If based on the ambient data the waterbody is found to not meet water quality standards special intensive studies would be conducted to assess the point and non point sources contributions and to establish the Total Maximum Daily Loads and Waste Load Allocations.

As related above, upon review of the public comment, the Department has prepared an alternate proposal (Option 2) for public hearing. Higher values are proposed as the daily minima to provide better assurance that even with limited monitoring data, uses will be protected. Though the proposed 30-day and 7-day mean values are aimed at "no production impairment", the Department relies on data which must be considered representative of the 1-day minima in assessing compliance with standards.

The Department, with the aid of a Technical Advisory Committee, has not yet selected the model for the Willamette River. A stoichastic model will be used to make preliminary sensitivity checks. Depending on the sensitive checks a dynamic model may be used. If a dynamic model is to be used, a significantly greater amount of effort will be needed for data collection than can be provided with available resources.

The Department is not proposing a change in the basin treatment criteria, though effluent limits may be made more stringent if necessary to achieve water quality standards or address the policies of the EQC, including the antidegradation policy.

4. Effect of the Change: What will be the effect of the proposed standards on dischargers? Some commented that the proposed dissolved oxygen values would result in virtually all discharges on the Willamette River in violation of the proposed values and compliance with the proposed dissolved oxygen standard will cost hundreds of millions of dollars. Others suggested that additional investigations be performed by the Department before adopting numerical concentrations as regulatory standards or that the EPA "national" criteria" be adopted until the Willamette River study is complete. Others asked if upgraded treatment is needed, how much and will a schedule of compliance be provided?

RESPONSE

The Department does not anticipate treatment requirements any more stringent than would be needed to meet existing water quality standards for dissolved oxygen. Compliance schedules are typically developed for permittees required to achieve effluent limits more stringent than specified in their current permit.

VI. PROPOSED RULE AMENDMENT: Dissolved Oxygen Option 1 & Option 2

OPTION 1 - Dissolved Oxygen

The following presents the first of two alternate dissolved oxygen standards proposals for which the Department is requesting public comment. The numerical values proposed as the 30-day average for salmonid waters and the 7-day averages for salmonid spawning and nonsalmonid waters are based upon U.S. EPA criteria for "No Production Impairment" to the specific fisheries at constant exposure values. Option 1 differs from Option 2 primarily in the 1-day (instaneous) minima values proposed to protect the uses. Also, proposed dissolved oxygen values for nonsalmonid producing waters (warmwater fisheries) differentiate between nonspawning areas and periods and spawning areas and periods under Option 1.

Existing rule language proposed to be deleted is bracketed and proposed new language is underlined. Specific basin standards, or rules, which are affected by each recommendation are identified following the proposed new language.

340-41-___(2)(a) Dissolved Oxygen (DO):

(A)(i) Salmonid producing waters:

[Fresh waters: DO concentrations shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column

concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(A)	340-41-205-(2)(a)(A)(i)
Mid Coast	340-41-245(2)(a)(A)	340-41-245-(2)(a)(A)(i)
Umpqua	340-41-285(2)(a)(A)	340-41-285-(2)(a)(A)(i)
South Coast	340-41-325(2)(a)(A)	340-41-325-(2)(a)(A)(i)
Roque	340-41-365(2)(a)(A)	340-41-365-(2)(a)(A)(i)
Willamette	340-41-445(2)(a)(E)(i)	340-41-445-(2)(a)(A)(i)
Sandy	340-41-485(2)(a)(B)	340-41-485-(2)(a)(A)(i)
Hood	340-41-525(2)(a)(B)(i)	340-41-525-(2)(a)(A)(i)
Deschutes	340-41-565(2)(a)(B)	340-41-565-(2)(a)(A)(i)
Klamath	340-41-965(2)(a)(C)(i)	340-41-965-(2)(a)(A)(i)

340-41-___(2)(a)

(A)(i) Salmonid producing waters:

[DO concentrations shall not be less than 75% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
John Day	340-41-605(2)(a)(B)	340-41-605(2)(a)(A)(i)
Umatilla	340-41-645(2)(a)(B)	340-41-645(2)(a)(A)(i)
Walla Walla	340-41-685(2)(a)	340-41-685(2)(a)(A)(i)
Grande Ronde	340-41-725(2)(a)	340-41-725(2)(a)(A)(i)
Powder	340-41-765(2)(a)	340-41-765(2)(a)(A)(i)
Malheur	340-41-805(2)(a)	340-41-805(2)(a)(A)(i)
Owyhee	340-41-845(2)(a)	340-41-845(2)(a)(A)(i)
Malheur Lake	340-41-885(2)(a)	340-41-885(2)(a)(A)(i)
Goose and Summer Lakes	340-41-925(2)(a)(A)	340-41-925(2)(a)(A)(i)

340-41-___(2)(a)

(A)(ii) Non-salmonid fish producing waters:

[The DO concentration shall not be less than 6 mg/l].
The 30 day mean dissolved oxygen concentrations shall be 6.0 mg/l or greater with one day minimum concentrations of not less than 4.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 5.0 mg/l. Dissolved oxygen concentrations in spawning areas shall have seven day mean water column concentrations of 6.5 mg/l or greater and one day minimum concentrations of 5.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
Willamette	340-41-445(2)(a)(E)(ii)	340-41-445(2)(a)(A)(ii)
Hood	340-41-525(2)(a)(B)(ii)	340-41-525(2)(a)(A)(ii)
Klamath	340-41-965(2)(a)(C)(ii)	340-41-965(2)(a)(A)(ii)
North Coast		340-41-205(2)(a)(A)(ii)
Mid Coast		340-41-225(2)(a)(A)(ii)
Umpqua		340-41-285(2)(a)(A)(ii)
South Coast		340-41-325(2)(a)(A)(ii)
Roque		340-41-365(2)(a)(A)(ii)
Sandy		340-41-485(2)(a)(A)(ii)
Deschutes		340-41-565(2)(a)(A)(ii)
John Day		340-41-605(2)(a)(A)(ii)
Umatilla		340-41-645(2)(a)(A)(ii)
Walla Walla		340-41-685(2)(a)(A)(ii)
Grande Ronde		340-41-725(2)(a)(A)(ii)
Powder		340-41-765(2)(a)(A)(ii)
Malheur		340-41-805(2)(a)(A)(ii)
Owyhee		340-41-845(2)(a)(A)(ii)
Malheur Lake		340-41-885(2)(a)(A)(ii)
Goose and Summer Lakes		340-41-925(2)(a)(A)(ii)

340-41-___ (2)(a)

(B) Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(B)	340-41-205-(2)(a)(B)
Mid Coast	340-41-225(2)(a)(B)	340-41-225-(2)(a)(B)
Umpqua	340-41-285(2)(a)(B)	340-41-285-(2)(a)(B)
South Coast	340-41-325(2)(a)(B)	340-41-325-(2)(a)(B)
Roque	340-41-365(2)(a)(B)	340-41-365-(2)(a)(B)

340-41-___(2)(a)

(C) When natural environmental conditions limit dissolved oxygen concentrations to less than 110 percent of the applicable numerical standard, 90 percent of the natural dissolved oxygen concentration shall be the standard.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast		340-41-205(2)(a)(C)
Mid Coast		340-41-225(2)(a)(C)
Umpqua		340-41-285(2)(a)(C)
South Coast		340-41-325(2)(a)(C)
Roque		340-41-365(2)(a)(C)
Willamette		340-41-445(2)(a)(B)
Sandy		340-41-485(2)(a)(B)
Hood		340-41-525(2)(a)(B)
Deschutes		340-41-565(2)(a)(B)
John Day		340-41-605(2)(a)(B)
Umatilla		340-41-645(2)(a)(B)
Walla Walla		340-41-685(2)(a)(B)
Grande Ronde		340-41-725(2)(a)(B)
Powder		340-41-765(2)(a)(B)
Malheur		340-41-805(2)(a)(B)
Owyhee		340-41-845(2)(a)(B)
Malheur Lake		340-41-885(2)(a)(B)
Goose and Summer Lakes		340-41-925(2)(a)(B)
Klamath		340-41-965(2)(a)(B)

Additional Proposed Deletions:

340-41-___(2)(a)

[(C) Columbia River: DO concentrations shall not be less than 90 percent of saturation].

RULE REFERENCES BY BASIN

Basin	Old Rule
North Coast	340-41-205(2)(a)(C)
Willamette	340-41-445(2)(a)(F)
Sandy	340-41-485(2)(a)(A)
Hood	340-41-525(2)(a)(A)
Deschutes	340-41-565(2)(a)(A)
John Day	340-41-605(2)(a)(A)
Umatilla	340-41-645(2)(a)(A)

340-41-445(2)(a)

[(A) Multnomah Channel and Main stem Willamette River from mouth to the Willamette Falls at Oregon City, river mile 26.6: The DO concentration shall not be less than 5 mg/l.

(B) Main stem Willamette River from the Willamette Falls to Newberg, river mile 50: The DO concentration shall not be less than 6 mg/l.

(C) Main stem Willamette River from Newberg to Salem, river mile 85: The DO concentration shall not be less than 7 mg/l.

(D) Main stem Willamette River from Salem to the confluence of the Coast and Middle Forks, river mile 187: The DO concentration shall not be less than 90% of saturation.]

340-41-925(2)(a)

[(B) Goose Lake:DO concentrations shall not be less than 7 milligrams per liter.]

340-41-965(2)(a)

[(A) Main stem Klamath River from Klamath Lake to Keno Dam, (river miles 255 to 232.5): DO concentrations shall not be less than 5 mg/l.

(B) Main stem Klamath River from Keno dam to Oregon-California Border (river miles 232.5 to 208.5): DO concentrations shall not be less than 7 mg/l.]

New standards proposed above are also applicable to these water bodies.

PROPOSED RULE AMENDMENTS

OPTION 2 - Dissolved Oxygen

The following presents the second of two alternate dissolved oxygen standards proposals for which the Department is requesting public comment. The numerical values proposed as the 30-day average for salmonid waters and the 7-day averages for salmonid spawning and nonsalmonid waters are based upon U.S. EPA criteria for "No Production Impairment" to the specific fisheries at constant exposure values. Option 2 differs from Option 2 primarily in the 1-day (instaneous) minima values proposed to protect the uses, though they differ in several other aspects as well.

Existing rule language proposed to be deleted is bracketed and proposed new language is underlined. Specific basin standards, or rules, which are affected by each recommendation are identified following the proposed new language.

340-41-___(2)(a) Dissolved Oxygen (DO):

(A)(i) Salmonid producing waters:

[Fresh waters: DO concentrations shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(A)	340-41-205-(2)(a)(A)(i)
Mid Coast	340-41-245(2)(a)(A)	340-41-245-(2)(a)(A)(i)
Umpqua	340-41-285(2)(a)(A)	340-41-285-(2)(a)(A)(i)
South Coast	340-41-325(2)(a)(A)	340-41-325-(2)(a)(A)(i)
Roque	340-41-365(2)(a)(A)	340-41-365-(2)(a)(A)(i)
Willamette	340-41-445(2)(a)(E)(i)	340-41-445-(2)(a)(A)(i)
Sandy	340-41-485(2)(a)(B)	340-41-485-(2)(a)(A)(i)
Hood	340-41-525(2)(a)(B)(i)	340-41-525-(2)(a)(A)(i)
Deschutes	340-41-565(2)(a)(B)	340-41-565-(2)(a)(A)(i)
Klamath	340-41-965(2)(a)(C)(i)	340-41-965-(2)(a)(A)(i)

340-41-___(2)(a)

(A)(i) Salmonid producing waters:

[DO concentrations shall not be less than 75% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
John Day	340-41-605(2)(a)(B)	340-41-605(2)(a)(A)(i)
Umatilla	340-41-645(2)(a)(B)	340-41-645(2)(a)(A)(i)
Walla Walla	340-41-685(2)(a)	340-41-685(2)(a)(A)(i)
Grande Ronde	340-41-725(2)(a)	340-41-725(2)(a)(A)(i)
Powder	340-41-765(2)(a)	340-41-765(2)(a)(A)(i)
Malheur	340-41-805(2)(a)	340-41-805(2)(a)(A)(i)
Owyhee	340-41-845(2)(a)	340-41-845(2)(a)(A)(i)
Malheur Lake	340-41-885(2)(a)	340-41-885(2)(a)(A)(i)
Goose and Summer Lakes	340-41-925(2)(a)(A)	340-41-925(2)(a)(A)(i)

340-41-___(2)(a)

(A)(ii) Non-salmonid fish producing waters:

[The DO concentration shall not be less than 6 mg/l].
The 30 day mean dissolved oxygen concentrations shall be 6.0 mg/l or greater with one day minimum concentrations of not less than 4.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 5.0 mg/l. Dissolved oxygen concentrations in spawning areas shall have seven day mean water column concentrations of 6.5 mg/l or greater and one day minimum concentrations of 5.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
Willamette	340-41-445(2)(a)(E)(ii)	340-41-445(2)(a)(A)(ii)
Hood	340-41-525(2)(a)(B)(ii)	340-41-525(2)(a)(A)(ii)
Klamath	340-41-965(2)(a)(C)(ii)	340-41-965(2)(a)(A)(ii)
North Coast		340-41-205(2)(a)(A)(ii)
Mid Coast		340-41-225(2)(a)(A)(ii)
Umpqua		340-41-285(2)(a)(A)(ii)
South Coast		340-41-325(2)(a)(A)(ii)
Roque		340-41-365(2)(a)(A)(ii)
Sandy		340-41-485(2)(a)(A)(ii)
Deschutes		340-41-565(2)(a)(A)(ii)
John Day		340-41-605(2)(a)(A)(ii)
Umatilla		340-41-645(2)(a)(A)(ii)
Walla Walla		340-41-685(2)(a)(A)(ii)
Grande Ronde		340-41-725(2)(a)(A)(ii)
Powder		340-41-765(2)(a)(A)(ii)
Malheur		340-41-805(2)(a)(A)(ii)
Owyhee		340-41-845(2)(a)(A)(ii)
Malheur Lake		340-41-885(2)(a)(A)(ii)
Goose and Summer Lakes		340-41-925(2)(a)(A)(ii)

340-41-___ (2)(a)

(B) Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(B)	340-41-205-(2)(a)(B)
Mid Coast	340-41-225(2)(a)(B)	340-41-225-(2)(a)(B)
Umpqua	340-41-285(2)(a)(B)	340-41-285-(2)(a)(B)
South Coast	340-41-325(2)(a)(B)	340-41-325-(2)(a)(B)
Roque	340-41-365(2)(a)(B)	340-41-365-(2)(a)(B)

340-41-___(2)(a)

(C) When natural environmental conditions limit dissolved oxygen concentrations to less than 110 percent of the applicable numerical standard, 90 percent of the natural dissolved oxygen concentration shall be the standard.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast		340-41-205(2)(a)(C)
Mid Coast		340-41-225(2)(a)(C)
Umpqua		340-41-285(2)(a)(C)
South Coast		340-41-325(2)(a)(C)
Roque		340-41-365(2)(a)(C)
Willamette		340-41-445(2)(a)(B)
Sandy		340-41-485(2)(a)(B)
Hood		340-41-525(2)(a)(B)
Deschutes		340-41-565(2)(a)(B)
John Day		340-41-605(2)(a)(B)
Umatilla		340-41-645(2)(a)(B)
Walla Walla		340-41-685(2)(a)(B)
Grande Ronde		340-41-725(2)(a)(B)
Powder		340-41-765(2)(a)(B)
Malheur		340-41-805(2)(a)(B)
Owyhee		340-41-845(2)(a)(B)
Malheur Lake		340-41-885(2)(a)(B)
Goose and Summer Lakes		340-41-925(2)(a)(B)
Klamath		340-41-965(2)(a)(B)

Additional Proposed Deletions:

340-41-___(2)(a)

[(C) Columbia River: DO concentrations shall not be less than 90 percent of saturation].

RULE REFERENCES BY BASIN

Basin	Old Rule
North Coast	340-41-205(2)(a)(C)
Willamette	340-41-445(2)(a)(F)
Sandy	340-41-485(2)(a)(A)
Hood	340-41-525(2)(a)(A)
Deschutes	340-41-565(2)(a)(A)
John Day	340-41-605(2)(a)(A)
Umatilla	340-41-645(2)(a)(A)

340-41-445(2)(a)

[(A) Multnomah Channel and Main stem Willamette River from mouth to the Willamette Falls at Oregon City, river mile 26.6: The DO concentration shall not be less than 5 mg/l.

(B) Main stem Willamette River from the Willamette Falls to Newberg, river mile 50: The DO concentration shall not be less than 6 mg/l.

(C) Main stem Willamette River from Newberg to Salem, river mile 85: The DO concentration shall not be less than 7 mg/l.

(D) Main stem Willamette River from Salem to the confluence of the Coast and Middle Forks, river mile 187: The DO concentration shall not be less than 90% of saturation.]

340-41-925(2)(a)

[(B) Goose Lake:DO concentrations shall not be less than 7 milligrams per liter.]

340-41-965(2)(a)

[(A) Main stem Klamath River from Klamath Lake to Keno Dam, (river miles 255 to 232.5): DO concentrations shall not be less than 5 mg/l.

(B) Main stem Klamath River from Keno dam to Oregon-California Border (river miles 232.5 to 208.5): DO concentrations shall not be less than 7 mg/l.]

New standards proposed above are also applicable to these water bodies.

REFERENCES

Chapman, G. 1986. Water Quality Criteria for Dissolved Oxygen. EPA 440/5-86-003

EPA. 1986. Quality Criteria for Water 1986. EPA 440/5-86-001

(COMPARISON OF EXISTING DISSOLVED OXYGEN STANDARDS, EPA CRITERIA AND ALTERNATE PROPOSALS FOR HEARING AUTHORIZATION REQUEST ON NOVEMBER 2, 1990)

BENEFICIAL USE: SALMONID PRODUCING WATERS -- SPAWNING, INCUBATION, HATCHING AND EARLY LIFE STAGE

Stream Basin	Application of Numerical Value	Existing Standard	09/21/90 Proposal	11/02/90 Alternate Proposal	EPA "National" Criteria(1)	EPA Criteria With Quality Effects(2)
Willamette 0 - 26.6 + Multnomah Channel	30-Day Average	This Beneficial Use Is Not Designated for This Segment	None Proposed For This Use	Standard for Salmonid Producing (Passage, Rearing & Later Life Stage) Appl.		
	7-Day Average					
	7-Day Mean Min.					
	1 Day					
Willamette >26.6 - RM 50	30-Day Average	This Beneficial Use Is Not Designated for This Segment	None Proposed For This Use	Standard for Salmonid Producing (Passage, Rearing & Later Life Stage) Appl.		
	7-Day Average					
	7-Day Mean Min.					
	1 Day					
Willamette >50 to RM 85	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 7.0	9.0	9.0	8.0	9.0
Willamette >85 to RM 187	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 90% Saturation	9.0	9.5	8.0	9.0
Willamette Tributaries, and North Coast, Mid Coast, Umpqua, SC, Rogue, Sandy, Hood, Deschutes, & Klamath River Basins, Except as Noted Below	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 95% Saturation(3)	9.0	9.0	8.0	9.0
Columbia River	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 90% of Saturation(4)	9.0	9.0	8.0	9.0
John Day, Umatilla, Walla Walla, Grande Ronde, Powder, Malheur, Owyee, Malheur Lake, Goose & Summer Lake	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 95% of Saturation(3)	9.0	9.0	8.0	9.0
Mainsteam Klamath Falls from Klamath Lake to Keno Dam	30-Day Average	This Beneficial Use Is Not Designated for This Segment	None Proposed For This Use	Standard for Non-Salmonid Waters (Early Life Stages) Applies		
	7-Day Average					
	7-Day Mean Min.					
	1 Day					
Mainsteam Klamath Falls from Keno Dam to OR/CA Border	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 7.0	9.0	9.0	8.0	9.0

NOTE:

(1) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986, Table 8, National Criteria. Average DO concentration values are 0.5 mg/l above the slight production impairment values. Serve as estimate of threshold concentrations below which detrimental effects expected.

(2) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986. Summary of DO concentrations coinciding with EPA's judgments on qualitative levels of effect: 30-day average -- No Production Impairment; 7-day average -- Slight Production Impairment; 1-day minimum -- Moderate Production Impairment. Slight and Moderate are equivalent to 10 - 20 percent growth impairment, respectively.

(3) 95% Sat.: Is equivalent at 10°C to DO concentrations of 10.8 mg/l and 9.3 mg/l for elevations of 0 and 4,000 feet, respectively. Is equivalent at 15°C to DO concentrations of 9.6 mg/l and 8.3 mg/l for elevations of 0 and 4,000 feet, respectively.

(4) 90% Sat.: Is equivalent at 10°C to DO concentrations of 10.2 mg/l and 8.8 mg/l for elevations of 0 and 4,000 feet, respectively. Is equivalent at 15°C to DO concentrations of 9.1 mg/l and 7.9 mg/l for elevations of 0 and 4,000 feet, respectively.

(COMPARISON OF EXISTING DISSOLVED OXYGEN STANDARDS, EPA CRITERIA AND ALTERNATE PROPOSALS FOR HEARING AUTHORIZATION REQUEST ON NOVEMBER 2, 1990)

BENEFICIAL USE: SALMONID PRODUCING WATERS -- PASSAGE & REARING AND LATER LIFE STAGE

Stream Basin	Application of Numerical Value	Existing Standard	09/21/90 Proposal	11/02/90 Alternate Proposal	EPA "National" Criteria(1)	EPA Criteria With Quality Effects(2)
Willamette 0 - 26.6 + Multnomah Channel	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 5.0	5.0	6.0	4.5*	5.0
Willamette >26.6 - RM 50	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 6.0	5.0	6.0	4.5*	5.0
Willamette >50 to RM 85	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 7.0	5.0	6.0	4.5*	5.0
Willamette >85 to RM 187	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 90% Saturation(4)	5.0	6.0	4.5*	5.0
Willamette Tributaries, and North Coast, Mid Coast, Umpqua, SC, Rogue, Sandy, Hood, Deschutes, & Klamath River Basins, Except as Noted Below	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 90% Saturation, Except When More Sensitive Use Occurs(4)	5.0	6.0	4.5*	5.0
Columbia River	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 90% Saturation(4)	5.0	6.0	4.5*	5.0
John Day, Umatilla, Walla Walla, Grande Ronde, Powder, Malheur, Owyee, Malheur Lake, Goose & Summer Lake	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 75% Saturation, Except When More Sensitive Use Occurs(5)	5.0	6.0	4.5*	5.0
Mainsteam Klamath Falls from Klamath Lake to Keno Dam	30-Day Average	This Beneficial Use Is Not Designated for This Segment		Standard for Non-Salmonid Waters (Early Life Stages) Applies		
	7-Day Average					
	7-Day Mean Min.					
	1 Day					
Mainsteam Klamath Falls from Keno Dam to OR/CA Border	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 7.0	5.0	6.0	4.5*	5.0

* 0.5 mg/l added to value of Table B as suggested by EPA to minimize risk where "manipulatable" discharges would allow repeated weekly cycles of minimum acutely acceptable DO values.

NOTE:

(1) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986, Table 8, National Criteria. Average DO concentration values are 0.5 mg/l above the slight production impairment values. Serve as estimate of threshold concentrations below which detrimental effects expected.

(2) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986. Summary of DO concentrations coinciding with EPA's judgments on qualitative levels of effect: 30-day average -- No Production Impairment; 7-day average -- Slight Production Impairment; 1-day minimum -- Moderate Production Impairment. Slight and Moderate are equivalent to 10 - 20 percent growth impairment, respectively.

(4) 90% Sat.: Is equivalent at 20°C to DO concentrations between 8.2 mg/l and 7.1 mg/l for elevations between 0 and 4,000 feet, respectively.

(5) 75% Sat.: Is equivalent at 20°C to DO concentrations of 6.5 mg/l and 5.9 mg/l for elevations of 1,000 and 4,000 feet, respectively. Is equivalent at 24°C to DO concentrations of 6.1 mg/l and 5.5 mg/l for elevations of 1,000 4,000 feet, respectively.

(COMPARISON OF EXISTING DISSOLVED OXYGEN STANDARDS, EPA CRITERIA AND ALTERNATE PROPOSALS FOR HEARING AUTHORIZATION REQUEST ON NOVEMBER 2, 1990)

BENEFICIAL USE: NON-SALMONID WATERS -- WARMWATER FISH CRITERIA (EARLY LIFE STAGES)

Stream Basin	Application of Numerical Value	Existing Standard	09/21/90 Proposal	11/02/90 Alternate Proposal	EPA "National" Criteria(1)	EPA Criteria With Quality Effects(2)
Willamette 0 - 26.6 + Multnomah Channel	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 5.0	N/A		5.0	5.5
Willamette >26.6 - RM 50	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 6.0	N/A		5.0	5.5
Willamette >50 to RM 85	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 7.0	N/A		5.0	5.5
Willamette >85 to RM 187	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 90% Saturation	N/A		5.0	5.5
Willamette Tributaries, and North Coast, Mid Coast, Umpqua, SC, Rogue, Sandy, Hood, Deschutes, & Klamath River Basins, Except as Noted Below	30-Day Average					
	7-Day Average		6.5	6.5	6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 6.0, Except Where More Sensitive Use Occurs	5.0	5.5	5.0	5.5
Columbia River	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 90% Saturation	N/A		5.0	5.5
John Day, Umatilla, Walla Walla, Grande Ronde, Powder, Malheur, Owyee, Malheur Lake, Goose & & Summer Lake	30-Day Average					
	7-Day Average		6.5	6.5	6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 75% Saturation, Except When More Sensitive Use Occurs(5)	4.0	5.5	5.0	5.5
Mainsteam Klamath Falls from Klamath Lake to Keno Dam	30-Day Average					
	7-Day Average		6.5	6.5	6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 5.0	5.0	5.5	5.0	5.5
Mainsteam Klamath Falls from Keno Dam to OR/CA Border	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 7.0	N/A		5.0	5.5

NOTE:

(1) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986, Table 8, National Criteria. Average DO concentration values are 0.5 mg/l above the slight production impairment values. Serve as estimate of threshold concentrations below which detrimental effects expected.

(2) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986. Summary of DO concentrations coinciding with EPA's judgments on qualitative levels of effect: 30-day average -- No Production Impairment; 7-day average -- Slight Production Impairment; 1-day minimum -- Moderate Production Impairment. Slight and Moderate are equivalent to 10 - 20 percent growth impairment, respectively.

(5) 75% Sat.: Is equivalent at 15°C to DO concentrations of 7.3 mg/l and 6.6 mg/l for elevations of 1,000 and 4,000 feet.
Is equivalent at 20°C to DO concentrations of 6.6 mg/l and 5.9 mg/l for elevations of 1,000 and 4,000 feet.
Is equivalent at 24°C to DO concentrations of 6.1 mg/l and 5.5 mg/l for elevations of 1,000 and 4,000 feet.

(COMPARISON OF EXISTING DISSOLVED OXYGEN STANDARDS, EPA CRITERIA AND ALTERNATE PROPOSALS FOR HEARING AUTHORIZATION REQUEST ON NOVEMBER 2, 1990)

BENEFICIAL USE: NON-SALMONID WATERS -- WARMWATER FISH CRITERIA (LATER LIFE STAGES)

Stream Basin	Application of Numerical Value	Existing Standard	09/21/90 Proposal	11/02/90 Alternate Proposal	EPA "National" Criteria[1]	EPA Criteria With Quality Effects[2]
Willamette 0 - 26.6 + Multnomah Channel	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.0	6.0
	7-Day Average		N/A			
	7-Day Mean Min.				4.0	5.0
	1 Day	Not Less than 5.0	N/A		3.0	4.0
Willamette >26.6 - RM 50	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 6.0	N/A		3.0	4.0
Willamette >50 to RM 85	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 7.0	N/A		3.0	4.0
Willamette >85 to RM 187	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 90% Saturation	N/A		3.0	4.0
Willamette Tributaries, and North Coast, Mid Coast, Umpqua, SC, Rogue, Sandy, Hood, Deschutes, & Klamath River Basins, Except as Noted Below	30-Day Average		6.0	*	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		5.0			
	1 Day	Not Less than 6.0, Except Where More Sensitive Use Occurs	4.0		3.0	4.0
Columbia River	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 90% Saturation	N/A		3.0	4.0
John Day, Umatilla, Walla Walla, Grande Ronde, Powder, Malheur, Owyee, Malheur Lake, Goose & Summer Lake	30-Day Average		6.0	*	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		5.0		4.0	5.0
	1 Day	Not Less than 75% of Saturation	4.0		3.0	4.0
Mainsteam Klamath Falls from Klamath Lake to Keno Dam	30-Day Average		6.0	*	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		5.0		4.0	5.0
	1 Day	Not Less than 75% Saturation, Except When More Sensitive Use Occurs	4.0		3.0	4.0
Mainsteam Klamath Falls from Keno Dam to OR/CA Border	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 7.0	N/A		3.0	4.0

* For Warm-Water Fisheries, use criteria for Early Life Stages Only.

NOTE:

(1) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986, Table 8, National Criteria. Average DO concentration values are 0.5 mg/l above the slight production impairment values. Serve as estimate of threshold concentrations below which detrimental effects expected.

(2) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986. Summary of DO concentrations coinciding with EPA's judgments on qualitative levels of effect: 30-day average -- No Production Impairment; 7-day average -- Slight Production Impairment; 1-day minimum -- Moderate Production Impairment. Slight and Moderate are equivalent to 10 - 20 percent growth impairment, respectively.

ISSUE PAPER # 4
TEMPERATURE
Revised as of 10/22/90

I. INTRODUCTION

Water temperature affects physiological processes and the ability of aquatic organisms to survive and reproduce effectively. Temperature also affects other water quality conditions such as the degradation in organic material and other pollutants, the survival of bacteria and pathogens, and the solubility of oxygen in water.

Upper and lower temperature tolerance limits have been established for a number of aquatic species. Within these tolerance limits is a narrower range in which normal metabolic activities can occur. Reproduction generally requires an even more limited temperature range which is determined in part by genetics, acclimation, and length of exposure. Optimal temperatures for a species change from season to season as the organism progresses through its lifecycle and acclimates to the environment.

Oregon has adopted temperature standards to protect the beneficial uses of each basin.

II. CURRENT RULE

Narrative statements for the North Coast-Lower Columbia Basin are listed below, standards for the remaining basins are attached:

340-41-205

(1) Notwithstanding the water quality standards contained below, the highest and best practicable treatment and/or control of wastes, activities, and flows shall in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures... at the lowest levels.

(2) No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause violation of the following standards in the waters of the North Coast-Lower Columbia Basin:

(b) Temperature

(A) Columbia River. No measurable increases shall be allowed outside of the assigned mixing zone, as measured relative to a control point immediately upstream from a discharge when stream temperatures are 68°F. or greater; or more than 0.5°F. increase due to a single-source discharge when receiving water temperatures are 67.5°F. or less; or more than 2°F. increase due to all sources combined when stream temperatures are 66°F. or less, except for specifically limited duration activities which may be authorized by DEQ under such conditions as DEQ and Department of Fish and Wildlife may prescribe as necessary to accommodate legitimate uses or activities where temperatures in excess of this standard are unavoidable and all practical preventive techniques have been applied to minimize temperature rises. The Director shall hold a public hearing when a request for an exception to the temperature standard for a planned activity or discharge will in all probability adversely affect the beneficial uses.

(B) All other freshwater streams and tributaries thereto: No measurable increases shall be allowed outside of the assigned mixing zone, as measured relative to a control point immediately upstream from a discharge when stream temperatures are 58°F. or greater; or more than 0.5°F. increase due to a single-source discharge when receiving water temperatures are 57.5°F. or less; or more than 2°F. increase due to all sources combined when stream temperatures are 56°F. or less, except for specifically limited duration activities...

(C) Marine and estuarine waters: No significant increase above natural background temperatures shall be allowed, and water temperatures shall not be altered to a degree which creates or can reasonably be expected to create an adverse effect on fish or other aquatic life.

(i) The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.

(3) Where the natural quality parameters of waters of the North Coast-Lower Columbia Basin are outside the numerical limits of the above assigned water quality standards, the natural water quality shall be the standard.

III. CONCERNS WITH THE CURRENT RULE

The table below was taken from the 1986 Quality Criteria for Water and lists 1) calculated maximum weekly average temperatures in Celsius and (Fahrenheit) for growth, 2) short-term maxima (24 hours) for survival for juveniles and adults, 3) the average or median temperature for spawning, and 4) the temperature maxima for embryo survival.

Species	Growth [range]	Maxima	Spawning	Embryo Survival
bluegill	32(90) [22-34]	35(95)	25(77)	34(93)
Coho	18(64) [5-17*]	24(75)	10(50)	13(55)
Rb trout	19(66) [13-19]	24(75)	9(48)	13(55)
Sockeye	18(64) [10-17]	22(72)	10(50)	13(55)
smallmouth bass	29(84)	---	17(63)	---
striped bass	---	---	18(64)	24(75)

Oregon temperature standards for many basins are sufficient to protect aquatic life. These basin standards prohibit artificial temperature increases in ambient waters when temperatures are less than the maximum weekly averages for growth reported in the table above, and therefore, should provide adequate protection for juvenile and older fish. It is assumed that it will be these juvenile and older life stages that are most likely to experience temperature stress during summer and early fall.

However, some basin standards allow for an increase in water temperature though the ambient water temperature exceeds the maximum weekly averages for growth listed above. For example, temperatures in the Columbia and lower Willamette Rivers can be raised from 66°F to 68°F and 68°F to 70oF, respectively, although the recommended maximum weekly average temperature for coho salmon is 64°F.

The Willamette and Klamath River Basins have separate temperature standards for nonsalmonid producing waters. Data for native warm-water fish is scarce, but the existing standard for these waters in the Willamette basin (64°F) seems to be adequate to protect growth and spawning of these fish. The nonsalmonid standard for the Klamath Basin allows for artificial temperature increases in ambient waters with temperatures to 71.5°F. This higher temperature standard may reflect natural conditions, but it may not fully protect certain nonsalmonid species that require cooler water temperatures for spawning and rearing.

Temperature Reductions

Aquatic life is also sensitive to unseasonable decreases in ambient temperatures. Fish acclimated to cooler waters can tolerate some additional reduction in ambient temperatures, if ambient temperatures are near optimal for the life stage and season. However, a rapid decrease in water temperature may stress fish and invertebrates acclimated to warmer waters. Another consideration is that a continuous cold water discharge may lower ambient temperatures in the receiving waters to the extent that growth and maturation of coldwater species are impaired, and spawning and larval survival in warmwater species are also adversely affected.

Seasonal and Diurnal Fluctuation

Daily and seasonal temperature fluctuations are essential to aquatic life. Sexual maturation and other physiological or behavioral processes are often dependent on environmental cues such as gradual temperature changes. To preserve normal species diversity and fish health, natural diurnal fluctuations and seasonal temperature changes should be maintained. Presently, no specific mention is made in the freshwater standards to maintain these fluctuations.

Marine and Estuarine

Standards for marine and estuarine waters are adequate to protect aquatic life in these waters from discharge-related temperature effects. The present language prohibits significant increases in temperature above natural background levels changing water temperature to the extent that it will create an adverse effect for aquatic life. This can be simplified to state that no changes in ambient water temperature will be permitted beyond the permitted mixing zones.

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

1) Change standards for salmonid producing waterbodies in those basins which currently permit artificial increases in ambient water temperatures above 64°F. Available data indicate this is the maximum acceptable weekly average temperature for coho and sockeye salmon, and available information for chinook, chum and pink salmon indicates that these species have similar preferred temperatures and upper lethal temperature thresholds.

2) Keep the standards for the remaining basins which restrict temperature increases to waterbodies less than 64°F. Maintain existing standard permitting a 0.5oF increase for a single discharge and a cumulative increase of 2oF provided the elevated temperature does not exceed the basin standard.

3) Establish standards to limit temperature decreases to a maximum of 2°F for ambient waters with no temperature decreases in a) salmonid producing streams during summer when ambient water temperatures are less than 10C (50°F), or b) nonsalmonid streams when ambient water temperatures are less than 14C (57°F). These weekly minimum temperatures were calculated in a similar manner to maximum weekly average temperature in the table above:

$$T_C = T_O + 1/3(T_{11t} - T_O)$$

T_C is criterion temperature, T_O is optimum temperature for the sensitive species at the appropriate life stage, and T_{11t} is lower incipient lethal temperature, which is often 0°C.

This equation calculates the following minimum temperature criteria for growth of the following species:

Sockeye salmon:	10C	50F
Coho Salmon:	10C	50F
Rainbow Trout:	12C	54F
Smallmouth bass:	14C	57F
Largemouth Bass:	20C	68F
Bluegill:	21C	70F

CORRECTIONS TO EQC AGENDA ITEM D

November 2, 1990 EQC Meeting

There are two minor corrections to the proposed rule language that the Department would like to note.

1. On page A3-7, the language contained in 340-41___ (2)(a)(A)(ii) first line "in spawning areas" should be deleted. This language is to appear in Option 1 but not Option 2.

2. On page A4-2, the language contained in 340-41___ (2)(e)(C) last sentence should read, "No single sample should exceed 104 enterococci per 100 ml." This change should also appear in Issue Paper #5 of Attachment E.

There is also one additional change to Attachment E, Issue * Paper #3.

In merging typing files the language for option 2 was inadvertently substituted for the language for option 1 in the final issue paper revision. Issue Paper #3 has been revised to place the language option 1 back into the issue paper.

* Attached

This copy corrects mistakes and omissions of Issue Paper 3 10/23/90 revisions.

ISSUE PAPER #3
DISSOLVED OXYGEN
Revised as of 11/2/90

I. INTRODUCTION

Dissolved oxygen is an important indicator of water quality and the ability of a waterbody to support a healthy aquatic community. Primary sources of dissolved oxygen include photosynthesis and diffusion from the atmosphere. Oxygen is consumed in normal biological and chemical processes that occur in the water column and benthic sediments. Oxygen may also be bound to benthic sediments or lost to the atmosphere.

II. CURRENT RULE

DEQ has adopted several dissolved oxygen water quality standards to protect designated beneficial uses (OAR 340, Division 41, Tables 2-19). For basins in western Oregon the standards are:

340-41-(river basin) 2(a)(A)

(i) Fresh waters shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes.

(ii) Non-salmonid fish producing waters: The DO concentration shall not be less than 6 mg/l.

340-41-(river basin) 2(a)(B)

Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

340-41-(river basin) 2(a)(C)

Columbia River: DO concentrations shall not be less than 90 percent of saturation.

340-41-(river basin) 3

Where the natural quality parameters of water of the ____ basin are outside the numerical limits of the above assigned water quality standards, the natural water quality shall be the standard.

These standards are applied to the following basins: North Coast-Lower Columbia, Mid Coast, Umpqua, South Coast, Rogue, portions of the Willamette, Sandy, Hood, Deschutes, and portions of the Klamath.

The seasonal low dissolved oxygen standards for the salmonid producing streams (340-41-(river basin) 2(a)(A) in eastern Oregon basins is 75% of saturation. This standard is applicable in the following basins: John Day, Umatilla, Walla, Grande Ronde, Powder, Malheur, Owyhee, Malheur Lake, Goose and Summer Lakes.

The Willamette and Klamath River Basins have several river reach specific dissolved oxygen standards. Specifically, the dissolved oxygen standards for the Willamette River Basin (340-41-445) are:

Multnomah Channel to Willamette Falls...5 mg/l
Willamette Falls to Newberg.....6 mg/l
Newberg to Salem.....7 mg/l
Salem to the confluence of tributaries..90 % saturation
Upper tributaries (spawning areas).....90 or 95% saturation
Non-salmonid producing waters.....6 mg/l

The dissolved oxygen standards for the Klamath River Basin (340-41-965) are:

Mainstem Klamath from Klamath Lake to
Keno Dam.....5 mg/l
Mainstem Klamath Keno Dam to
California Border.....7 mg/l
All other basin waters (spawning).....90 or 95% saturation
Non-salmonid producing waters.....6 mg/l

III. CONCERNS WITH THE CURRENT RULE

Dissolved oxygen standards expressed as a percent of saturation may be unnecessarily stringent during winter months and potentially unprotective during summer months (Chapman, 1986). The U.S. Environmental Protection Agency (EPA) has developed numerical dissolved oxygen criteria for

the protection of salmonid and nonsalmonid fisheries (EPA< 1986) that are also specific for the life stage of each fishery and the length of exposure. These criteria are shown below. Early life stage (ELS) refers to all embryonic, larval and juvenile fish to 30 days old, and other life stages (OLS) refers to all older fish.

	Coldwater		Warmwater	
	ELS	OLS	ELS	OLS
30 day mean	NA	6.5	NA	5.5
7 day mean	9.5	NA	6.0	NA
7 day mean min.	NA	5.0	NA	4.0
1 day min.	8.0	5.0	5.0	3.0

30 and 7 day mean values are then calculated from daily means, which are (daily maximum + daily minimum values)/2. The 7 day mean minimum is calculated from seven consecutive daily minimum values.

Included in the EPA Ambient Water Quality Criteria for Dissolved Oxygen document (Chapman, 1986) is a table identifying the level of fishery resource protection offered at various dissolved oxygen concentrations. These impairment values are listed below.

1. Salmonid Waters

   a. Embryo and Larval Stages

   - No Production Impairment (NPI) =11* (8)
   - Slight Production Impairment (SPI) = 9* (6)
   - Moderate Production Impairment = 8* (5)
   - Severe Production Impairment = 7* (4)
   - Limit to Avoid Acute Mortality = 6* (3)

(*Note: These are water column concentrations recommended to achieve the required intergravel dissolved oxygen concentration shown in parentheses. The 3 mg/l difference is discussed in the criteria document).

   b. Other Life Stages

   - No Production Impairment = 8
   - Slight Production Impairment = 6
   - Moderate Production Impairment = 5
   - Severe Production Impairment = 4
   - Limit to Avoid Acute Mortality = 3

2. Nonsalmonid Waters

a. Early Life Stages

- No Production Impairment = 6.5
- Slight Production Impairment = 5.5
- Moderate Production Impairment = 5
- Severe Production Impairment = 4.5
- Limit to Avoid Acute Mortality = 4

b. Other Life Stages

- No Production Impairment = 6
- Slight Production Impairment = 5
- Moderate Production Impairment = 4
- Severe Production Impairment =3.5
- Limit to Avoid Acute Mortality = 3

3. Invertebrates

- No Production Impairment = 8
- Some Production Impairment = 5
- Limit to Avoid Acute Mortality = 4

From: Chapman, 1986, Water Quality Criteria for Dissolved Oxygen

Specific concerns with existing Oregon water quality standards include:

1. The percent of saturation standards, most notably the 75 percent saturation standards, may not fully protect older salmonids exposed to warmer water temperatures. These standards need to be modified to include acceptable mean and minimum dissolved oxygen concentrations and length of exposures for each.

2. Standards for some portions of the Willamette and Klamath Rivers are less than the EPA 30 day mean criterion for nonspawning salmonids. The existing 5 mg/l dissolved oxygen minimum standard is the same as the EPA seven day minimum mean and will protect persisting fish populations, but as written could allow for considerable loss of production. This 5 mg/l standard is also equal to the one day minimum criterion for the early life stages of nonsalmonid populations. Expansion of the standard to include acceptable long-term and short-term exposure concentrations is necessary.

3. The 6 mg/l minimum standard for the Willamette River above Willamette Falls offers a higher level of protection for salmonids and risks only slight impairment of production. This standard also offers more protection to all life stages of warm water fish in the river. Minimum and mean values and acceptable exposure periods should be established.

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

The following proposed revisions to the dissolved oxygen standards were prepared for public comment to address the Department's concerns with the existing rules. Language proposed to be deleted is bracketed and new language is underlined. Specific basin standards, or rules, which are affected by each recommendation are identified following the proposal.

340-41-___(2)(a)

Dissolved Oxygen (DO):

(A)(i) Salmonid producing waters:

[Fresh waters shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
<u>Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.</u>

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(A)	340-41-205-(2)(a)(A)(i)
Mid Coast	340-41-245(2)(a)(A)	340-41-245-(2)(a)(A)(i)
Umpqua	340-41-285(2)(a)(A)	340-41-285-(2)(a)(A)(i)
South Coast	340-41-325(2)(a)(A)	340-41-325-(2)(a)(A)(i)
Roque	340-41-365(2)(a)(A)	340-41-365-(2)(a)(A)(i)
Willamette	340-41-445(2)(a)(E)(i)	340-41-445-(2)(a)(A)(i)
Sandy	340-41-485(2)(a)(B)	340-41-485-(2)(a)(A)(i)
Hood	340-41-525(2)(a)(B)(i)	340-41-525-(2)(a)(A)(i)
Deschutes	340-41-565(2)(a)(B)	340-41-565-(2)(a)(A)(i)
Klamath	340-41-965(2)(a)(C)(i)	340-41-965-(2)(a)(A)(i)

340-41-___(2)(a)

(A)(i) Salmonid producing waters:

[DO concentrations shall not be less than 75% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
John Day	340-41-605(2)(a)(B)	340-41-605(2)(a)(A)(i)
Umatilla	340-41-645(2)(a)(B)	340-41-645(2)(a)(A)(i)
Walla Walla	340-41-685(2)(a)	340-41-685(2)(a)(A)(i)
Grande Ronde	340-41-725(2)(a)	340-41-725(2)(a)(A)(i)
Powder	340-41-765(2)(a)	340-41-765(2)(a)(A)(i)
Malheur	340-41-805(2)(a)	340-41-805(2)(a)(A)(i)
Owyhee	340-41-845(2)(a)	340-41-845(2)(a)(A)(i)
Malheur Lake	340-41-885(2)(a)	340-41-885(2)(a)(A)(i)
Goose and Summer Lakes	340-41-925(2)(a)(A)	340-41-925(2)(a)(A)(i)

340-41-___(2)(a)

(A)(ii) Non-salmonid fish producing waters:

[The DO concentration shall not be less than 6 mg/l].
The 30 day mean dissolved oxygen concentrations shall be 6.0 mg/l or greater with one day minimum concentrations of not less than 4.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 5.0 mg/l. Dissolved oxygen concentrations in spawning areas shall have seven day mean water column concentrations of 6.5 mg/l or greater and one day minimum concentrations of 5.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
Willamette	340-41-445(2)(a)(E)(ii)	340-41-445(2)(a)(A)(ii)
Hood	340-41-525(2)(a)(B)(ii)	340-41-525(2)(a)(A)(ii)
Klamath	340-41-965(2)(a)(C)(ii)	340-41-965(2)(a)(A)(ii)
North Coast		340-41-205(2)(a)(A)(ii)
Mid Coast		340-41-225(2)(a)(A)(ii)
Umpqua		340-41-285(2)(a)(A)(ii)
South Coast		340-41-325(2)(a)(A)(ii)
Roque		340-41-365(2)(a)(A)(ii)
Sandy		340-41-485(2)(a)(A)(ii)
Deschutes		340-41-565(2)(a)(A)(ii)
John Day		340-41-605(2)(a)(A)(ii)
Umatilla		340-41-645(2)(a)(A)(ii)
Walla Walla		340-41-685(2)(a)(A)(ii)
Grande Ronde		340-41-725(2)(a)(A)(ii)
Powder		340-41-765(2)(a)(A)(ii)
Malheur		340-41-805(2)(a)(A)(ii)
Owyhee		340-41-845(2)(a)(A)(ii)
Malheur Lake		340-41-885(2)(a)(A)(ii)
Goose and Summer Lakes		340-41-925(2)(a)(A)(ii)

340-41-___ (2)(a)

(B) Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(B)	340-41-205-(2)(a)(B)
Mid Coast	340-41-225(2)(a)(B)	340-41-225-(2)(a)(B)
Umpqua	340-41-285(2)(a)(B)	340-41-285-(2)(a)(B)
South Coast	340-41-325(2)(a)(B)	340-41-325-(2)(a)(B)
Roque	340-41-365(2)(a)(B)	340-41-365-(2)(a)(B)

340-41-___(2)(a)

(C) When natural environmental conditions limit dissolved oxygen concentrations to less than 110 percent of the applicable numerical standard, 90 percent of the natural dissolved oxygen concentration shall be the standard.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast		340-41-205(2)(a)(C)
Mid Coast		340-41-225(2)(a)(C)
Umpqua		340-41-285(2)(a)(C)
South Coast		340-41-325(2)(a)(C)
Roque		340-41-365(2)(a)(C)
Willamette		340-41-445(2)(a)(B)
Sandy		340-41-485(2)(a)(B)
Hood		340-41-525(2)(a)(B)
Deschutes		340-41-565(2)(a)(B)
John Day		340-41-605(2)(a)(B)
Umatilla		340-41-645(2)(a)(B)
Walla Walla		340-41-685(2)(a)(B)
Grande Ronde		340-41-725(2)(a)(B)
Powder		340-41-765(2)(a)(B)
Malheur		340-41-805(2)(a)(B)
Owyhee		340-41-845(2)(a)(B)
Malheur Lake		340-41-885(2)(a)(B)
Goose and Summer Lakes		340-41-925(2)(a)(B)
Klamath		340-41-965(2)(a)(B)

Additional Proposed Deletions:

340-41-___(2)(a)

(C) [Columbia River: DO concentrations shall not be less than 90 percent of saturation].

RULE REFERENCES BY BASIN

Basin	Old Rule
North Coast	340-41-205(2)(a)(C)
Willamette	340-41-445(2)(a)(F)
Sandy	340-41-485(2)(a)(A)
Hood	340-41-525(2)(a)(A)
Deschutes	340-41-565(2)(a)(A)
John Day	340-41-605(2)(a)(A)
Umatilla	340-41-645(2)(a)(A)

340-41-445(2)(a)

(A) [Multnomah Channel and Main stem Willamette River from mouth to the Willamette Falls at Oregon City, river mile 26.6: The DO concentration shall not be less than 5 mg/l.

(B) Main stem Willamette River from the Willamette Falls to Newberg, river mile 50: The DO concentration shall not be less than 6 mg/l.

(C) Main stem Willamette River from Newberg to Salem, river mile 85: The DO concentration shall not be less than 7 mg/l.

(D) Main stem Willamette River from Salem to the confluence of the Coast and Middle Forks, river mile 187: The DO concentration shall not be less than 90% of saturation.]

340-41-925(2)(a)

(B) [Goose Lake:DO concentrations shall not be less than 7 milligrams per liter.]

340-41-965(2)(a)

(A) Main stem Klamath River from Klamath Lake to Keno Dam, (river miles 255 to 232.5): DO concentrations shall not be less than 5 mg/l.

(B) Main stem Klamath River from Keno dam to Oregon-California Border (river miles 232.5 to 208.5): DO concentrations shall not be less than 7 mg/l.

New standards proposed above are also applicable to these water bodies.

V. PUBLIC COMMENT RECEIVED ON ISSUE PAPER AND AGENCY RESPONSE

DEQ received numerous comments on the proposed dissolved oxygen (DO) standard. The issues will be described and the Department's response will follow each issue. Generally, the questions and comments were related to the following four issues:

1. Need for change: Why are revisions being proposed? Has use impairment been documented under existing standards and what documentation is available to demonstrate that the Willamette River fishery is "under stress" and to show that the stress is related to the current D.O. (dissolved oxygen) standards? Will the proposed revisions maintain, improve or attain the designated use?

RESPONSE

The reasons for proposing revisions to the dissolved oxygen standards are as described in the Issues Paper. They include:

a) Concern that the percent saturation standards, specifically the 75 percent saturation standards which currently apply to many Eastern Oregon streams, may not protect older salmonids exposed to warmer water temperatures. As EPA pointed out to DEQ in their review of Oregon's list of streams identified as potentially water quality limiting and as presented in their 1986 guidance document, D.O. standards expressed as a percent of saturation may be unnecessarily stringent during winter months and potentially not protective during summer months. Also, the current standards do not express an acceptable mean and minimum and length of exposure for each.

b) Some existing standards are less than EPA criteria for no production impairment, and some standards established to protect the same sensitive use differ between some basins and stream segments. Revisions are proposed to address these anomalies.

The proposed revisions are aimed at protecting the designated beneficial uses by identifying the instream quality dissolved oxygen values that provide for "no production impairment" levels of the most sensitive designated uses of the water.

2. EPA Criteria: What beneficial uses are to be protected, what are the proposes values based on, and why weren't EPA national criteria used? Some recommended the EQC direct the DEQ to produce a detailed scientific basis for the proposal or utilize EPA's recommended approach for setting dissolved oxygen standards. Some asked whether EPA had been consulted regarding DEQ's departure from recommended criteria and how DEQ evaluated the factors EPA considered in setting the national criteria's D.O. levels.

RESPONSE

The proposed values are intended to protect the three beneficial uses most sensitive to dissolved oxygen. These include coldwater fish, warmwater fish and aquatic life. Coldwater fisheries are further categorized in the state's Beneficial Use Tables (OAR 340, Division 41) as Anadromous Fish Passage, Anadromous (Shad and Sturgeon) Fish Spawning, Salmonid Fish Rearing and Salmonid Fish Spawning. Coldwater fish include salmonids of the genera Coregonus, Oncorhyncus, Prosopium, Salmo, Salvelinus, Stenodus and Thymallus.

Even though standards are expressed in terms of salmonid and nonsalmonid producing waters, it is intended that the numerical values proposed for salmonid producing waters also apply to other coldwater fish. Oregon Fish and Wildlife may also have suggestions as to other sensitive species that need to be protected under the category of "salmonid producing" waters.

Salmonid producing waters may be identified as spawning and early life stage areas (the early life stage includes egg, embryo, larval and juvenile forms up to 30 days after hatching) where a higher seasonal D.O. standard would be applicable. The lower standard for salmonid producing waters would be applied in spawning areas when spawning adults or early life stages are not present and for rearing areas and migration routes. The salmonid producing waters standard would also apply to coldwater tributaries which support macroinvertebrate communities upon which the young salmonids feed. The warmwater, or nonsalmonid DO standard will not adequately protect these sensitive communities.

The nonsalmonid standard applies to all warmwater environments which support all nonsalmonid fish populations and the plant and animal life characteristic of these communities.

The proposed numerical values are based on EPA qualitative effects level criteria. The 7-day average (mean) values proposed for coldwater and warmwater fisheries spawning areas and seasons and the 30-day average (mean) values for nonspawning areas and seasons are equivalent to EPA's criteria for "no production impairment" at constant exposures levels. EPA recommends a 7-day averaging period for spawning waters and use of the "no production impairment" value as the mean where slight production impairment or a small but undefinable risk of moderate production impairment is unacceptable". They also recommend the "slight production impairment" values as minima to provide this level of protection.

EPA defines slight production impairment as a 10% reduction in productivity and a moderate production impairment as a 20% reduction in productivity. These values were generated primarily with laboratory data corroborated with limited field information.

In comparison and as EPA notes, the "national criteria" present averages which represent conditions **between** no production and slight production impairment. They do not represent an assured no-effect level. In situations where criteria conditions are just maintained for considerable periods, the criteria represent some risk of production impairment according to EPA.

After again reviewing EPA guidance in consideration of the public's comments, the Department has prepared an alternate proposal (Option 2) for public hearing. This proposal is suggested for public hearing comment in addition to the original proposal (Option 1). Under Option 2 all 1-day minima are proposed at the "slight production impairment" level as compared to Option 1 where some are at the "moderate production impairment" level. Under this Option, a return frequency (recurrence interval) of violations of the 1 day minima of once every 10 years would be used to evaluate compliance. In addition, Option 2 proposes to apply the more protective warmwater fisheries values for spawning periods and areas to all nonsalmonid fish producing waters yearround. A comparison of Option 1 (the 9/21/90 proposal) and Option 2 (a new 11/2/90 proposal) and EPA criteria are presented in Tables 1(A) through 1(D). Proposed rule language coinciding with Option 2 is presented in the revised attachment of proposals for public hearing.

3. TMDLs: Are the proposed values achievable in natural waters and how will compliance with the standards be evaluated. Will the change in standards necessitate a change in instream monitoring requirements? Will dynamic or statistical modeling be used to establish TMDLs that maintain dissolved oxygen standards? Will the basin standards for biochemical oxygen demand (for sewage treatment systems) be revised if TMDLs based on proposed standards do not justify as stringent levels of technology?

RESPONSE

Existing ambient data collected during intensive diurnal monitoring efforts on the Willamette River indicate that the proposed standards are attainable. Nevertheless, when natural conditions such as temperature, elevation, and natural allocthonous input limits the solubility of oxygen in water to less than 110% of the numerical standard, 90% of the natural condition would be the minimum standard.

Attainment of water quality standards will continue to be evaluated using ambient monitoring data. If based on the ambient data the waterbody is found to not meet water quality standards special intensive studies would be conducted to assess the point and non point sources contributions and to establish the Total Maximum Daily Loads and Waste Load Allocations.

As related above, upon review of the public comment, the Department has prepared an alternate proposal (Option 2) for public hearing. Higher values are proposed as the daily minima to provide better assurance that even with limited monitoring data, uses will be protected. Though the proposed 30-day and 7-day mean values are aimed at "no production impairment", the Department relies on data which must be considered representative of the 1-day minima in assessing compliance with standards.

The Department, with the aid of a Technical Advisory Committee, has not yet selected the model for the Willamette River. A stoichastic model will be used to make preliminary sensitivity checks. Depending on the sensitive checks a dynamic model may be used. If a dynamic model is to be used, a significantly greater amount of effort will be needed for data collection than can be provided with available resources.

The Department is not proposing a change in the basin treatment criteria, though effluent limits may be made more stringent if necessary to achieve water quality standards or address the policies of the EQC, including the antidegradation policy.

4. Effect of the Change: What will be the effect of the proposed standards on dischargers? Some commented that the proposed dissolved oxygen values would result in virtually all discharges on the Willamette River in violation of the proposed values and compliance with the proposed dissolved oxygen standard will cost hundreds of millions of dollars. Others suggested that additional investigations be performed by the Department before adopting numerical concentrations as regulatory standards or that the EPA "national" criteria" be adopted until the Willamette River study is complete. Others asked if upgraded treatment is needed, how much and will a schedule of compliance be provided?

RESPONSE

The Department does not anticipate treatment requirements any more stringent than would be needed to meet existing water quality standards for dissolved oxygen. Compliance schedules are typically developed for permittees required to achieve effluent limits more stringent than specified in their current permit.

VI. PROPOSED RULE AMENDMENT: Dissolved Oxygen Option 1 & Option 2

OPTION 1 - Dissolved Oxygen

The following presents the first of two alternate dissolved oxygen standards proposals for which the Department is requesting public comment. The numerical values proposed as the 30-day average for salmonid waters and the 7-day averages for salmonid spawning and nonsalmonid waters are based upon U.S. EPA criteria for "No Production Impairment" to the specific fisheries at constant exposure values. Option 1 differs from Option 2 primarily in the 1-day (instaneous) minima values proposed to protect the uses. Also, proposed dissolved oxygen values for nonsalmonid producing waters (warmwater fisheries) differentiate between nonspawning areas and periods and spawning areas and periods under Option 1.

Existing rule language proposed to be deleted is bracketed and proposed new language is underlined. Specific basin standards, or rules, which are affected by each recommendation are identified following the proposed new language.

340-41-___(2)(a) Dissolved Oxygen (DO):

(A)(i) Salmonid producing waters:

[Fresh waters: DO concentrations shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(A)	340-41-205-(2)(a)(A)(i)
Mid Coast	340-41-245(2)(a)(A)	340-41-245-(2)(a)(A)(i)
Umpqua	340-41-285(2)(a)(A)	340-41-285-(2)(a)(A)(i)
South Coast	340-41-325(2)(a)(A)	340-41-325-(2)(a)(A)(i)
Roque	340-41-365(2)(a)(A)	340-41-365-(2)(a)(A)(i)
Willamette	340-41-445(2)(a)(E)(i)	340-41-445-(2)(a)(A)(i)
Sandy	340-41-485(2)(a)(B)	340-41-485-(2)(a)(A)(i)
Hood	340-41-525(2)(a)(B)(i)	340-41-525-(2)(a)(A)(i)
Deschutes	340-41-565(2)(a)(B)	340-41-565-(2)(a)(A)(i)
Klamath	340-41-965(2)(a)(C)(i)	340-41-965-(2)(a)(A)(i)

340-41-___(2)(a)

(A)(i) Salmonid producing waters:

[DO concentrations shall not be less than 75% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].

Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
John Day	340-41-605(2)(a)(B)	340-41-605(2)(a)(A)(i)
Umatilla	340-41-645(2)(a)(B)	340-41-645(2)(a)(A)(i)
Walla Walla	340-41-685(2)(a)	340-41-685(2)(a)(A)(i)
Grande Ronde	340-41-725(2)(a)	340-41-725(2)(a)(A)(i)
Powder	340-41-765(2)(a)	340-41-765(2)(a)(A)(i)
Malheur	340-41-805(2)(a)	340-41-805(2)(a)(A)(i)
Owyhee	340-41-845(2)(a)	340-41-845(2)(a)(A)(i)
Malheur Lake	340-41-885(2)(a)	340-41-885(2)(a)(A)(i)
Goose and Summer Lakes	340-41-925(2)(a)(A)	340-41-925(2)(a)(A)(i)

340-41-___(2)(a)

(A)(ii) Non-salmonid fish producing waters:

[The DO concentration shall not be less than 6 mg/l].
The 30 day mean dissolved oxygen concentrations shall be 6.0 mg/l or greater with one day minimum concentrations of not less than 4.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 5.0 mg/l. Dissolved oxygen concentrations in spawning areas shall have seven day mean water column concentrations of 6.5 mg/l or greater and one day minimum concentrations of 5.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
Willamette	340-41-445(2)(a)(E)(ii)	340-41-445(2)(a)(A)(ii)
Hood	340-41-525(2)(a)(B)(ii)	340-41-525(2)(a)(A)(ii)
Klamath	340-41-965(2)(a)(C)(ii)	340-41-965(2)(a)(A)(ii)
North Coast		340-41-205(2)(a)(A)(ii)
Mid Coast		340-41-225(2)(a)(A)(ii)
Umpqua		340-41-285(2)(a)(A)(ii)
South Coast		340-41-325(2)(a)(A)(ii)
Roque		340-41-365(2)(a)(A)(ii)
Sandy		340-41-485(2)(a)(A)(ii)
Deschutes		340-41-565(2)(a)(A)(ii)
John Day		340-41-605(2)(a)(A)(ii)
Umatilla		340-41-645(2)(a)(A)(ii)
Walla Walla		340-41-685(2)(a)(A)(ii)
Grande Ronde		340-41-725(2)(a)(A)(ii)
Powder		340-41-765(2)(a)(A)(ii)
Malheur		340-41-805(2)(a)(A)(ii)
Owyhee		340-41-845(2)(a)(A)(ii)
Malheur Lake		340-41-885(2)(a)(A)(ii)
Goose and Summer Lakes		340-41-925(2)(a)(A)(ii)

340-41-___ (2)(a)

(B) Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(B)	340-41-205-(2)(a)(B)
Mid Coast	340-41-225(2)(a)(B)	340-41-225-(2)(a)(B)
Umpqua	340-41-285(2)(a)(B)	340-41-285-(2)(a)(B)
South Coast	340-41-325(2)(a)(B)	340-41-325-(2)(a)(B)
Roque	340-41-365(2)(a)(B)	340-41-365-(2)(a)(B)

340-41-___(2)(a)

(C) When natural environmental conditions limit dissolved oxygen concentrations to less than 110 percent of the applicable numerical standard, 90 percent of the natural dissolved oxygen concentration shall be the standard.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast		340-41-205(2)(a)(C)
Mid Coast		340-41-225(2)(a)(C)
Umpqua		340-41-285(2)(a)(C)
South Coast		340-41-325(2)(a)(C)
Roque		340-41-365(2)(a)(C)
Willamette		340-41-445(2)(a)(B)
Sandy		340-41-485(2)(a)(B)
Hood		340-41-525(2)(a)(B)
Deschutes		340-41-565(2)(a)(B)
John Day		340-41-605(2)(a)(B)
Umatilla		340-41-645(2)(a)(B)
Walla Walla		340-41-685(2)(a)(B)
Grande Ronde		340-41-725(2)(a)(B)
Powder		340-41-765(2)(a)(B)
Malheur		340-41-805(2)(a)(B)
Owyhee		340-41-845(2)(a)(B)
Malheur Lake		340-41-885(2)(a)(B)
Goose and Summer Lakes		340-41-925(2)(a)(B)
Klamath		340-41-965(2)(a)(B)

Additional Proposed Deletions:

340-41-___(2)(a)

[(C) Columbia River: DO concentrations shall not be less than 90 percent of saturation].

RULE REFERENCES BY BASIN

Basin	Old Rule
North Coast	340-41-205(2)(a)(C)
Willamette	340-41-445(2)(a)(F)
Sandy	340-41-485(2)(a)(A)
Hood	340-41-525(2)(a)(A)
Deschutes	340-41-565(2)(a)(A)
John Day	340-41-605(2)(a)(A)
Umatilla	340-41-645(2)(a)(A)

340-41-445(2)(a)

[(A) Multnomah Channel and Main stem Willamette River from mouth to the Willamette Falls at Oregon City, river mile 26.6: The DO concentration shall not be less than 5 mg/l.

(B) Main stem Willamette River from the Willamette Falls to Newberg, river mile 50: The DO concentration shall not be less than 6 mg/l.

(C) Main stem Willamette River from Newberg to Salem, river mile 85: The DO concentration shall not be less than 7 mg/l.

(D) Main stem Willamette River from Salem to the confluence of the Coast and Middle Forks, river mile 187: The DO concentration shall not be less than 90% of saturation.]

340-41-925(2)(a)

[(B) Goose Lake:DO concentrations shall not be less than 7 milligrams per liter.]

340-41-965(2)(a)

[(A) Main stem Klamath River from Klamath Lake to Keno Dam, (river miles 255 to 232.5): DO concentrations shall not be less than 5 mg/l.

(B) Main stem Klamath River from Keno dam to Oregon-California Border (river miles 232.5 to 208.5): DO concentrations shall not be less than 7 mg/l.]

New standards proposed above are also applicable to these water bodies.

PROPOSED RULE AMENDMENTS

OPTION 2 - Dissolved Oxygen

The following presents the second of two alternate dissolved oxygen standards proposals for which the Department is requesting public comment. The numerical values proposed as the 30-day average for salmonid waters and the 7-day averages for salmonid spawning and nonsalmonid waters are based upon U.S. EPA criteria for "No Production Impairment" to the specific fisheries at constant exposure values. Option 2 differs from Option 2 primarily in the 1-day (instaneous) minima values proposed to protect the uses, though they differ in several other aspects as well.

Existing rule language proposed to be deleted is bracketed and proposed new language is underlined. Specific basin standards, or rules, which are affected by each recommendation are identified following the proposed new language.

340-41-___(2)(a) Dissolved Oxygen (DO):

(A)(i) Salmonid producing waters:

[Fresh waters: DO concentrations shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(A)	340-41-205-(2)(a)(A)(i)
Mid Coast	340-41-245(2)(a)(A)	340-41-245-(2)(a)(A)(i)
Umpqua	340-41-285(2)(a)(A)	340-41-285-(2)(a)(A)(i)
South Coast	340-41-325(2)(a)(A)	340-41-325-(2)(a)(A)(i)
Roque	340-41-365(2)(a)(A)	340-41-365-(2)(a)(A)(i)
Willamette	340-41-445(2)(a)(E)(i)	340-41-445-(2)(a)(A)(i)
Sandy	340-41-485(2)(a)(B)	340-41-485-(2)(a)(A)(i)
Hood	340-41-525(2)(a)(B)(i)	340-41-525-(2)(a)(A)(i)
Deschutes	340-41-565(2)(a)(B)	340-41-565-(2)(a)(A)(i)
Klamath	340-41-965(2)(a)(C)(i)	340-41-965-(2)(a)(A)(i)

340-41-___(2)(a)

(A)(i) Salmonid producing waters:

[DO concentrations shall not be less than 75% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
John Day	340-41-605(2)(a)(B)	340-41-605(2)(a)(A)(i)
Umatilla	340-41-645(2)(a)(B)	340-41-645(2)(a)(A)(i)
Walla Walla	340-41-685(2)(a)	340-41-685(2)(a)(A)(i)
Grande Ronde	340-41-725(2)(a)	340-41-725(2)(a)(A)(i)
Powder	340-41-765(2)(a)	340-41-765(2)(a)(A)(i)
Malheur	340-41-805(2)(a)	340-41-805(2)(a)(A)(i)
Owyhee	340-41-845(2)(a)	340-41-845(2)(a)(A)(i)
Malheur Lake	340-41-885(2)(a)	340-41-885(2)(a)(A)(i)
Goose and Summer Lakes	340-41-925(2)(a)(A)	340-41-925(2)(a)(A)(i)

340-41-___(2)(a)

(A)(ii) Non-salmonid fish producing waters:

[The DO concentration shall not be less than 6 mg/l]. Dissolved oxygen concentrations shall have seven day mean water column concentrations of 6.5 mg/l or greater and one day minimum concentrations of 5.5 mg/l or greater.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
Willamette	340-41-445(2)(a)(E)(ii)	340-41-445(2)(a)(A)(ii)
Hood	340-41-525(2)(a)(B)(ii)	340-41-525(2)(a)(A)(ii)
Klamath	340-41-965(2)(a)(C)(ii)	340-41-965(2)(a)(A)(ii)
North Coast		340-41-205(2)(a)(A)(ii)
Mid Coast		340-41-225(2)(a)(A)(ii)
Umpqua		340-41-285(2)(a)(A)(ii)
South Coast		340-41-325(2)(a)(A)(ii)
Roque		340-41-365(2)(a)(A)(ii)
Sandy		340-41-485(2)(a)(A)(ii)
Deschutes		340-41-565(2)(a)(A)(ii)
John Day		340-41-605(2)(a)(A)(ii)
Umatilla		340-41-645(2)(a)(A)(ii)
Walla Walla		340-41-685(2)(a)(A)(ii)
Grande Ronde		340-41-725(2)(a)(A)(ii)
Powder		340-41-765(2)(a)(A)(ii)
Malheur		340-41-805(2)(a)(A)(ii)
Owyhee		340-41-845(2)(a)(A)(ii)
Malheur Lake		340-41-885(2)(a)(A)(ii)
Goose and Summer Lakes		340-41-925(2)(a)(A)(ii)

340-41-___ (2)(a)

(B) Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(B)	340-41-205-(2)(a)(B)
Mid Coast	340-41-225(2)(a)(B)	340-41-225-(2)(a)(B)
Umpqua	340-41-285(2)(a)(B)	340-41-285-(2)(a)(B)
South Coast	340-41-325(2)(a)(B)	340-41-325-(2)(a)(B)
Roque	340-41-365(2)(a)(B)	340-41-365-(2)(a)(B)

340-41-___(2)(a)

(C) When natural environmental conditions limit dissolved oxygen concentrations to less than 110 percent of the applicable numerical standard, 90 percent of the natural dissolved oxygen concentration shall be the standard.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast		340-41-205(2)(a)(C)
Mid Coast		340-41-225(2)(a)(C)
Umpqua		340-41-285(2)(a)(C)
South Coast		340-41-325(2)(a)(C)
Roque		340-41-365(2)(a)(C)
Willamette		340-41-445(2)(a)(B)
Sandy		340-41-485(2)(a)(B)
Hood		340-41-525(2)(a)(B)
Deschutes		340-41-565(2)(a)(B)
John Day		340-41-605(2)(a)(B)
Umatilla		340-41-645(2)(a)(B)
Walla Walla		340-41-685(2)(a)(B)
Grande Ronde		340-41-725(2)(a)(B)
Powder		340-41-765(2)(a)(B)
Malheur		340-41-805(2)(a)(B)
Owyhee		340-41-845(2)(a)(B)
Malheur Lake		340-41-885(2)(a)(B)
Goose and Summer Lakes		340-41-925(2)(a)(B)
Klamath		340-41-965(2)(a)(B)

Additional Proposed Deletions:

340-41-___(2)(a)

[(C) Columbia River: DO concentrations shall not be less than 90 percent of saturation].

RULE REFERENCES BY BASIN

Basin	Old Rule
North Coast	340-41-205(2)(a)(C)
Willamette	340-41-445(2)(a)(F)
Sandy	340-41-485(2)(a)(A)
Hood	340-41-525(2)(a)(A)
Deschutes	340-41-565(2)(a)(A)
John Day	340-41-605(2)(a)(A)
Umatilla	340-41-645(2)(a)(A)

340-41-445(2)(a)

[(A) Multnomah Channel and Main stem Willamette River from mouth to the Willamette Falls at Oregon City, river mile 26.6: The DO concentration shall not be less than 5 mg/l.

(B) Main stem Willamette River from the Willamette Falls to Newberg, river mile 50: The DO concentration shall not be less than 6 mg/l.

(C) Main stem Willamette River from Newberg to Salem, river mile 85: The DO concentration shall not be less than 7 mg/l.

(D) Main stem Willamette River from Salem to the confluence of the Coast and Middle Forks, river mile 187: The DO concentration shall not be less than 90% of saturation.]

340-41-925(2)(a)

[(B) Goose Lake:DO concentrations shall not be less than 7 milligrams per liter.]

340-41-965(2)(a)

[(A) Main stem Klamath River from Klamath Lake to Keno Dam, (river miles 255 to 232.5): DO concentrations shall not be less than 5 mg/l.

(B) Main stem Klamath River from Keno dam to Oregon-California Border (river miles 232.5 to 208.5): DO concentrations shall not be less than 7 mg/l.]

New standards proposed above are also applicable to these water bodies.

REFERENCES

Chapman, G. 1986. Water Quality Criteria for Dissolved Oxygen. EPA 440/5-86-003

EPA. 1986. Quality Criteria for Water 1986. EPA 440/5-86-001

(COMPARISON OF EXISTING DISSOLVED OXYGEN STANDARDS, EPA CRITERIA AND ALTERNATE PROPOSALS FOR HEARING AUTHORIZATION REQUEST ON NOVEMBER 2, 1990)

BENEFICIAL USE: SALMONID PRODUCING WATERS -- SPAWNING, INCUBATION, HATCHING AND EARLY LIFE STAGE

Stream Basin	Application of Numerical Value	Existing Standard	09/21/90 Proposal	11/02/90 Alternate Proposal	EPA "National" Criteria(1)	EPA Criteria With Quality Effects(2)
Willamette 0 - 26.6 + Multnomah Channel	30-Day Average	This Beneficial Use Is Not Designated for This Segment	None Proposed For This Use	Standard for Salmonid Producing (Passage, Rearing & Later Life Stage) Appl.		
	7-Day Average					
	7-Day Mean Min.					
	1 Day					
Willamette >26.6 - RM 50	30-Day Average	This Beneficial Use Is Not Designated for This Segment	None Proposed For This Use	Standard for Salmonid Producing (Passage, Rearing & Later Life Stage) Appl.		
	7-Day Average					
	7-Day Mean Min.					
	1 Day					
Willamette >50 to RM 85	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 7.0	9.0	9.0	8.0	9.0
Willamette >85 to RM 187	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 90% Saturation	9.0	9.5	8.0	9.0
Willamette Tributaries, and North Coast, Mid Coast, Umpqua, SC, Rogue, Sandy, Hood, Deschutes, & Klamath River Basins, Except as Noted Below	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 95% Saturation(3)	9.0	9.0	8.0	9.0
Columbia River	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 90% of Saturation(4)	9.0	9.0	8.0	9.0
John Day, Umatilla, Walla Walla, Grande Ronde, Powder, Malheur, Owyee, Malheur Lake, Goose & Summer Lake	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 95% of Saturation(3)	9.0	9.0	8.0	9.0
Mainsteam Klamath Falls from Klamath Lake to Keno Dam	30-Day Average	This Beneficial Use Is Not Designated for This Segment	None Proposed For This Use	Standard for Non-Salmonid Waters (Early Life Stages) Applies		
	7-Day Average					
	7-Day Mean Min.					
	1 Day					
Mainsteam Klamath Falls from Keno Dam to OR/CA Border	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 7.0	9.0	9.0	8.0	9.0

NOTE:

(1) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986, Table 8, National Criteria. Average DO concentration values are 0.5 mg/l above the slight production impairment values. Serve as estimate of threshold concentrations below which detrimental effects expected.

(2) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986. Summary of DO concentrations coinciding with EPA's judgments on qualitative levels of effect: 30-day average -- No Production Impairment; 7-day average -- Slight Production Impairment; 1-day minimum -- Moderate Production Impairment. Slight and Moderate are equivalent to 10 - 20 percent growth impairment, respectively.

(3) 95% Sat.: Is equivalent at 10°C to DO concentrations of 10.8 mg/l and 9.3 mg/l for elevations of 0 and 4,000 feet, respectively. Is equivalent at 15°C to DO concentrations of 9.6 mg/l and 8.3 mg/l for elevations of 0 and 4,000 feet, respectively.

(4) 90% Sat.: Is equivalent at 10°C to DO concentrations of 10.2 mg/l and 8.8 mg/l for elevations of 0 and 4,000 feet, respectively. Is equivalent at 15°C to DO concentrations of 9.1 mg/l and 7.9 mg/l for elevations of 0 and 4,000 feet, respectively.

Table 1B

(COMPARISON OF EXISTING DISSOLVED OXYGEN STANDARDS, EPA CRITERIA AND ALTERNATE PROPOSALS FOR HEARING AUTHORIZATION REQUEST ON NOVEMBER 2, 1990)

BENEFICIAL USE: SALMONID PRODUCING WATERS -- PASSAGE & REARING AND LATER LIFE STAGE

Stream Basin	Application of Numerical Value	Existing Standard	09/21/90 Proposal	11/02/90 Alternate Proposal	EPA "National" Criteria(1)	EPA Criteria With Quality Effects(2)
Willamette 0 - 26.6 + Multnomah Channel	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 5.0	5.0	6.0	4.5*	5.0
Willamette >26.6 - RM 50	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 6.0	5.0	6.0	4.5*	5.0
Willamette >50 to RM 85	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 7.0	5.0	6.0	4.5*	5.0
Willamette >85 to RM 187	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 90% Saturation(4)	5.0	6.0	4.5*	5.0
Willamette Tributaries, and North Coast, Mid Coast, Umpqua, SC, Rogue, Sandy, Hood, Deschutes, & Klamath River Basins, Except as Noted Below	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 90% Saturation, Except When More Sensitive Use Occurs(4)	5.0	6.0	4.5*	5.0
Columbia River	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 90% Saturation(4)	5.0	6.0	4.5*	5.0
John Day, Umatilla, Walla Walla, Grande Ronde, Powder, Malheur, Owyee, Malheur Lake, Goose & Summer Lake	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 75% Saturation, Except When More Sensitive Use Occurs(5)	5.0	6.0	4.5*	5.0
Mainsteam Klamath Falls from Klamath Lake to Keno Dam	30-Day Average	This Beneficial Use Is Not Designated for This Segment		Standard for Non-Salmonid Waters (Early Life Stages) Applies*		
	7-Day Average					
	7-Day Mean Min.					
	1 Day					
Mainsteam Klamath Falls from Keno Dam to OR/CA Border	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 7.0	5.0	6.0	4.5*	5.0

* 0.5 mg/l added to value of Table 8 as suggested by EPA to minimize risk where "manipulatable" discharges would allow repeated weekly cycles of minimum acutely acceptable DO values.

NOTE:

(1) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986, Table 8, National Criteria. Average DO concentration values are 0.5 mg/l above the slight production impairment values. Serve as estimate of threshold concentrations below which detrimental effects expected.

(2) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986. Summary of DO concentrations coinciding with EPA's judgments on qualitative levels of effect: 30-day average -- No Production Impairment; 7-day average -- Slight Production Impairment; 1-day minimum -- Moderate Production Impairment. Slight and Moderate are equivalent to 10 - 20 percent growth impairment, respectively.

(4) 90% Sat.: Is equivalent at 20°C to DO concentrations between 8.2 mg/l and 7.1 mg/l for elevations between 0 and 4,000 feet, respectively.

(5) 75% Sat.: Is equivalent at 20°C to DO concentrations of 6.5 mg/l and 5.9 mg/l for elevations of 1,000 and 4,000 feet, respectively. Is equivalent at 24°C to DO concentrations of 6.1 mg/l and 5.5 mg/l for elevations of 1,000 4,000 feet, respectively.

(COMPARISON OF EXISTING DISSOLVED OXYGEN STANDARDS, EPA CRITERIA AND ALTERNATE PROPOSALS FOR HEARING AUTHORIZATION REQUEST ON NOVEMBER 2, 1990)

BENEFICIAL USE: NON-SALMONID WATERS -- WARMWATER FISH CRITERIA (EARLY LIFE STAGES)

Stream Basin	Application of Numerical Value	Existing Standard	09/21/90 Proposal	11/02/90 Alternate Proposal	EPA "National" Criteria(1)	EPA Criteria With Quality Effects(2)
Willamette 0 - 26.6 + Multnomah Channel	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 5.0	N/A		5.0	5.5
Willamette >26.6 - RM 50	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 6.0	N/A		5.0	5.5
Willamette >50 to RM 85	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 7.0	N/A		5.0	5.5
Willamette >85 to RM 187	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 90% Saturation	N/A		5.0	5.5
Willamette Tributaries, and North Coast, Mid Coast, Umpqua, SC, Rogue, Sandy, Hood, Deschutes, & Klamath River Basins, Except as Noted Below	30-Day Average					
	7-Day Average		6.5	6.5	6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 6.0, Except Where More Sensitive Use Occurs	5.0	5.5	5.0	5.5
Columbia River	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 90% Saturation	N/A		5.0	5.5
John Day, Umatilla, Walla Walla, Grande Ronde, Powder, Malheur, Owyee, Malheur Lake, Goose & & Summer Lake	30-Day Average					
	7-Day Average		6.5	6.5	6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 75% Saturation, Except When More Sensitive Use Occurs(5)	4.0	5.5	5.0	5.5
Mainsteam Klamath Falls from Klamath Lake to Keno Dam	30-Day Average					
	7-Day Average		6.5	6.5	6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 5.0	5.0	5.5	5.0	5.5
Mainsteam Klamath Falls from Keno Dam to OR/CA Border	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 7.0	N/A		5.0	5.5

NOTE:

(1) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986, Table 8, National Criteria. Average DO concentration values are 0.5 mg/l above the slight production impairment values. Serve as estimate of threshold concentrations below which detrimental effects expected.

(2) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986. Summary of DO concentrations coinciding with EPA's judgments on qualitative levels of effect: 30-day average -- No Production Impairment; 7-day average -- Slight Production Impairment; 1-day minimum -- Moderate Production Impairment. Slight and Moderate are equivalent to 10 - 20 percent growth impairment, respectively.

(5) 75% Sat.: Is equivalent at 15°C to DO concentrations of 7.3 mg/l and 6.6 mg/l for elevations of 1,000 and 4,000 feet.
Is equivalent at 20°C to DO concentrations of 6.6 mg/l and 5.9 mg/l for elevations of 1,000 and 4,000 feet.
Is equivalent at 24°C to DO concentrations of 6.1 mg/l and 5.5 mg/l for elevations of 1,000 and 4,000 feet.

(COMPARISON OF EXISTING DISSOLVED OXYGEN STANDARDS, EPA CRITERIA AND ALTERNATE PROPOSALS FOR HEARING AUTHORIZATION REQUEST ON NOVEMBER 2, 1990)

BENEFICIAL USE: NON-SALMONID WATERS -- WARMWATER FISH CRITERIA (LATER LIFE STAGES)

Stream Basin	Application of Numerical Value	Existing Standard	09/21/90 Proposal	11/02/90 Alternate Proposal	EPA "National" Criteria(1)	EPA Criteria With Quality Effects(2)
Willamette 0 - 26.6 + Multnomah Channel	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.0	6.0
	7-Day Average		N/A			
	7-Day Mean Min.				4.0	5.0
	1 Day	Not Less than 5.0	N/A		3.0	4.0
Willamette >26.6 - RM 50	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 6.0	N/A		3.0	4.0
Willamette >50 to RM 85	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 7.0	N/A		3.0	4.0
Willamette >85 to RM 187	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 90% Saturation	N/A		3.0	4.0
Willamette Tributaries, and North Coast, Mid Coast, Umpqua, SC, Rogue, Sandy, Hood, Deschutes, & Klamath River Basins, Except as Noted Below	30-Day Average		6.0	*	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		5.0			
	1 Day	Not Less than 6.0, Except Where More Sensitive Use Occurs	4.0		3.0	4.0
Columbia River	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 90% Saturation	N/A		3.0	4.0
John Day, Umatilla, Walla Walla, Grande Ronde, Powder, Malheur, Owyee, Malheur Lake, Goose & Summer Lake	30-Day Average		6.0	*	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		5.0		4.0	5.0
	1 Day	Not Less than 75% of Saturation	4.0		3.0	4.0
Mainsteam Klamath Falls from Klamath Lake to Keno Dam	30-Day Average		6.0	*	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		5.0		4.0	5.0
	1 Day	Not Less than 75% Saturation, Except When More Sensitive Use Occurs	4.0		3.0	4.0
Mainsteam Klamath Falls from Keno Dam to OR/CA Border	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 7.0	N/A		3.0	4.0

* For Warm-Water Fisheries, use criteria for Early Life Stages Only.

NOTE:

(1) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986, Table 8, National Criteria. Average DO concentration values are 0.5 mg/l above the slight production impairment values. Serve as estimate of threshold concentrations below which detrimental effects expected.

(2) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986. Summary of DO concentrations coinciding with EPA's judgments on qualitative levels of effect: 30-day average -- No Production Impairment; 7-day average -- Slight Production Impairment; 1-day minimum -- Moderate Production Impairment. Slight and Moderate are equivalent to 10 - 20 percent growth impairment, respectively.

NEIL GOLDSCHMIDT
GOVERNOR

Environmental Quality Commission

811 SW SIXTH AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

REQUEST FOR EQC ACTION

Meeting Date: November 2, 1990
Agenda Item: H
Division: Water Quality
Section: Standards & Assess.

SUBJECT:

Proposed Adoption of Rule Establishing Bear Creek TMDL Time Schedule

PURPOSE:

The Bear Creek Total Maximum Daily Load (TMDL) rule (OAR 340-41-385), adopted in July of 1989, included a timetable for implementation and compliance. The rule requires the Department of Environmental Quality (Department) to distribute initial load and waste load allocations, and it requires point source dischargers and land management agencies to develop program plans for implementing these allocations.

The proposed rule amendment delays the deadlines for the Department to distribute load allocations (LAs) and waste load allocations (WLAs), and for the regulated entities to submit program plans. The delay is requested because the Department did not meet its deadline for establishing the preliminary LAs and WLAs. The sources who were working with the Department had the opportunity to develop program plans based on draft TMDLs, WLAs and LAs, but only the City of Ashland proceeded. The remaining sources have made little progress.

ACTION REQUESTED:

___ Work Session Discussion
___ General Program Background
___ Potential Strategy, Policy, or Rules
___ Agenda Item ___ for Current Meeting
___ Other: (specify)

___ Authorize Rulemaking Hearing

_X_ Adopt Rules
- Proposed Rules — Attachment A
- Rulemaking Statements — Attachment B
- Fiscal and Economic Impact Statement — Attachment C
- Public Notice — Attachment D

___ Issue a Contested Case Order
___ Approve a Stipulated Order
___ Enter an Order
- Proposed Order — Attachment ___

___ Approve Department Recommendation
- ___ Variance Request — Attachment ___
- ___ Exception to Rule — Attachment ___
- ___ Informational Report — Attachment ___
- ___ Other: (specify) — Attachment ___

DESCRIPTION OF REQUESTED ACTION:

The proposed rule amendment requires the Department to distribute initial load and waste load allocations by September 30, 1990. (The allocations were distributed on September 25, 1990.)

The proposed amendment requires industries permitted for log pond discharge to submit program plans before May 25, 1991 (eight months after the Department distributed the LAs). It requires Jackson County, the incorporated cities, and the Departments of Forestry and Agriculture to submit their program plans before June 1, 1992. The proposed language is shown in Attachment A.

The proposal would delay the log pond plan deadline by 10 months, and the nonpoint source plan deadline by 17 months, from those in the original rule.

The Department is not proposing to extend the December, 1994 final compliance date for achieving the TMDL at this time. Achievement of this deadline will be subject to timely plan submittal, review and approval by the Department, and implementation by the Designated Management Agencies (DMAs).

AUTHORITY/NEED FOR ACTION:

___ Required by Statute: _____ — Attachment ___
Enactment Date: _____
_X_ Statutory Authority: ORS 468.735 — Attachment ___
___ Pursuant to Rule: _____ — Attachment ___

X	Pursuant to Federal Law/Rule: CWA Sec.303 (Public Law 92-500 as amended)	Attachment ___
___	Other:	Attachment ___
___	Time Constraints: (explain)	

DEVELOPMENTAL BACKGROUND:

___	Advisory Committee Report/Recommendation	Attachment ___
X	Hearing Officer's Report/Recommendations	Attachment F
X	Response to Testimony/Comments	Attachment F
X	Prior EQC Agenda Items: July 21, 1989, Agenda Item I	Attachment E
___	Other Related Reports/Rules/Statutes:	Attachment ___
___	Supplemental Background Information	Attachment ___

REGULATED/AFFECTED COMMUNITY CONSTRAINTS/CONSIDERATIONS:

The regulated community affected by the proposed rule amendment includes the point source dischargers, local governments and resource management agencies required to develop program plans by the Bear Creek TMDL rule. Specifically, these parties include three industries permitted for log pond discharge, Jackson County, all the incorporated cities in the basin, the Department of Forestry, and the Department of Agriculture.

The City of Ashland sewerage facility is not affected by the proposed amendment because they have already submitted their program plan.

The proposal allows the affected parties additional time to complete their program plans and does not restrict them from submitting the plans early. Therefore, the proposal should provide relief rather than additional burden.

The affected parties may have difficulty submitting plans within the timeframe of the original rule due to the delay by the Department in distributing the waste load and load allocations. The purpose of a program plan is to describe the strategy and timeline by which the regulated party will achieve their allocation. The regulated parties should be allowed a reasonable amount of time following formal notification of their allocation to complete the program plans.

A delay in the completion of program plans will result in less time to implement those plans and achieve final LAs and WLAs by the December, 1994 compliance date.

The program plans were intended to provide additional information as to whether the 1994 compliance date is achievable. The Department can not judge at this time whether the program plan delays will necessitate an extension of the compliance date.

PROGRAM CONSIDERATIONS:

The development and distribution of waste loads for Bear Creek were considerably more complex than any other water quality limited receiving stream examined to date. It included multiple parameters in both winter and summer flow situations. The Bear Creek TMDL added a significant workload to the Department which had to be assumed by existing staff. This situation, along with other Department priorities, caused a delay in the calculation and distribution of the load and waste load allocations.

The allocations were distributed by mail on September 25, 1990, however, to all the Designated Management Agencies - all those given a load or waste load allocation and responsible for developing a program plan.

The proposed amendment does not change the resource demands on the Department, but corrects for the delay in Department action which has already resulted due to insufficient resources. It will also spread out the demands on Department staff to assist with plan development, review plans, hold public hearings and request Environmental Quality Commission (Commission) approval of the plans. Additional staff were recently hired on a temporary basis to assist with the TMDL workload.

Bear Creek is the fourth TMDL to be established. There are ten additional water bodies with TMDL work in progress or scheduled. The work of the Department does not end when the TMDL is established. Therefore, it will become more and more difficult to continue to establish new TMDLs, as well as follow through on load allocations and program plan development and approval, in a timely manner with existing resources.

Environmental Protection Agency resources to support TMDL development will be greatly reduced after September 30, 1990. The Department's proposed Water Program budget includes a

request for funds to continue the TMDL effort (Decision Package #103). Without this funding, the Department will be severely limited in its ability to comply with the Federal Court Order to complete two TMDLs per year. This situation would also, of course, limit our ability to achieve timely implementation of TMDLs already established.

ALTERNATIVES CONSIDERED BY THE DEPARTMENT:

1. Extend the deadline for distribution of allocations by the Department to September 30, 1990. Establish the following deadlines for the program plans:

   - May 25, 1991 for log pond permittees (an eight month delay from the original rule), and

   - June 1, 1992 for the nonpoint source plans (a seventeen month delay from the original rule).

   This alternative is included in response to testimony received on the Department's first proposal. See Attachment D for the proposed amendment circulated for public comment. See Attachment F for the Hearing Officer's Report.

2. Extend the deadline for distribution of allocations by the Department to August 30, 1990. Establish deadlines for program plans as 8 and 14 months from the date the Department distributes allocations.

   If adopted November 2, 1990, this alternative would delay program plan submittal deadlines over 9 months from those in the original rule.

   This alternative was the Department's proposed amendment prior to the public hearing.

3. Establish deadlines that allow 10 and 16 months following the distribution of WLAs and LAs to complete program plans. This is the amount of time between allocation distribution and program plan submittal provided in the existing rule.

DEPARTMENT RECOMMENDATION FOR ACTION, WITH RATIONALE:

The Department recommends that the EQC adopt the amendment proposal described in Alternative 1 above and shown in Attachment A.

This alternative provides slightly less time (2 months less) between the allocations distribution and program plan submittal than the original rule for the log pond permittees. Because these parties have known of the requirement since July, 1989 and have been aware of the draft allocations, it is believed that this proposal provides adequate time.

The alternative provides more time than the first proposed amendment (shown in Attachment D) or the original rule for the development of nonpoint source plans. The nonpoint source management agencies felt they needed more time to better coordinate their planning efforts with the actions of the Ashland sewage treatment plant, the primary contributor of the phosphorus load. In addition, the Department of Agriculture felt additional time was necessary to develop a useful, meaningful and implementable program plan. The DEQ expects the specificity and comprehensiveness of the program plans to reflect the additional time allotted for their development.

The Department does not want to delay the deadlines any longer than necessary because the later the plans are submitted, the more likely the December, 1994 final compliance date will need to be extended as well. The Department has no reason to believe that the compliance date will not be achievable under this proposal. The program plans will provide the information necessary to make this determination.

CONSISTENCY WITH STRATEGIC PLAN, AGENCY POLICY, LEGISLATIVE POLICY:

The proposed amendment is inconsistent with the strategic plan, agency policy and legislative policy to the extent that it delays the implementation of pollution prevention practices, and the protection of Bear Creek for beneficial uses. It is uncertain whether the delay in the submittal of program plans will necessitate an extension of the December, 1994 compliance date for the Bear Creek TMDLs.

ISSUES FOR COMMISSION TO RESOLVE:

1. Should a departmental delay cause a potential hardship on the regulated entities, or should they be allowed additional time to complete program plans?

INTENDED FOLLOWUP ACTIONS:

- Work with the Designated Management Agencies to assist them in the development of their program plans to the extent that Department resources allow.

- Review the program plans following their submittal to the Department, hold a public hearing and bring the plans before the Commission for approval.

- Take necessary steps to ensure that new TMDL rules can be met and the need for this type of rule amendment is avoided.

Approved:

Section: Neil J. Mullane

Division: Lydia Taylor

Director: Fred Hansen

Report Prepared By: Debra Sturdevant

Phone: 229-5289

Date Prepared: October 15, 1990

(DJS:djs)
(October 15, 1990)

OREGON ADMINISTRATIVE RULES
340-41-385

NOTE:

The **underlined** portions of text represent proposed additions made to the rules.

The [~~bracketed~~] portions of text represent proposed deletions made to the rules.

SPECIAL POLICIES AND GUIDELINES

340-41-385

(1) In order to improve water quality within the Bear Creek subbasin to meet existing water quality standards for dissolved oxygen and pH, the following special rules for total maximum daily loads, waste load allocations, load allocations, and program plans are established.

(a) After the completion of wastewater control facilities and program plans approved by the Commission under this rule and no later than December 31, 1994, unless otherwise modified by program plans no activities shall be allowed and no wastewater shall be discharged to Bear Creek or its tributaries without the authorization of the Commission that cause the following parameters to be exceeded in Bear Creek:

Low-Flow Season
Approximately
May 1 through November 30*

Ammonia Nitrogen Nitrogen as N (mg/l)	Instream Five-Day Biochemical Oxygen Demand (mg/l)[1]	Total Phosphorus as P (mg/l)
0.25	3.0	0.08

High Flow Season
Approximately
December 1 through April 30*

Ammonia Nitrogen Nitrogen as N (mg/l)	Instream Five-Day Biochemical Oxygen Demand (mg/l)[2]
1.0	2.5

---

[1] As measured at the Valley View Road Sampling Site. For the purposes of waste load allocations, the biochemical oxygen demand is calculated as the ammonia concentration multiplied

by 4.35 and added to the measured effluent biochemical oxygen demand.

[2] Median value as measured at the Kirtland Road sampling site.

* Precise dates for complying with this rule may be conditioned on physical conditions, such as flow and temperature, of the receiving stream and shall be specified in individual permits or memorandums of understanding issued by the Department.

(b) The Department shall before September 30, 1990 ~~[within 60 days of adoption of these rules]~~ distribute initial waste load and load allocations to point and nonpoint sources in the basin. These loads are interim and may be redistributed upon conclusion of the approved program plans.

(c) Before October 21, 1989 ~~[Within 90 days of adoption of these rules]~~, the City of Ashland shall submit to the Department a program plan and time schedule describing how and when they will modify their sewerage facility to comply with this rule and all other applicable rules regulating waste discharges.

(d) Before May 25, 1991 ~~[Within 12 months of adoption of these rules]~~, the industries permitted for log pond discharge, Boise Cascade Corporation, Kogap Manufacturing Company, and Medford Corporation shall submit program plans to the Department describing how and when they will modify their operations to comply with this rule and all other applicable rules regulating waste discharges.

(e) Before June 1, 1992 ~~[Within 18 months after the adoption of these rules]~~, Jackson County and the incorporated cities within the Bear Creek subbasin shall submit to the Department a program plan for controlling urban runoff within their respective jurisdictions to comply with these rules.

(f) Before June 1, 1992, ~~[Memorandums of Agreement developed following adoption of this rule between]~~ the Departments of Forestry and Agriculture ~~[and the Department of Environmental Quality]~~ shall submit to the Department ~~[require that]~~ program plans for achieving specified load allocations of state and private forest lands and agricultural lands respectively ~~[be developed within 18 months of rule adoption]~~.

(g) Program plans shall be reviewed and approved by the Commission. All proposed final program plans shall be subject to public comment and hearing prior to consideration for approval by the Commission.

STATEMENT OF NEED FOR RULEMAKING

Pursuant to ORS 183.335(7), this statement provides information on the Environmental Quality Commission's intended action to adopt and amend rules.

1. Legal Authority

ORS 468.735 provides that the Commission may establish by rule standards of quality and purity for waters of the state in accordance with the public policy set forth in ORS 468.710. Section 303 of the Federal Clean Water Act (Public Law 92-500) requires that Total Maximum Daily Loads be established for water quality limited stream segments.

2. Need for the Rule Amendment

Because the Bear Creek TMDL includes five parameters for which interim load and waste load allocations had to be established, and because this workload had to be assumed by existing staff, the Department did not meet the deadline in the original rule (OAR 340-41-385) for distributing the allocations to the affected parties.

A Program plan describes the strategy and timeline by which a regulated party will achieve its load or waste load allocation. Program plans can not be completed without knowledge of the allocations. The Department feels the proposed rule amendment is needed to allow the regulated parties adequate time to complete their plans.

3. Principal Documents Relied Upon in this Rulemaking

Clean Water Act as amended in 1977 (Public Law 92-500).

Quality Criteria for Water, EPA, 1986.

Code of Federal Regulations, 40 CFR Part 130 - Water Quality Planning and Management, 1987.

State/EPA Agreement, July, 1987. Program Document for FY 1988.

Staff Report to the EQC, Agenda Item I, Bear Creek - Establishment of Total Maximum Daily Loads, July 21, 1989.

FISCAL AND ECONOMIC IMPACT STATEMENT

The delay of the deadline for submitting program plans proposed in the rule amendment is not expected to increase the cost of plan development.

There could potentially be fiscal or economic impacts resulting from the fact that a delay in plan completion would leave less time for implementation. The regulated parties must implement their plans and achieve their load and waste load allocations by December, 1994. If the amendment is adopted on November 2nd, the deadlines would be delayed 10 to 18 months, leaving two and one-half to over 3 years for implementation.

It is not yet possible to describe the potential impacts of the delay on implementation costs because the program plans will describe the strategies and timeline proposed to achieve the allocations.

In addition, the TMDL rule states that the December 1994 compliance date can be modified if deemed necessary by the EQC following review of the program plans.

Oregon Department of Environmental Quality

A CHANCE TO COMMENT ON...

PROGRAM PLAN DEADLINES FOR BEAR CREEK TOTAL MAXIMUM DAILY LOADS

Notice Issued: 8-17-90
Public Hearing Scheduled: 9-24-90
Comments Due: 9-26-90

WHO IS AFFECTED: All businesses, residents, industries, and local governments within the Bear Creek basin.

WHAT IS PROPOSED: The Department proposes to amend Oregon Administrative Rule (OAR) Chapter 340, Division 41-385 (1). This rule establishes instream phosphorous, ammonia and oxygen demand criteria, or total maximum daily loads (TMDLs), for Bear Creek and defines the time period for when the criteria will apply.

The proposed amendment would delay the deadlines established in the rule as followes:

- The Department will be required to distribute load and wasteload allocations by August 30, 1990.
- Industries permitted for log pond discharges will be required to submit a program plan describing how and when they will modify their operations to achieve the specified waste load allocations within 8 months of the date the Department distributes allocations.
- Jackson County and the incorporated cities within the Bear Creek basin will be required to submit a program plan for controlling urban runoff within 14 months of the date the Department distributes allocations.
- The Departments of Forestry and Agriculture will be required to submit program plans for achieving specified load allocations from state and private forest lands and agricultural lands within 14 months of the date the Department distributes allocations.

811 S.W. 6th Avenue
Portland, OR 97204

FOR FURTHER INFORMATION:

Contact the person or division identified in the public notice by calling 229-5696 in the Portland area. To avoid long distance charges from other parts of the state, call 1-800-452-4011.

11/1/86

WHAT ARE THE HIGHLIGHTS:

Based on the criteria established in the above mentioned rule, the Department was required to determine Total Maximum Daily Loads (TMDLs) and Load Allocations and Waste Load Allocations for specific sources of pollutants in the basin. Point source dischargers, local governments and land management agencies are then required to develop program plans to describe strategies and a timeline for achieving their allocations.

The Department is requesting to delay the deadlines for the program plans because the distribution of load and waste load allocations by the Department was delayed. The program plans can not be completed until the allocations are distributed.

HOW TO COMMENT:

The Department will accept public comment on the proposed amendment to OAR 340-41-385 (attached).

A Public Hearing to receive comments on the amendment is scheduled as follows:

WHEN: Monday, September 24, 1990
7:00 pm

WHERE: Jackson County Courthouse
Auditorium
10 S. Oakdale (at 8th)
Medford, Oregon

The Department will accept written comments received by 5:00 pm on September 26, 1990. Comments should be sent to:

Attn.: Debra Sturdevant
Department of Environmental Quality
Water Quality Division
811 SW 6th Ave.
Portland, Oregon 97204

SA\WC6794 (8/16/90)

OREGON ADMINISTRATIVE RULES
340-41-385

NOTE:

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The [bracketed] portions of text represent proposed deletions made to the rules.

SPECIAL POLICIES AND GUIDELINES

340-41-385

(1) In order to improve water quality within the Bear Creek subbasin to meet existing water quality standards for dissolved oxygen and pH, the following special rules for total maximum daily loads, waste load allocations, load allocations, and program plans are established.

(a) After the completion of wastewater control facilities and program plans approved by the Commission under this rule and no later than December 31, 1994, unless otherwise modified by program plans no activities shall be allowed and no wastewater shall be discharged to Bear Creek or its tributaries without the authorization of the Commission that cause the following parameters to be exceeded in Bear Creek:

Low-Flow Season
Approximately
May 1 through November 30*

Ammonia Nitrogen Nitrogen as N (mg/l)	Instream Five Day Biochemical Oxygen Demand (mg/l)[1]	Total Phosphorus as P (mg/l)
0.25	3.0	0.08

High Flow Season
Approximately
December 1 through April 30*

Ammonia Nitrogen Nitrogen as N (mg/l)	Instream Five Day Biochemical Oxygen Demand (mg/l)[2]
1.0	2.5

[1] As measured at the Valley View Road Sampling Site. For the purposes of waste load allocations, the biochemical oxygen demand is calculated as the ammonia concentration multiplied

by 4.35 and added to the measured effluent biochemical oxygen demand.

[2] Median value as measured at the Kirtland Road sampling site.

* Precise dates for complying with this rule may be conditioned on physical conditions, such as flow and temperature, of the receiving stream and shall be specified in individual permits or memorandums of understanding issued by the Department.

(b) The Department shall before August 30, 1990 ~~[within 60 days of adoption of these rules]~~ distribute initial waste load and load allocations to point and nonpoint sources in the basin. These loads are interim and may be redistributed upon conclusion of the approved program plans.

(c) Before October 21, 1989 ~~[Within 90 days of adoption of these rules]~~, the City of Ashland shall submit to the Department a program plan and time schedule describing how and when they will modify their sewerage facility to comply with this rule and all other applicable rules regulating waste discharges.

(d) Within ~~[12]~~ 8 months of the date the Department distributes allocations under section (b) of this rule ~~[adoption of these rules]~~, the industries permitted for log pond discharge, Boise Cascade Corporation, Kogap Manufacturing Company, and Medford Corporation shall submit program plans to the Department describing how and when they will modify their operations to comply with this rule and all other applicable rules regulating waste discharges.

(e) Within ~~[18]~~ 14 months of the date the Department distributes allocations under section (b) of this rule ~~[after the adoption of these rules]~~, Jackson County and the incorporated cities within the Bear Creek subbasin shall submit to the Department a program plan for controlling urban runoff within their respective jurisdictions to comply with these rules.

(f) Memorandums of Agreement developed following adoption of this rule between the Departments of Forestry and Agriculture and the Department of Environmental Quality shall require that program plans for achieving specified load allocations of state and private forest lands and agricultural lands respectively be developed within ~~[18]~~ 14 months of the date the Department distributes allocations under section (b) of this rule ~~[rule adoption]~~.

(g) Program plans shall be reviewed and approved by the Commission. All proposed final program plans shall be subject to public comment and hearing prior to consideration for approval by the Commission.

NEIL GOLDSCHMIDT
GOVERNOR

Environmental Quality Commission

811 SW SIXTH AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

REQUEST FOR EQC ACTION

Meeting Date: July 21, 1989
Agenda Item: I
Division: Water Quality
Section: Planning/Monitoring

SUBJECT:

Bear Creek - Establishment of Total Maximum Daily Loads

PURPOSE:

Water Quality standards are violated in Bear Creek basin for pH, dissolved oxygen, and ammonia toxicity standards. The proposed criteria will provide the basis for developing and allocating the total maximum daily loads (TMDLs) for nutrients and biochemical oxygen demand (BOD) in Bear Creek, a tributary to the Rogue River. The TMDLs are required to achieve dissolved oxygen, pH, and ammonia toxicity standards. Achieving water quality standards is required to protect the recognized beneficial uses of fish and aquatic life, salmonid spawning and rearing, anadromous fish passage, fishing, and aesthetic quality.

ACTION REQUESTED:

___ Work Session Discussion
- ___ General Program Background
- ___ Potential Strategy, Policy, or Rules
- ___ Agenda Item ___ for Current Meeting
- ___ Other: (specify)

___ Authorize Rulemaking Hearing
_X_ Adopt Rules

Proposed Rules	Attachment A
Rulemaking Statements	Attachment B
Fiscal and Economic Impact Statement	Attachment C
Public Notice	Attachment D
Hearing Officer's Report	Attachment E
Written Comments	Attachment F
Response to Comments	Attachment G

___ Issue a Contested Case Order
___ Approve a Stipulated Order
___ Enter an Order
Proposed Order — Attachment ___

___ Approve Department Recommendation
___ Variance Request — Attachment ___
___ Exception to Rule — Attachment ___
___ Informational Report — Attachment ___
___ Other: (specify) — Attachment ___

DESCRIPTION OF REQUESTED ACTION:

The proposed rule would:

1. Identify the assimilative capacity of Bear Creek for nutrients and biochemical oxygen demand by season.

2. Define the time frame for the Department to publish interim waste load and load allocations based on the proposed criteria established in the rule. Interim allocations will be used to develop and review program plans.

3. Require the point sources which discharge to Bear Creek to develop and submit to the Department a program plan which describes strategies, options, and costs for achieving specified allocations.

4. Require that nonpoint source program plans which describe strategies and options for achieving load allocations be submitted to the Department by Jackson County and the incorporated cities within the Bear Creek basin.

5. Require that memorandums of agreement between DEQ and the Departments of Agriculture and Forestry include program plans for agricultural and forested nonpoint sources, respectively.

AUTHORITY/NEED FOR ACTION:

_X_ Required by Statute: ORS 468.735 — Attachment B
Enactment Date: _____
___ Statutory Authority: _____ — Attachment ___
___ Pursuant to Rule: _____ — Attachment ___
___ Pursuant to Federal Law/Rule: _____ — Attachment ___

_X_ Other: Implement Public Law 92-500 as amended, specifically Section 303. Attachment _B_

_X_ Time Constraints:
The Department is required under a Federal District Court Consent Decree to establish TMDLs for identified water quality limited streams at the rate of 20 percent annually, but in no event less than two streams annually. Allocations must be established for Bear Creek to comply with the requirements stated in the consent decree. Oregon's failure to establish allocations will require the Environmental Protection Agency to notice in the Federal Register proposed action within 90 days after the deadline.

DEVELOPMENTAL BACKGROUND:

___	Advisory Committee Report/Recommendation	Attachment ___
_X_	Hearing Officer's Report/Recommendations	Attachment _E_
_X_	Response to Testimony/Comments	Attachment _G_
_X_	Prior EQC Agenda Items: (list) March 13, 1987, Agenda Item O (Not Attached)	Attachment ___
___	Other Related Reports/Rules/Statutes:	Attachment ___
___	Supplemental Background Information	Attachment ___

REGULATED/AFFECTED COMMUNITY CONSTRAINTS/CONSIDERATIONS:

1. The City of Ashland operates the Ashland Sewage Treatment Plant (STP). The Ashland STP is the major source of nutrients and biochemical oxygen demand to Bear Creek. Bear Creek does not have enough flow to assimilate the waste from the Ashland STP. Inadequate dilution is most apparent in the late summer - fall when flows are routinely below 15 cubic feet per second (cfs).

   Effluent limitations based on Bear Creek's assimilative capacity would require significant load reductions from the Ashland STP during the summer through late fall. Load reductions could occur through alternative disposal or improved treatment. Either option would be expected to increase cost of treatment for the City of Ashland.

   The proposed rule will define a final compliance date and require a program plan which describes strategies and time frames for achieving the waste load allocations (WLAs). Several additional localized water quality

issues and concerns, such as chlorine toxicity, are discussed in this staff report. The Department expects these local issues to be addressed prior to the compliance date.

Achieving water quality standards will require modifying existing treatment facilities. The Ashland STP will be required to achieve the minimum design requirements already described in OAR 340-41-375(1) for the basin, unless exempted from these rules by the Commission, as well as waste load allocations.

2. Industries with discharging log ponds currently have either a General permit or a site specific National Pollution Discharge Elimination System (NPDES) permit. Achieving proposed winter WLAs may require additional controls. Those industries will be required to submit program plans to the Department describing strategies and time frames for achieving the WLAs.

3. Nonpoint source controls from urban and agricultural areas will be required to achieve the proposed TMDLs. Increased cost may be associated with achieving the load allocations (LAs). Program plans identifying strategies and options for achieving the nonpoint source load allocations will be required from designated agriculture and forestry management agencies, as well as from Jackson County and the incorporated cities within the Bear Creek Basin. The Rogue Valley Council of Governments currently coordinates a water quality program and may provide assistance and coordination of program plans within the basin.

   The Department of Agriculture has been identified as the lead agency for agricultural nonpoint sources. The State Department of Forestry is the lead agency for state and private forest lands. Memorandums of Agreement between the DEQ and these Departments will describe appropriate program plans.

PROGRAM CONSIDERATIONS:

New tasks established by this rule will have to be assumed by existing staff. The added workload of this TMDL is significant. New tasks include development of interim

allocations; program plan reviews; holding public hearings on program plans; report to EQC; continuing proactive involvement with communities in the Bear Creek Basin; increased monitoring requirements; and issuance of modified permits which incorporate compliance conditions, schedules and permit limitations based on wasteload allocations.

ALTERNATIVES CONSIDERED BY THE DEPARTMENT:

Several alternatives to the proposed rule were submitted during the public hearing or recommended during review and discussion with Environmental Protection Agency staff.

1. Summer limits of 100 micrograms per liter (µg/l) total phosphorus based on the EPA suggested criteria.

   Alternative phosphorus levels were discussed in the original staff report. Several commenters suggested that 100 µg/l total phosphorus be adopted, primarily for consistency with EPA recommended criteria. One individual supported the 80 µg/l phosphorus criteria so that pollutant levels would be reduced to the greatest extent possible.

2. Alternative time frames for the definition of "summer low flow" period were proposed by several commentators. In summary, the request involved the deletion of the months of April, May, and November from the definition of low flow season.

3. Most commentators requested that the final compliance date be extended to the winter of 1996, based on the program plans adopted by Ashland. In effect, nutrient reductions would not be expected to occur until the summer of 1997.

4. During review of the proposed criteria, suggestions were made to refine the winter BOD criteria to be defined as the instream BOD_5 as measured at Kirtland Road. This alternative would provide the primary advantage of measuring BOD_5 during ambient surveys and focusing in the area of winter dissolved oxygen violations. This alternative would not change the waste load allocations for Ashland, however.

DEPARTMENT RECOMMENDATION FOR ACTION, WITH RATIONALE:

1. The Department recommends that the Commission adopt the 80 µg/l total phosphorus as proposed. The Department believes that site specific data justifies a lower phosphorus value than national criteria suggested by EPA. The EPA recommends that site specific data be used where available.

2. The Department recommends that the Commission adopt the modified language in the rule that defines the summer low flow period as approximately May through November. April is characteristically a winter high flow period and should not be included in the summer low flow definition.

   The existing definition of low flow as outlined in OAR 340-41-006(15) states that ". . . the low flow period has been approximated by the inclusive months. Where applicable in a waste discharge permit, the low flow period may be further defined." The existing low flow period in the Rogue Basin Plan is defined as approximately from May through October (OAR 340-41-375). In Bear Creek, critical low flows have routinely been observed to persist through November. Therefore, the Department recommends that November be included in the proposed rule.

   The diurnal pattern of pH violations in Bear Creek has been observed during May at Kirtland Road. The Department recognizes that high flow conditions can be expected to persist through May in some years. However, the Department believes it is appropriate to retain the month of May in the definition of low flow period and provide appropriate refinements to the definition in permits, if warranted. The Department therefore recommends that the Commission not remove the month of May from the low flow period definition.

3. Final compliance date:

   The Department recommends that the Commission retain the proposed five year compliance deadline. The proposed rule requires that all program plans be subject to public comment. No comments were proposed suggesting eliminating this requirement from the proposed rule. The program plan submitted by Ashland provides an alternative final date, time schedule, and justification for the alternative date. The

Department has not fully reviewed Ashland's program plan or accepted public comment on the plan. Until this step in the process is complete, approximately 180 days following adoption, the Department can not support the alternative date suggested in the program plan.

Similar to other concerns discussed in the Hearing Officer's report, the Department recognizes that all the answers are not yet known. The program plans are expected to provide a rational strategy and time frame for achieving the TMDL. Public comment on strategies for attaining the beneficial uses of Bear Creek is an important aspect of the Department's review process. The Department does not want to supersede the public review process and recommends that the proposed final compliance date be retained until the review process is completed. Additional language is included in the proposed rule that would allow modifications to the final compliance date as program plans are approved.

4. Measurement of BOD at Kirtland Road during the winter:

Biochemical oxygen demand has several components, including the five-day demand (BOD_5), the nitrogenous demand, and the ultimate demand. The BOD_5 test is measured during the ambient surveys. The other components are calculated from instream data or by long-term laboratory tests. The BOD_5 offers the advantage of being directly measured in the field. As such, it offers a readily available measurement to determine the effectiveness of the TMDL.

Observed BOD_5 values in Bear Creek are higher below Ashland's discharge than at Kirtland Road. There is also greater assimilative capacity for oxygen demand in the upper portions of Bear Creek than in the lower sections. Due to greater assimilative capacity, higher BOD levels could exist without leading to a violation of water quality standards.

It is important to define where the BOD levels are to be measured. The originally proposed levels represented the maximum level of BOD that could exist below Ashland STP. These levels are greater than those observed at Kirtland Road. Dilution and instream attenuation reduce the BOD concentrations between Ashland and Kirtland Road. EPA felt that the proposed levels implied a TMDL which was much higher than existing loads.

Measuring the BOD_5 level at Kirtland Road provides a longer historical record for evaluation. Measurement at Kirtland Road will also allow the load to the Rogue to be directly interpreted. Using the measured BOD_5 allows for direct comparison of the ambient data to the criterion. Therefore, the Department suggest that the criterion be 2.5 mg/l BOD_5 as measured at Kirtland Road.

CONSISTENCY WITH STRATEGIC PLAN, AGENCY POLICY, LEGISLATIVE POLICY:

The proposed rule is consistent with the approach for establishing TMDLs on water quality limited stream segments identified in EQC Agenda Item O, March 13, 1987.

The establishment of phosphorus and oxygen demand criteria are necessary to protect the recognized beneficial uses of Bear Creek.

The Federal Clean Water Act, under Section 303, requires that pollution limits, termed Total Maximum Daily Loads, be established in waters that do not meet standards, in either numerical or narrative form, even after technology-based limitations have been applied.

In December 1986, the Northwest Environmental Defense Center (NEDC) filed suit in Federal District Court against the Environmental Protection Agency to ensure that total maximum daily loads would be established and implemented for waters in Oregon identified as being water quality limited. On June 3, 1987, Federal Judge James Burns signed a consent decree between NEDC and EPA describing a schedule for establishing TMDLs in Oregon. Bear Creek was one of the streams identified in the consent decree.

ISSUES FOR COMMISSION TO RESOLVE:

1. The proposed rule will require Ashland to modify treatment plant operation. This modification will require that the treatment plant be upgraded to meet existing basin treatment plant design requirements as discussed in the staff report. The Commission may allow exemption from the dilution rule in the basin-wide design criteria. The Commission has been asked to provide this exemption for Ashland.

The Department does not view the establishment of a TMDL as superceding existing basin requirements. Achieving the TMDL requirements will protect the beneficial uses of Bear Creek. Achieving the TMDL may provide technical justification for exempting Ashland from the dilution rule.

No economic information has been presented that would justify exempting Ashland from the dilution rule. Prior to allowing an exemption, Ashland needs to demonstrate that the costs of complying with the rule are unreasonable.

The Department recommends that the Commission not exempt Ashland from the dilution rule at this time. Options for complying with the TMDL and the basin requirements should be reviewed. The decision to exempt Ashland from the basin treatment criteria will depend in part on information generated during the review of options.

2. The Commission has been asked to retain the concept of using tributary streams as conduits for waste to Bear Creek. This concern applies primarily to log ponds which discharge to tributary streams.

Recognizing tributary streams as conduits for waste would be equivalent to identifying the tributary as the mixing zone for the discharge. The Department may suspend standards or set less restrictive standards in defined mixing zones as long as several specific conditions are met. OAR 340-41-365(4)(A) states that the mixing zone shall be free from:

- Materials that will cause acute toxicity;
- Materials that will settle to form objectional deposits; and
- Floating debris, oil, or scum.

One of the major concerns with wastewater discharge to a tributary is the lack of dilution. Log pond dischargers question if the 50:1 dilution required in general permits for log pond discharge exist in the tributaries. However, attenuation of pollutants may occur in the tributaries which would result in less direct load to Bear Creek.

Beneficial uses of the tributaries are defined in the Rogue Basin Plan. The Department of Fish and Wildlife has stated that fish do not utilize the two creeks that receive direct discharge from log ponds.

The Department recommends that the Commission reject the concept of tributary streams as conduits for log pond waste. If this concept is accepted, it would indicate that less restrictive standards apply in small streams and that beneficial uses are not expected to be attained.

The Department expects that the program plans submitted by the log pond dischargers will evaluate the effect of discharge on the receiving waters' beneficial uses. This evaluation will be used to determine if an appropriately sized mixing zone can be defined for the discharge of log pond effluent.

Permits will be modified to include the TMDL requirements including any modifications to the mixing zone definition. Program plans may be opened to public comment. This process will allow direct public input on what are the appropriate uses of the tributary streams.

3. The Commission has been asked to direct the Department to include instream attenuation in the initial load and waste load allocations.

Instream attenuation is the process which removes phosphorus or other pollutants from the water. As described in the Response to Testimony, the allocation process includes attenuation as a negative load allocation. The net load allocations for a jurisdiction would not change by defining the amount of attenuation that will occur. However, the distributable load will depend to some degree on the amount of attenuation that will occur.

The preliminary load allocations discussed to date do not include attenuation. The load allocations discussed to date define the net allocation required to achieve the instream criteria. The proposed rule will require the Department to establish within sixty days interim allocations for the development of program plans. The Department is working with the local advisory group to develop the interim allocations. The advisory group provides an appropriate forum for the discussion of advantages and disadvantages of estimating attenuation in the allocation procedure.

The Department recommends that the Commission take no action at this time as to whether an estimate of attenuation should be included in the interim allocations.

INTENDED FOLLOWUP ACTIONS:

- o File Adopted Rules with the Secretary of State.
- o Establish Interim Allocations.
- o Evaluate, hold Public Hearings, and respond to Program Plans.

Approved:

Section: _____

Division: _____

Director: _____

Report Prepared By: Robert Baumgartner

Phone: 229-5877

Date Prepared: June 28, 1989

BB:kjc:crw
SA\WC6834
July 16, 1990

SPECIAL POLICIES AND GUIDELINES

340-41-385

1. In order to improve water quality within the Bear Creek subbasin to meet existing water quality standards for dissolved oxygen and pH, the following special rules for total maximum daily loads, waste load allocations, load allocations, and program plans are established.

(a) After the completion of wastewater control facilities and program plans approved by the Commission under this rule and no later than December 31, 1994, **unless otherwise modified by program plans** no activities shall be allowed and no wastewater shall be discharged to Bear Creek or its tributaries without the authorization of the Commission that cause the following parameters to be exceeded in Bear Creek:

[Summer, Irrigation, and] Low-Flow Season[s]
Approximately
[April] **May** 1 through November 30

Ammonia Nitrogen Nitrogen as N (mg/l)	Instream Five Day Biochemical Oxygen Demand (mg/l)[1]	Total Phosphorus as P (mg/l)
0.25	3.0	0.08

[Winter] High Flow Season
Approximately
December 1 through [March]**April** 3[1]**0**

Ammonia Nitrogen Nitrogen as N (mg/l)	Instream Five Day Biochemical Oxygen Demand (mg/l)[1]**2**
1.0	[7.0]2.5

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[1] **As measured at the Valley View Road Sampling Site.** For the purposes of waste load allocations, the biochemical oxygen demand is calculated as the ammonia concentration multiplied by 4.35 and added to the measured effluent biochemical oxygen demand.

2 Median value as measured at the Kirtland Roadsampling site

* Precise dates for complying with this rule may be conditioned on physical conditions, such as flow and temperature, of the receiving stream and shall be specified in individual permits or memorandums of understanding issued by the Department.

(b) The Department shall within 60 days of adoption of these rules distribute initial waste load and load allocations to point and nonpoint sources in the basin. These loads are interim and may be redistributed upon conclusion of the approved program plans.

(c) Within 90 days of adoption of these rules, the City of Ashland shall submit to the Department a program plan and time schedule describing how and when they will modify their sewerage facility to comply with this rule and all other applicable rules regulating waste discharges.

(d) Within [90 days] **12 months** of adoption of these rules the industries permitted for log pond discharge, Boise Cascade Corporation, Kogap Manufacturing Company, and Medford Corporation shall submit program plans to the Department describing how and when they will modify their operations to comply with this rule and all other applicable rules regulating waste discharges.

(e) Within 18 months after the adoption of these rules Jackson County and the incorporated cities within the Bear Creek subbasin shall submit to the Department a program plan for controlling urban runoff within their respective jurisdictions to comply with these rules.

(f) Memorandums of Agreement developed following adoption of this rule between the Departments of Forestry and Agriculture and the Department of Environmental Quality shall require that program plans for achieving specified load allocations of state and private forest lands and agricultural lands respectively be developed within 18 months of rule adoption.

(g) Program plans shall be reviewed and approved by the Commission. All proposed final program plans shall be subject to public comment and hearing prior to consideration for approval by the Commission.

STATEMENT OF NEED FOR RULEMAKING

Pursuant to ORS 183.335(7), this statement provides information on the Environmental Quality Commission's intended action to adopt and amend rules.

(1) Legal Authority

ORS 468.735 provides that the Commission by rule may establish standards of quality and purity for waters of the state in accordance with the public policy set forth in ORS 468.710. ORS 183.545 requires a review every three years of state agency Administrative Rules to minimize the economic effect these rules may have on businesses. ORS 183.550 requires, among other factors, that public comments be considered in the review and evaluation of these rules. The Clean Water Act (Public Law 92-500, as amended) requires the states to hold public hearings, at least once every three years, to review applicable water quality standards. Section 303 of the Act further requires that Total Maximum Daily Loads be established for water quality limited stream segments.

(2) Need for the Rule

The Environmental Quality Commission, at its meeting on March 13, 1987, approved the process identified by the Department for establishing Total Maximum Daily Loads (TMDLs), including the proposed schedule for completing Phase I of the process for ten stream segments and one lake. To start the process, the Commission concurred with the Department's intent to place the Tualatin River TMDLs on 30-day notice for public review and comment, thus initiating the entire TMDL/WLA (Waste Load Allocation) process for Bear Creek.

(3) Principal Documents Relied Upon in this Rulemaking

Clean Water Act as amended in 1977.

Quality Criteria for Water, 1986. EPA.

Code of Federal Regulations, 1987 (40 CFR) Part 130 - Water Quality Planning and Management.

State/EPA Agreement, July 1987. Program Document for FY 1988.

Fiscal and Economic Impact Statement

Overall Impact

Adoption and implementation of the proposed amendments to water quality standards for the Bear Creek subbasin will result in increased cost for wastewater treatment and control. These increased costs will be limited to Ashland, the only community which discharges effluent to Bear Creek. The City of Ashland will receive specified waste load allocations (WLAs), to the extent that these waste load allocations require substantial and expensive improvements to treatment capability, there will be significant fiscal impacts. Cost associated with achieving the specified WLAs may not however be greater than the costs incurred to achieve existing minimum design criteria for treatment and control of wastes for the Rouge Basin (OAR 340-41-375).

Specific WLAs will be assigned to three industries with permits to discharge log pond effluent to Bear Creek. To the extent that these allocations require significant changes in operation procedures, there may be significant fiscal impacts.

The proposed rules will lead to the establishment of nonpoint source load allocations. The load allocations require implementation of management practices, passive treatments, and nonpoint source controls in urban and agricultural areas in the Bear Creek subbasin. To the extent that these load allocations require additional management practices and controls, there may be significant fiscal impacts.

The actual fiscal impacts to the communities cannot be described at this time because the cost for alternative options are not available. The proposed rule establishes dates for the submittal of program plans. A component of the program plan will be to described how and when various options and associated costs will be analyzed and described. When this information is available the cost effective alternatives can be described.

Although cost information is not available, it is possible to ascertain who may incur fiscal impacts, how they may be impacted, and where the impacts may occur. Local governments may be directly impacted. If capitol investment is require, they will have to secure cash from bond sales or from loans. Operating expenses may increase to cover operation and maintenance of new facilities. Sewerage system users may indirectly impacted. Local

governments may have to increase user charges to pay off the bonds and/or loans; system users would have to pay the increased charges. These users include homeowners, small businesses, and large businesses. If business operating expenses increase, the public may be indirectly impacted through increased product prices. Property owners could also be indirectly impacted through property tax increases if operating expenses increase for public institutions such as schools. Table 1 presents a summary of possible fiscal and economic impacts which could result from waste load allocation to Bear Creek Basin streams. Once cost information is available, these possible impacts will be evaluated.

TABLE 1

SUMMARY OF POSSIBLE FISCAL IMPACTS--BEAR CREEK BASIN

WHO IS IMPACTED?	HOW ARE THEY IMPACTED?	WHERE ARE THEY IMPACTED?
Local Government	Bond Sale or Loan-Direct	Cash Outlay-1 time
	Operating Expenses-Direct	Cash Outlays-Ongoing
General Public	Rate Increases-Indirect	Cash Outlays-Ongoing
	Price Increases-Indirect	Cash Outlays-Ongoing
	Tax Increases-Indirect	Cash Outlays-Annual
Small Businesses	Rate Increases-Indirect	Cash Outlays-Ongoing
	Increased Operating Expenses-Indirect	Cash Outlays-Ongoing
	Tax Increases-Indirect	Cash Outlays-Annual
Large Businesses	Rate Increases-Indirect	Cash Outlays-Ongoing
	Increased Operating Expenses-Indirect	Cash Outlays-Ongoing
	Tax Increases-Indirect	Cash Outlays-Annual

Probable Community Impacts:

Ashland. The City of Ashland's sewage treatment plant is the major source of nutrients and biochemical oxygen demand to Bear Creek. The discharge from Ashland STP is far in excess of the available dilution and assimilation capacity of Bear Creek during low flow conditions. The WLAs to this facility will require substantial facility modifications. The City is now initiating studies to describe and evaluate potential alternatives. Possible alternatives to meet the WLAs include improved treatment, irrigation, discharge to irrigation canals, discharge to the Bear Creek Valley Sanitary Authority, and land disposal. Ashland would be eligible for low interest loans from the State Revolving Fund.

Urban Areas. Urban areas within the basin include Medford, Phoenix, Central Point, Jacksonville, Talent, Ashland and unincorporated areas of Jackson County. The proposed rule will require these communities develop appropriate nonpoint source controls to achieve their specified Load Allocations. The Rouge Valley Council of Governments currently has a water quality program in the Bear Creek Basin. Additional costs are expected to achieve the LAs.

Agriculture. Agricultural return flows provide a significant load of nutrients and oxygen demand to Bear Creek. The Department of Agriculture is the designated management agency for agriculture nonpoint source control. Achieving the load allocations may require identifying and adopting alternative best management practices.

Industry. Log pond discharges provide large loads of oxygen demand to Bear Creek. Three industries hold permits for the discharge of log pond effluent during rainfall events. Modifications to existing practices may be required to achieve specified mass loadings for the permitted log ponds. Pollution Control tax credits may be available to industrial sources to offset costs of additional pollution control facilities.

(5) Land Use Consistency

The Department has concluded that the proposed rule conforms with the statewide planning goals and guidelines.

GOAL 6 (Air, Water, and Land Resource Quality):

This proposal is designed to improve and maintain water quality in the Bear Creek subbasin by reducing pollutant loadings.

GOAL 11 (Public Facilities):

Compliance with the proposed rules would require the City of Ashland to provide program plans describing strategies for achieving pollution limits. Additional sewerage facilities may be required.

The proposed rules do not appear to conflict with other goals.

Public comment on any land use involved is welcome and may be submitted in the same manner as indicated for testimony in this notice. It is requested that local, state, and federal agencies review the proposed action and comment on possible conflicts with their program affecting land use and with statewide planning goals within their expertise and jurisdiction.

Attachment F

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: October 1, 1990

TO: Environmental Quality Commission

FROM: Debra Sturdevant

SUBJECT: Agenda Item J, November 2, 1990 EQC Meeting

Hearings Officer's Report on Bear Creek Program Plan Deadlines

A public hearing was held at 7:00 pm on September 24, 1990 to accept testimony on a proposed rule amendment to postpone the deadlines for the submittal of program plans. The program plans describe strategies for the implementation of the Bear Creek Total Maximum Daily Load policies.

Ten people attended, three provided oral testimony. Bob Baumgartner of DEQ's staff was present to answer questions following the hearing.

SUMMARY OF TESTIMONY

Lou Hannum, President of Medford City Council, spoke against the amendment, requesting that the nonpoint source program plans, such as that required of the City of Medford, be due two years before the implementation for Ashland's Water Quality Control Plan is scheduled. The implementation date is currently 1994, so the proposal is that the nonpoint source plans be due in 1992.

The City of Medford also provided written testimony (attached), which explains their rational for this request.

Eric Dittmer, of the Rogue Valley Council of Governments, had two comments. First, he was glad to hear that the "management letters" (the TMDL and allocation documents) will be mailed September 25th and stated that RVCOG is willing to assist in the implementation.

Second, he requested that DEQ follow up on the intensive monitoring done in August of 1988 with a subsequent set of sampling in November or January/February of this or a following year. The August data was collected during the time of year that Bear Creek is used intensively for irrigation and typically experiences low flows. November sampling would reflect the non-irrigation season before high winter runoff. January/February would reflect the non-irrigation, rainy season and higher overland runoff. Sampling would be more efficiently and consistently collected by DEQ rather than by various local agencies using private labs. This information should enable us to better differentiate between point sources and nonpoint sources, particularly agriculture.

Brad Prior, Jackson County Department of Planning and Development, stated that DEQ staff have said that 75-90% of the total nutrient load to Bear Creek is from the Ashland sewage treatment plant discharge, with the majority of the 10-25% remaining the result of agricultural practices and particularly irrigation return flows. Therefore, DEQ should target cleanup efforts to working with the Ashland STP and the irrigation districts. The nutrient loads from urban runoff and small hobby farms is such a small volume as compared to the other sources that these can best be handled by voluntary advisory programs rather than enforcement actions or plans that would have to be enforced by the County.

Judson Parson, Vice Chairman, Jackson Soil and Water Conservation District, submitted written testimony against the proposed amendment. See the attached letter.

Michael Wolf, of the Oregon Department of Agriculture, submitted written testimony (attached) against the 14 month deadline. The DOA recommends an earliest date of June 1, 1992 for submittal of an agricultural nonpoint source program plan.

The DOA believes that 14 months is "inadequate because of the status of other plans, and because of the workload necessary for the gathering of information which is critical for the formulation of a meaningful agricultural plan." The Ashland STP is the main contributor of phosphorus and if their discharge is eliminated, DEQ may reconsider the allocations to the other management agencies.

"The major difficulty with the 14 month time frame for agriculture lies in the time necessary to do the work required for the needs assessment portion of the plan, which is critical for the formulation of a useful, meaningful, and implementable plan..."

The DOA also recommends that monitoring be conducted in early to mid-November and in mid-winter in order to know what portion of current loads are from agriculture and to prioritize subbasins for needs assessments. This information will allow cleanup efforts to be concentrated where water quality benefits would be the greatest.

See the attached letter for additional DOA comments.

RESPONSE TO COMMENTS

1) COMMENT: Because the Ashland STP is the primary source of phosphorus to Bear Creek, the nonpoint plans should be delayed until after a decision on the implementation strategy of the Ashland STP has been made. The nonpoint plans should be due two years before the final compliance date of December 31, 1994.

RESPONSE: While the Ashland STP is the primary source, the nonpoint sources also contribute phosphorus loads to Bear Creek as reflected in the load allocations. The implementation of nonpoint source controls is often a long process. The Department feels that in order to meet the December 31, 1994 compliance date the nonpoint source program plans should be completed in a timely fashion. The delay in completing program plans will reduce the time available for implementation.

The Department does agree, however, that more time is appropriate and has changed its proposed date for the nonpoint source program plans to June 1, 1992. The Department does not agree with delaying the program plans until December 1992, two years before the implementation date. This would eliminate an entire growing and construction season and significantly reduce the time available for the nonpoint sources to achieve compliance.

Considerable work has been done in the Bear Creek valley over the last 10 years to identify and correct water quality problems. There is a considerable amount of information available on needed practices.

2) COMMENT: The Department should conduct another intensive water quality data collection effort in November or mid-winter of this or a following year in order to separate irrigation and non-irrigation loads to Bear Creek.

RESPONSE: The Department does not currently have the funds to conduct a fall or winter intensive water quality survey this

year. Further discussion is necessary to determine whether this would be the best use of the Department's limited monitoring resources, particularly in light of the fact that the phosphorus load allocations are applicable only during the irrigation season (May 1 - October 1).

3) COMMENT: The nutrient loads from urban runoff is such a small volume as compared to other sources that these can best be handled by voluntary advisory programs rather than enforcement actions or plans that would have to be enforced by the County.

RESPONSE: The program plans should describe the strategy(ies) the DMAs determine would best address the sources within their jurisdiction. Voluntary educational or incentive-based programs may be proposed as an implementation strategy. The County, together with the cities, has been given an allocation for urban runoff and, while the load from urban runoff may be small as compared to that of the Ashland STP, the program plan is still necessary to describe how the urban load allocation will be met. The size and complexity of the program plan may reflect the size and complexity of the problem and proposed control measures it addresses.

4) COMMENT: Knowledge of the allocations as well as placing the program plans into the work plans and budgets of the DMAs are necessary before a time frame can be established.

RESPONSE: While the allocations were not yet distributed as of the date of this comment (September 24), they were distributed on September 25th. The Department agrees that knowledge of the allocations is necessary before program plans can be completed and that is why the Department is proposing to delay those deadlines.

The Department does not agree that the program planning process must be placed into DMA work plans and budgets before a time line can be established, however. Establishing the time frame should provide an incentive to the DMAs to place this effort into their workplans and budgets and provide adequate time for completion. In addition, the DMAs have known since the passage of the rules in July of 1989 that a program plan would be required in the near future.

5) COMMENT: The Department of Agriculture felt that 14 months was too short a time to complete the work necessary to develop a useful and implementable agricultural nonpoint source program plan. A due date of June 1, 1992 was requested.

The Department has changed its proposed due date for the nonpoint source plans to June 1, 1992 in response to this request. The Department expects, however, that the additional time will be reflected in the plan's specificity and comprehensiveness.

The Department of Agriculture should be advised of another factor that may affect the timeline for their program plan. Applications for Section 319 grant funds for the implementation of nonpoint source efforts during the 1993 federal fiscal year (Oct 92- Sept. 93), will be due during the summer of 1992. In order for the DOA to be in the best position to compete for these funds, they may wish to have an approved program plan in place and ready for implementation. DEQ will need several months to review the program plan, hold a public hearing, and obtain EQC approval.

The later the date of program plan submittal, the greater the potential for DOA to miss this funding opportunity. The earlier the submittal, the greater the potential of obtaining these implementation funds in a timely manner. In the final analysis, it may mean having one more growing and construction season in which to implement plans prior to the December 1994 compliance date.

CITY COUNCIL

CITY OF MEDFORD

MEDFORD, OREGON 97501

September 24, 1990

Debra Sturdevant
Dept. of Environmental Quality
Water Quality Division
811 S.W. 6th Ave.
Portland, OR 97204

Subject: Bear Creek Program Plans and Implementation Schedules

The City of Medford has a history of being environmentally concerned and we are pleased to see that an emphasis is being placed on Bear Creek to help ensure a cleaner stream flowing through the middle of our City. We hope, and believe, that a joint effort from all the surrounding land owners and users can bring about an improved water quality in Bear Creek. We hope that these efforts do not significantly decrease the water volume in the stream.

We would request that non-point sources be given a time schedule that would play off the program plan and implementation schedule for Ashland's WQCP. We think that everyone recognizes that what the non-point sources may accomplish would be overshadowed by the point source impact. Therefore, we request that non-point source's program plans be due two years before implementation is scheduled for Ashland's WQCP. As it presently stands, Ashland's implementation is targeted for 1994 (there is some anticipation that this date will be reset to 1996), so, under our request, non-point source plans would be due in 1992 (1994 if Ashland's date changes).

The rational to support this request is as follows:

1. If the plans were due two years prior to Ashland's implementation schedule, we would know what they plan to do with their WQCP. Their decision could effect what plan(s) would be best for the non-point source entities to apply. An expanded time frame would allow for better coordination between the various agencies for a unified plan as well.

2. Wetland use is often thought of as the most viable non-point source pollution removal technique. At the present, rules and regulations concerning wetlands are cloudy at best. Medford would be very cautious about considering wetland construction until we have a much clearer understanding of the rules. More time should let us know if this tool is available for our use.

3. Implementation time for non-point source activities will be much shorter, much less complex and, hopefully, less costly than what Ashland appears to be facing. Therefore, we should be able to implement our plans to coincide with Ashland's implementation.

Medford has had and will continue a program of both monitoring for and correcting situations that have caused adverse impact on Bear Creek. Through the Association of Oregon Sewer Agencies (AOSA), we are supporting the state wide ban on phosphates in soaps and detergents. We have a storm drain utility that is funded for the express purpose of expanding and maintaining our storm drain systems in a manner consistent with city needs. In short, we think that at the proper time we will be fully prepared to act in a responsible manner to meet our commitment to help make Bear Creek a pleasant community amenity.

Sincerely,

Lou Hannum

Lou Hannum, President
Medford City Council

DW/js

c: Mayor and City Council
City Manager
Public Works Director
Planning Director

Jackson Soil and Water Conservation District
1119 Ellen Avenue - Medford, Oregon 97501 - Phone (503) 776-4267

September 24, 1990

Department of Environmental Quality
Water Resource Division
811 SW 6th Avenue
Portland, Oregon 97204

Attn: Debra Sturdevant

The Jackson Soil & Water Conservation District directors, at the regular board meeting September 18, 1990, reviewed the proposed plan deadlines for Bear Creek Total Maximum Daily Loads -- Oregon Administrative Rules 340-41-385.

Under 1. (b)"...before August 30,1990" may be incorrect. We are not aware that the distribution of waste load allocations (TMDl's) has been made to the Designated Management Agencies yet.

Under 1 (d),(e),& (f) we believe the months (time frame) to prepare a program plans may be too short. Until the load allocations are distributed to the Designated Management Agencies and they are aware of the scope and size of the job, how can they be expected to commit to a time frame?

The load allocations should be made to the Designated Management Agencies, then they should be allowed to respond with a time frame needed to prepare a program plan, along with business, residents, industries, and local governments in the Bear Creek Basin. Sufficient time will be needed for a good program plan to be written; one which will accomplish the objective of cleaning up Bear Creek. Unless those involved know what portion of the Total Maximum Daily Load is theirs, how can anyone estimate how long it will take to prepare a program plan and the time frame that will be needed to solve the problems? Also, many agencies prepare work plans and budgets on an annual or biannual basis and will need to set aside sufficient time and money to do the planning work.

As Directors of Jackson SWCD, we feel that knowledge of the allocations is necessary, as well as placing the program plan into the work plans and budgets of Designated Management Agencies, before a workable time frame can be established.

Yours truly,

Judson Parsons

Judson Parsons
Vice Chairman

NEIL GOLDSCHMIDT
GOVERNOR

Oregon Department of Agriculture

635 CAPITOL STREET NE, SALEM, OREGON 97310-0110

September 26, 1990

Debra Sturdevant
Department of Environmental Quality
Water Quality Division
811 SW 6th Ave.
Portland, OR 97204

The following are the Department of Agriculture's written comments on the Department of Environmental Quality's proposal to amend Oregon Administrative Rule Chapter 340, Division 41-385 (1). Specifically, our comments relate to the portion of the proposed amendment requiring the Department of Agriculture to submit a nonpoint source program plan for Bear Creek within 14 months of DEQ's distribution of load allocations. We received the Department of Agriculture's Load Allocations yesterday, September 25, 1990. The proposal would require that we submit our plan by November 25, 1990.

The planning process for agriculture in the Bear Creek basin has been initiated. From a logistical standpoint, the process and responsibility for plan development is in place. Though steps toward creation of the Agricultural Nonpoint Source Pollution program plan has begun, the Department believes that the 14 month time frame for completion of the plan is inadequate because of the status of other plans, and because of the workload necessary for the gathering of information which is critical for the formulation of a meaningful agricultural plan.

It is our understanding that the current main contributor of phosphorous loading into Bear Creek is the City of Ashland's Wastewater Treatment Plant, through its effluent discharge to Ashland Creek. It is also our understanding that if the City of Ashland finds an alternative use for its effluent and does not discharge it directly to the basin's waters, the Department of Environmental Quality will consider the reassessment of Load Allocations to the other DMAs, including the Department of Agriculture.

The program for effluent management ultimately implemented by the City of Ashland may directly and significantly affect agriculture's final load allocations, and therefore, the detailed needs assessment and implementation plan necessary for the creation of a meaningful agricultural NPS plan may be premature at this time. On this basis, the Department recommends that a program plan not be required until two years prior to implementation of the City of Ashland's program plan.

The major difficulty with the 14 month time frame for agriculture lies in the time necessary to do the work required for the needs assessment portion of the plan, which is critical for the formulation of a useful, meaningful, and implementable plan which, along with plans implemented by the other Designated Management Agencies (DMAs), would help to meet DEQ's overall objective of restoring the beneficial uses of Bear Creek.

Unlike point sources, sources of nonpoint pollution are very difficult to quantify. This is particularly true for agriculture, where potential sources are very diffuse and based over large land areas. A needs assessment is necessary to identify potential nonpoint sources of pollution from agriculture. Without an adequate needs assessment by subbasin in the Bear Creek watershed, the resulting NPS agricultural plan would lack the specifics necessary for a meaningful plan.

In order to efficiently and effectively conduct an agricultural needs assessment, it is necessary to have adequate information on existing water quality by subbasin and land use. With this information, it would be possible to assess agriculture's current potential impact on water quality in relation to the interim Load Allocations which have now been distributed to agriculture by DEQ. The NPS plan could then target subbasins on a priority basis, giving highest priority and concentrating efforts on those areas where implementation would result in the greatest gains toward the objective of restoring beneficial uses.

Current monitoring information is insufficient to provide agriculture with an adequate basis from which to carry out the needs assessment portion of the plan. Without further subbasin monitoring information, the potential current contribution of agriculture to NPS pollution in the Bear Creek watershed is unclear, and agriculture's efforts in planning would be diffuse.

The Department of Agriculture recommends that a monitoring program be conducted during two periods in the near future. The first period should be two to three weeks after the irrigation season ends, when irrigation return flows should be flushed out of the system, and before the rainy season begins. In a normal year, the sampling time in this case would be in early to mid-November. The second period should be in midwinter, during the rainy season. The information gained by this monitoring program would help agriculture to know what portion of current loadings are potentially coming from agriculture, to prioritize subbasins for needs assessments based on comparison of monitoring data with Load Allocations distributed to agriculture, and to concentrate its efforts where gains toward the overall objective of increased water quality will be the greatest.

The Department feels that with the additional monitoring information and subsequent priority setting, a minimum of two winters may be necessary to complete the needs assessment and involve the affected public to the degree necessary for the creation of a meaningful, implementable plan. We would therefore recommend an earliest date of June 1, 1992, for submittal of an agricultural NPS program plan. If results of additional monitoring indicate that agriculture may be a major potential contributor to phosphorous loading in widespread areas of the basin, time required for an adequate needs assessment will be greater, and June 1, 1993, may then be a more appropriate date.

Thank you for your consideration.

Michael J. Wolf
Natural Resources Division

cc: John Billings, Jackson SWCD
Eric Dittmer

State of Oregon

ENVIRONMENTAL QUALITY COMMISSION

A G E N D A

WORK SESSION -- November 1, 1990

DEQ Conference Room 3a
811 S. W. 6th Avenue
Portland, Oregon

1:00 p.m. - 1. Discussion of Draft EPA Environmental Education Program

1:20 p.m. - 2. Operating Plans: First Quarter Report and Discussion

2:15 p.m. - 3. Out-of-State Waste Fee: Discussion

Note: An invited panel of major participants will respond to questions from the Commission. This is not a public hearing; the public rulemaking hearing has already been held.

4:15 p.m. - 4. Oil Spill Planning: Background and Update

NOTE: The purpose of the work session is to provide an opportunity for informal discussion of the above items. The Commission will not be making decisions at the work session.

REGULAR MEETING -- November 2, 1990

DEQ Conference Room 3a
811 S. W. 6th Avenue
Portland, Oregon
8:30 a.m.

Consent Items

NOTE: These are routine items that may be acted upon without public discussion. If any item is of special interest to the Commission or sufficient need for public comment is indicated, the Chairman may hold any item over for discussion. When a rulemaking hearing is authorized, a public hearing will be scheduled and held to receive public comments. Following the hearing, the item will be returned to the Commission for consideration and final adoption of rules. When rules are proposed for final adoption as Consent Items, a hearing has been held, no significant issues were raised, and no changes are proposed to the original draft that was authorized for hearing.

A-1. Approval of Minutes of the September 20-21, 1990 EQC Meeting

A-2. Approval of Deputy Director Position

B. Approval of Tax Credit Applications

C. Authorization for Rulemaking Hearing: Ranking Rules for Inventory of Hazardous Substance Sites

D. Authorization for Rulemaking Hearing: Proposed Amendments to Water Quality Standards as Part of the Triennial Review Required by the Clean Water Act

Rule Adoptions

NOTE: Hearings have already been held on these Rule Adoption items; therefore any testimony received will be limited to comments on changes proposed by the Department in response to hearing testimony. The Commission also may choose to question interested parties present at the meeting.

E. Proposed Adoption of Rules for PM_{10} Control Strategy for Grants Pass

F. Proposed Adoption of Rule Amendments to Delegate Approval of Financial Assistance for Waste Tire Pile Cleanup to the Director

G. Proposed Adoption of Rules to Implement Required Out-of-State Waste Surcharge for Solid Waste

Note: No testimony will be received on this item at this time because of the prior consideration and discussion by the Commission at the Work Session on Thursday, November 1, 1990.

H. Proposed Adoption of Rule Establishing Bear Creek TMDL Time Schedule

Information Items

I. Wood Heating Alliance Presentation on Klamath Falls Study

J. Groundwater Management Plan for Malheur County: Background and Update

K. Commission Member Reports: (Oral Reports)
- Governor's Watershed Enhancement Board

L. Director's Report (Oral Report)

M. Legislative Update (Oral Report)

Public Forum

This is an opportunity for citizens to speak to the Commission on environmental issues and concerns not a part of the agenda for this meeting. 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.

Because of the uncertain length of time needed, the Commission may deal with any item at any time in the meeting except those set for a specific time. Anyone wishing to be heard on any item not having a set time should arrive at 8:30 a.m. to avoid missing any item of interest.

The next Commission meeting will be Friday, December 14, 1990, at DEQ offices in Portland, Oregon. There will be a brief work session at the same location on December 13, 1990.

Copies of the staff reports on the 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 229-5395, or toll-free 1-800-452-4011. Please specify the agenda item letter when requesting.

October 16, 1990

Approved ____
Approved with corrections ____
Corrections made ____

MINUTES ARE NOT FINAL UNTIL APPROVED BY THE EQC

ENVIRONMENTAL QUALITY COMMISSION

Minutes of the Two Hundred and Seventh Meeting
September 20-21, 1990

Work Session

The Environmental Quality Commission (Commission or EQC) Work Session was convened at about 1:15 p.m. at Conference Room 3a of the offices of the Department of Environmental Quality, 811 S. W. 6th Avenue, in Portland, Oregon. Commission members present were: Chairman Bill Hutchison and Commissioners Carol Whipple and Henry Lorenzen. Also present were Director Fred Hansen of the Department of Environmental Quality and Department staff.

Item 1: Third Party Appeals

Chairman Hutchison introduced the discussions on third party appeals.

Commissioner Lorenzen indicated the opportunity for third party appeals is important, but it should be used in limited circumstances, and the volume should not be a significant burden. Commissioner Lorenzen favored a discretionary approach, but with procedures established to formalize the process. He stated he wants discretion, but also wants some direction to people wanting to appeal.

Chairman Hutchison asked about defining standing, considering environmental effects, and establishing a briefing process. He stated that he wanted the Commission to be able to review issues before they reached court.

Commissioner Lorenzen stated that the aggrieved party standard is not good. He also questioned whether a third party would have the option to go to court even if the Commission elected to grant a third party appeal. Michael Huston responded that the aggrieved party standard is a loose one and is not of much benefit because anyone who had his view rejected would qualify. He also noted that a court would be expected to recognize a granted third party appeal option and defer to the administrative process.

Director Hansen noted that the Commission needs to be specific as to the criteria and information that should be on the table to determine whether to authorize a contested case.

Commissioner Lorenzen noted that there are two parts of the decision -- (1) will the Commission authorize a contested case, and (2) the time it takes for appeal. He noted that the EQC is more knowledgeable on environmental matters than the court. Michael Huston reminded the Commission that under the administrative process of a contested case, a permit is not finally issued until the contested case is resolved. In the case of a challenge of the permit issuance in court, the permit is issued unless enjoined by the court. Thus, the effect of the option for a third party appeal of a permit action can be very significant to a permittee.

Commissioner Lorenzen stated that the process should be short -- for example, two weeks for a third party to petition the Commission for a Contested Case, and the Commission's discretionary decision completed within a week.

Director Hansen again asked for an expression of the criteria the Commission would use to determine whether to approve a petition for a contested case by a third party. He expressed the Department's view that the pulp mill contested cases are evidence that the current process is not broken, but if it is going to be changed, rules are important to establish the criteria. He also noted that this process should not be a substitute for a petition for rulemaking.

Chairman Hutchison and Commissioner Lorenzen noted that participation in the process, major environmental impact, a precedent setting issue (first impression) or a significant question presented (such as an inconsistency) could be criteria.

Tom Donaca, representing Associated Oregon Industries, expressed a preference for remaining with the current situation related to third party appeals. He noted that a change in rules could require all permits to be modified in order for sources to be in compliance. If third party appeals were allowed, significant numbers of sources could end up without a modified permit pending resolution of the appeal and in violation of the new rules.

The Commission asked that a draft rule be developed and brought back to the Commission for consideration in a work session in December or earlier if possible. They expressed the view that they wanted to keep time periods tight, and that they did not want the applicant in limbo.

Item 2: Deputy Director Position Description

Director Hansen advised the Commission that he had concluded that the agency had grown to the point where a Deputy Director was needed to assist the Director and share in the important workload of the Director's office. The Department had a Deputy Director prior to 1975, but the position has not been filled since that time. Since 1984, the agency has grown from under 300 employees to nearly 500. It has become impossible for the Director to attend all of the meetings, provide important legislative support, and have the day to day contact needed with Department managers. He stressed that addition of a Deputy position would not change the relationships between the Commission and the Director, that the Director and the Deputy would speak with one voice and not provide the opportunity for "opinion shopping" within the agency, and that the Deputy would handle more of the administrative matters within the Department (although not entirely) so as to enhance the achievement of the Department's mission and free some of the Director's time to devote to strategic thinking as well as Commission and legislative discussions.

Chairman Hutchison expressed the view that the Director was overworked. He wanted the opportunity to discuss the matter further when all commission members were present. The matter was set aside for discussion at a later meeting.

Item 3: Portland Airport Noise Abatement Plan: Background Discussion

Terry Obteshka of the Department Staff introduced the subject by noting that the Department had invited the Port of Portland to brief the Commission on the 5 year update of the airport noise plan. Noise control at the airport dates to 1981 when the Oregon Environmental Council asked the Department to initiate controls. Hearings were held, and the Port agreed to develop a plan. The original plan was submitted in 1983, updated in 1985, and was scheduled for updating by March 1990. In April, the Commission approved an extension to allow for coordination with long range planning for the airport.

Shelly Klapper, who directs the planning, noise, and properties programs for the airport made the presentation. Mr. Klapper is also the chair of the Noise Abatement Advisory Committee. With him were John Newell, the Port's noise abatement officer, and Steve Lockwood, a member of the Noise Abatement Advisory Committee.

Mr. Klapper noted that the Port seeks to make the airport a good neighbor while providing good air service. The Noise Plan guides airport operations. The Noise Abatement Advisory Committee aids in developing and overseeing the plan and has diverse representation. Update of the noise plan has been under way for a year and is

tied into the 20 year capacity plan development. The existing plan has resulted in a 50% reduction of the acreage affected by a given noise level and an 85% reduction in the population affected by that noise level. This has been accomplished by (1) an Operational Program which controls aircraft arrival and departure routes to minimize flights over residential areas, (2) a Land Use program which prohibits development in some zones, requires disclosure of potential noise impacts in some zones, and requires sound insulation in some instances, and (3) a Review and Monitoring program which includes the Advisory Committee, a complaint response system, periodic evaluation of procedures (track noise and flight paths), and field monitoring.

The accomplishments of the program have been good, however some people are still affected and are unhappy. The easy improvements have been made, further progress will be difficult.

A consultant is aiding in the capacity analysis for the airport and integrating new FAA requirements and noise into the update. A subcommittee of the Noise Abatement Advisory Committee has been involved in this effort. The next step is public hearings, followed by revision and presentation to the Port Commission on November 14. The plan will be presented to the EQC for approval at the December 14, 1990 meeting.

Steve Lockwood noted that quieter planes have helped in the process. However, the number of planes will double in the next decade or so.

Director Hansen noted that major issues remain with respect to land use. In the long term, one must restrict development and increased densities in the noise sensitive zones in order to protect the public's interest in having a viable airport.

Chairman Hutchison thanked the Port representatives for the briefing.

Item 4: Discussion of Pollution Control Facility Tax Credit Eligibility for Farm Equipment

Director Hansen introduced the subject by noting that it is difficult to make recommendations on facilities such as tractors that serve multiple purposes. Chairman Hutchison stated that the Commission needed to decide how to handle the 8 applications that had been delayed as well as establish future direction for handling such equipment.

Commissioner Lorenzen indicated his preference for an approach which includes a standardized methodology for evaluating the application combined with a safety valve that allows a case to be made for a different result based on individual facts. He did not

like the second option suggested by the Department because it did not seem possible to build in all of the potential relevant concerns.

After some discussion, the Commission directed the Department to meet with the Department of Agriculture and perhaps the Extension Service and Soil Conservation Service to come up with a standardized methodology to evaluate tractors. It was not intended that a new policy be developed, rather that review criteria be developed to assist in determining the percent allocable to pollution control. In addition, there should be a safety valve process that would allow an applicant to justify a level of eligibility based on factors not considered in the standardized methodology.

The Commission also expressed the desire to accomplish this process as soon as possible and to apply it to the 8 tractor applications currently being held.

Item 5: Stage II Vapor Recovery: Discussion of New Developments and Policy Options

Director Hansen introduced the item by noting that the Commission had previously discussed the issue at prior work sessions, and had authorized public hearings on rules to require installation of underground piping for Stage II vapor recovery as tank installations are modified. The final decision on a requirement to complete installation of Stage II systems was to be deferred until after reauthorization of the Federal Clean Air Act. Several changes have occurred to warrant reconsideration of the matter.

First, the Portland area recorded 4 ozone standard violations this summer whereas the area was on the margin of compliance previously. Second, EPA has imposed a more stringent gasoline volatility standard in Portland air shed. Growth is continuing in the area and the subject of a growth margin needs to be considered.

This led the Department to re-examine the options. The Department met with a technical advisory committee. The committee ended up concurring in an approach that would fully implement Stage II Vapor Recovery in the Portland Metropolitan area.

The approach proposed by the Department is guided by the following:

- The three Portland Area counties would be implemented first.
- Initial implementation would involve facilities with the largest gasoline throughput.
- Implementation would be phased to affect a constant number of tanks per year (level work for contractors).
- Implementation would be finish by end of 1993 (attain standards and provide room for growth).

The potential would be to then move to implementation in the remainder of the Willamette valley by 1994, and statewide by 1995, however, any such decision would be dependent on further evaluation.

Brian Boe, representing the Oregon Petroleum Marketers Association, expressed support for the Department recommendation relative to the Portland area, but cautioned about expanding the boundaries beyond the tri-county area.

John Charles, representing Oregon Environmental Council, urged a statewide program.

Director Hansen noted that the matter would be back for further consideration at a later date in relation to air toxics.

The Commission urged the Department to pursue the recommended course including returning for authorization for rulemaking hearing for Stage II in the Tri-County area.

Item 6: Strategic Planning Performance Indicators

Director Hansen introduced this item by noting that the Department had agreed to provide the Commission with the Performance and Workload Indicators from the Agency Budget Request Document. He noted that the Department does not have the ability to measure or provide data for a number of the performance measures. He further noted that the Department will be refining the measures over the course of the next year. Director Hansen also noted that the narrative statements at the beginning of each section provide a clearer indication of the environmental goals.

Chairman Hutchison noted that the performance and workload measures provided were not what he expected and felt they would not work to assist the Commission in measuring progress toward environmental goals.

Director Hansen noted that the accomplishment of environmental goals is the sum of many individual pieces that are reflected in the performance and workload indicators. Therefore, if this is not useful to the Commission, the Department needs direction from the Commission on its preferences.

Pete Dalke, Management Services Division Administrator, noted that the Department had tried to meet Executive Department requirements, relate measures to 1989 legislation, and also reflect the Strategic Plan. He noted that it can be modified as it proceeds through the budget process.

Chairman Hutchison stressed the need to reflect on how we are doing on the items that were included as priorities in the operating plans. Director Hansen asked if addition of a column to the operating plan to give the status of each item would provide the desired level of detail. Chairman Hutchison said he thought it would.

Harold Sawyer reminded the Commission that the Strategic Plan was intended to guide future actions. The Department was pretty well locked in for the current biennium by the approved budget and the State/EPA Agreement. The operating plans were developed to identify the high priority projects and tasks for the remainder of this biennium. The Strategic Plan would provide guidance for budget development for the next biennium, and would be better reflected in the operating plans that would be developed following approval of the 1991-93 budget. Mr. Sawyer also reminded the Commission that the Department had indicated in June when the operating plan was approved that a quarterly report would be made following the end of September.

Following further discussion, the Commission decided to wait for further discussion until the quarterly report at the November work session on the status of high priority projects and tasks reflected in the operating plans.

The Work Session was adjourned at about 5:00 p.m.

Regular Meeting

The Environmental Quality Commission regular meeting was convened at about 8:40 a.m. in Conference Room 3a of the Department of Environmental Quality Offices at 811 S. W. 6th Avenue in Portland, Oregon. Commission members present were: Chairman Bill Hutchison, Vice Chairman Emery Castle, and Commissioners Carol Whipple and Henry Lorenzen. Commissioner Wessinger was out of town and unable to attend the meeting. Also present were Michael Huston of the Attorney General's Office, Director Fred Hansen of the Department of Environmental Quality and Department staff.

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

Chairman Hutchison called the meeting to order and welcomed the public to the meeting. He asked people wishing to testify on any item to fill out a witness registration sheet.

The Commission then proceeded through the published agenda.

Consent Items

The following items were listed on the agenda as Consent Items:

A. Minutes of the August 9-10, 1990 Meeting

B. Approval of Tax Credit Applications

The Department recommended that approval be granted on Pollution Control Facility Tax Credit applications as follows:

TC-2257	Norpac Foods, Inc.	Addition to Wastewater Treatment System
TC-2320	Rogge Forest Products, Inc.	Log Yard Debris Separation System
TC-2451	Blue Sky Farm, Inc.	Straw Storage Shed 120' x 26'
TC-2477	Blue Sky Farm, Inc.	Straw Storage Shed 80' x 106'
TC-2723	Hawk Oil Company	Installation of fiberglass lining in 4 bare steel underground storage tanks, addition of cathodic protection anodes to the tanks, the replacement of bare steel piping with fiberglass, spill containment basins, tank monitor, line leak detectors, an overfill alarm, and monitoring wells.
TC-2724	Hawk Oil Company	Installation of fiberglass lining in 4 bare steel underground storage tanks, addition of cathodic protection anodes to the tanks, the replacement of bare steel piping with fiberglass, spill containment basins, tank monitor, line leak detectors, an overfill alarm, and monitoring wells.
TC-2725	Hawk Oil Company	Installation of fiberglass lining in 3 bare steel underground storage tanks, the addition of cathodic protection anodes to the tanks, the replacement of bare steel piping with fiberglass, spill containment basins, tank monitor, overfill alarm, and monitoring wells.
TC-2726	Hawk Oil Company	Installation of fiberglass lining in 3 bare steel underground storage tanks, the addition of cathodic protection anodes to the tanks, the replacement of bare steel piping with fiberglass, spill containment

		basins, tank monitor, overfill alarm, and line leak detectors.
TC-2727	Hawk Oil Company	Installation of fiberglass lining in 4 bare steel underground storage tanks, addition of cathodic protection anodes to the tanks, the replacement of bare steel piping with fiberglass, spill containment basins, tank monitor, line leak detectors, and an overfill alarm.
TC-2739	Doug Nulf	Fisher 370 Twine Baler
TC-2762	Richmond's Service	Replacement of 3 bare steel tanks and piping with 2 STI-P3 tanks and fiberglass piping, and the installation of Emco-Wheaton spill containment basins and a Pollulert tank monitor.
TC-2836	Hawk Oil Company	Replacement of 3 bare steel underground storage tanks and piping with fiberglass tanks and piping, spill containment basins, tank monitor, line leak detectors, breakaway shutoff devices and monitoring wells.
TC-2842	Springfield Fuel Center	Installation of epoxy lining to the interior of one existing steel 12,000 gallon underground storage tank; the purchase of a 14,000 gallon two-compartment double-bulkhead steel aboveground tank with secondary half-shell containment vessel and two Red Jacket line leak detectors on the aboveground tank.
TC-2858	Blue Sky Farm, Inc.	Straw Storage Shed, 80' x 106'
TC-2911	Boise Cascade Corporation	Replacement of 2 bare steel tanks and piping with one total containment double wall polyethylene jacketed steel underground storage tank and double wall fiberglass piping, and the installation of an EBW spill containment basin, monitoring wells, Petrosonic III tank monitor, Red Jacket line leak detectors and EBW breakaway shutoff devices. A third waste oil tank was decommissioned at the time of the project.
TC-2929	Hyster Company	Installation of a Petrosonic III tank monitor, Red Jacket line leak detectors, Emco spill containment basins, overfill alarm and Stage I vapor recovery fill tubes on four underground storage tank systems.
TC-2950	Fletcher Oil Company	Installation of sacrificial anode cathodic protection on 3 steel underground storage tanks and piping, Petrosonic III tank monitor, Red Jacket line leak

		detectors, spill containment basins, vapor monitoring well and overfill alarm.
TC-3005	May-Slade Oil Company, Inc.	Installation of epoxy lining in three underground storage tanks, impressed current cathodic protection to tanks, and piping and spill containment basins.
TC-3006	May-Slade Oil Company, Inc.	Installation of epoxy lining in three underground storage tanks, impressed current cathodic protection to tanks, and piping and spill containment basins.
TC-3007	May-Slade Oil Company, Inc.	Installation of epoxy lining in two underground storage tanks, impressed current cathodic protection to tanks, and piping and spill containment basins.
TC-3071	Metrofueling, Inc.	Installation of UST leak detection devices on three (3) gasoline USTs and one (1) diesel UST in the form of automatic liquid tank gauges with a built-in alarm.
TC-3075	Metrofueling, Inc.	Installation of UST leak detection devices on two (2) gasoline USTs and one (1) diesel UST in the form of automatic liquid tank gauges with a built-in alarm.
TC-3082	Metrofueling, Inc.	Installation of UST leak detection devices on two (2) gasoline USTs and one (1) diesel UST in the form of automatic liquid tank gauges with a built-in alarm.
TC-3095	Gary's Cannon Beach Service	Installation of epoxy lining in four bare steel underground storage tanks and the replacement of bare steel piping with fiberglass piping, the installation of a tank monitor, spill containment basins, suction pumps and breakaway shutoff devices.
TC-3149	Kirk Century Farms, Inc.	John Deere 300 Stackwagon; John Deere 260 Loader; John Deere 2810 7-Bottom Plow; Used 15 Dandl Flail Chopper; and John Deere 530 Round Baler.
TC-3156	Berger Brothers	Rear's 14' Flail Chopper; New Holland 858 Round Baler.
TC-3169	Oak Creek Farms, Inc.	Wil Rich Plow; Pul-Flail Straw Chopper.
TC-3171	Cersovski Farm	Ford Plow; 15' Dandl Flail Chopper.
TC-3189	Roger F. Neuschwander	John Deere 2800 Plow
TC-3195	Langmack Seed Co., Inc.	16' Pul Flail Chopper

TC-3196	Marion L. Knox	White 548 Plow; Agriweld 2200 Harrow; Dandl Chopper.
TC-3206	Metrofueling, Inc.	Installation of UST leak detection devices on four (4) gasoline USTs and one (1) diesel UST in the form of automatic liquid tank gauges with a built-in alarm.
TC-3212	Metrofueling, Inc.	Installation of UST leak detection devices on four (4) gasoline USTs and three (3) diesel USTs in the form of automatic liquid tank gauges with a built-in alarm.
TC-3213	Metrofueling, Inc.	Installation of UST leak detection devices on five (5) gasoline USTs and one (1) diesel UST in the form of automatic liquid tank gauges with a built-in alarm.
TC-3215	G & R Seeds	Gehl 5' Round Baler; Hesston 60B Stackhand; Roan's 30' Propane Flamer.
TC-3217	Roger Rucked	Straw Storage Shed 124' x 144'
TC-3218	Truax Oil, Inc.	Installation of UST leak detection devices on five (5) gasoline USTs and three (3) diesel UST in the form of automatic liquid tank gauges with built-in alarm.
TC-3220	Clovercrest Market	Replacement of 2 bare steel tanks and piping with 2 STI-P3 tanks and fiberglass piping, and the installation of spill containment basins and a monitoring well.
TC-3221	Jared L. Rogers Chevron	Installation of spill containment basins and a tank monitor system on three steel underground storage tanks.
TC-3222	George's Texaco	Replacement of 3 bare steel tanks and piping with 3 STI-P3 tanks and fiberglass piping, and the installation of spill containment basins, monitoring wells, breakaway shutoff devices and preparation of the site for a tank monitor system.
TC-3225	Lyle Neuschwander	John Deere Flail Chopper; John Deere Mold-Board Plow.
TC-3226	Western Stations Co.	Replacement of 4 bare steel tanks and piping with 4 STI-P3 tanks and fiberglass piping, and the installation of EBW spill containment basins, breakaway shutoff devices, oil/water separator, overfill vend valves, tank monitor, line leak detectors, overfill

		alarm, monitoring wells and single point Stage I vapor recovery.
TC-3227	Daryl J. Ferguson	Replacement of 3 bare steel tanks and piping with 2 STI-P3 tanks and fiberglass piping, and the installation of spill containment basins, a tank monitor, overfill alarm, line leak detectors and monitoring wells.
TC-3228	Grant's Petroleum, Inc.	Replacement of one bare steel tank and piping with 2 STI-P3 tanks and fiberglass piping, and the installation of spill containment basins, monitoring wells, overfill valves, automatic shutoff safety valves, piping for vapor recovery and preparation for the installation of a tank monitor.
TC-3232	Carmichael-Columbia Oil	Installation of a Petronsonic III tank monitor, EBW spill containment basins, OPW overfill valves, float vent valves, piping for Stage II vapor recovery and the underground wiring for an impressed current cathodic protection system to be installed at a later date to augment protection to the tanks now being provided by existing sacrificial anodes.
TC-3235	May-Slade Oil Company, Inc.	Replacement of bare steel piping with fiberglass piping in three underground storage tank systems.

C. Accountabilities and Expectations, Director, Department of Environmental Quality

This item presented a proposed statement of accountabilities and expectations for the position of Director of the Department of Environmental Quality.

D. Authorization for Rulemaking Hearing: Proposed Portland Central Business District Parking Offset Rule

This item requested authorization to hold a public rulemaking hearing on proposed rules which would add an Air Quality Parking Offset Rule to the Portland Carbon Monoxide (CO) State Implementation Plan (SIP). The new rule would allow the City of Portland to exceed the CO SIP parking lid to meet new parking growth needs projected for the next ten years in the Central Business District without any increase in CO emissions.

E. Authorization for Rulemaking Hearing: Proposed Amendments to Soil Matrix Rules for Underground Storage Tank Cleanups

This item requested authorization to hold a public rulemaking hearing on proposed amendments to the Soil Matrix Rules for Underground Storage Tank Cleanups. The proposed amendments make changes in the analytical methods, sampling methodology and reporting requirements, but do not change the actual numeric cleanup standards.

F. Authorization for Rulemaking Hearing: Proposed Amendments to Water Quality Standards as Part of the Triennial Review Required by the Clean Water Act

This item requested authorization to hold public rulemaking hearings on proposed amendments to Water Quality Standards. The proposed amendments are the result of the Triennial Review required by the Federal Clean Water Act. Following review of public comments received on a series of issue papers, the Department developed proposed amendments to the antidegradation policy, definition of waters of the state, dissolved oxygen, bacteria, toxics, mixing zones, particulate matter, and biological criteria. Changes in definitions were also proposed to support the proposed rule changes.

G. City of McMinnville: Request for Approval of Program Plan for Reducing Wastewater Discharges and Meeting the Total Maximum Daily Load for Phosphorous for the Yamhill River

This item requested approval of the City of McMinnville's program plan for reducing wastewater discharges and meeting the Total Maximum Daily Load (TMDL) for Phosphorous for the Yamhill River. The program plan outlines possible options for meeting the TMDL. Approval of the program plan will allow the City to proceed with development of a facilities plan report to be submitted by April 1, 1991.

H. City of Ashland: Request for Approval of Program Plan for Reducing Wastewater Discharges and Meeting the Total Maximum Daily Loads for Bear Creek

This item requested approval of the City of Ashland's program plan for reducing wastewater discharges and meeting the Total Maximum Daily Loads for Bear Creek. The plan calls for the facilities plan to be submitted by August 1992. The Depart-

ment recommended that a two-phase facility plan report be required with the first-phase report due in May 1991. The first-phase report will determine if another year will be needed to complete the facilities plan report and whether an extension of the final compliance date will be needed.

I. Waste Tire Pile Cleanup: Request for Approval of Funds from the Waste Tire Recycling Account to Assist Douglas County

This item requested Commission approval for use of funds from the Waste Tire Recycling Account to expedite cleanup of approximately 25,000 waste tires at a permitted waste tire storage site. The estimated cost for cleanup was $ 22,300 with the permittee required to pay 30% of the cost.

The Commission removed items A, C, F, and four Tax Credit Applications from Item B (TC-2257, TC-2858, TC-2451, and TC-2477) from the consent agenda by consensus to allow for public testimony and discussion.

Action on Consent Items B (part), D, E, G, H & I:

Commissioner Castle MOVED that Consent Item B with the exception of TC-2257, TC-2858, TC-2451, and TC-2477, and Consent Items D, E, G, H, and I be approved. The motion was seconded by Commissioner Lorenzen and unanimously approved.

Consideration of Consent Item A: (Minutes of the August 9-10, 1990 Meeting)

Harry Demaray appeared to ask the Commission to replace the paragraph in the minutes describing his comments at the Public Forum at the August 10, 1990 meeting with a verbatim transcript he had prepared from the tape of the meeting.

Commissioner Lorenzen MOVED that the transcript submitted by Mr. Demaray be included in the record of this meeting and that the minutes be approved as submitted (with correction of typographical errors). The motion was seconded by Commissioner Whipple and approved unanimously.

Consideration of 4 applications from Consent Item B: (Tax Credit Applications)

Harry Demaray appeared to question the appropriateness of granting certification to tax credit applications TC-2451, TC-2477, and TC-2858, submitted by Blue Sky Farms. Mr. Demaray read the reports to suggest that the three straw storage sheds claimed in the applications would have the capacity to store straw from 1500 acres, and the applications indicated that only 500 acres would be taken out of open field burning. Roberta Young

of the Management Services Division responded that the three sheds were used to store straw from the same 500 acres.

It was MOVED by Commissioner Lorenzen that Application TC-2858 be approved. The motion was seconded by Commissioner Castle and unanimously approved.

It was further MOVED by Commissioner Lorenzen that Applications TC-2451 and TC-2477 be approved. The motion was seconded by Commissioner Castle and unanimously approved.

It was MOVED by Commissioner Lorenzen that Application TC-2451 be approved. The motion was seconded by Commissioner Castle and approved with three yes votes and Chairman Hutchison abstaining.

Consideration of Consent Item C: (Accountabilities and Expectations, Director Department of Environmental Quality)

Harry Demaray appeared to recommend amendments to the wording of the statement of Accountabilities and Expectations as presented by Commissioners Lorenzen and Castle.

The Chairman deferred consideration of Item C until later in the meeting after the Commission had opportunity to consider the modifications suggested by Mr. Demaray.

Consideration of Consent Item F: (Authorization of Rulemaking Hearing on Proposed Amendment to Water Quality Standards)

Director Hansen briefly explained the background of the agenda item. He noted that the Department took the extraordinary step of drafting "issue papers" on a number of potential water quality standards issues and circulated them to informally solicit public comment. The Department evaluated comments received and made modifications to several of the concepts in the initial issue papers. Proposed rule amendments were then prepared and the Department was recommending that hearings be held to receive formal testimony on the proposals. Following hearings and evaluation of formal testimony, the matter would be returned to the Commission for adoption.

Chairman Hutchison noted that 8 persons had asked to testify, and the letters had been received from the Northwest Pulp and Paper Association and the Association of Oregon Sewerage Agencies. He then asked for the reaction of the staff. Neil Mullane stated that the package of rules proposed for hearing address many of the comments raised in the letters he had reviewed. Mr. Mullane further noted that many of the comments appear to be asking for amendments to rules other than water quality standards. The

Department made it clear from the beginning that the triennial review process would focus on water quality standards only, and that changes to other rules, including those which previously established technology based design criteria would be considered later. He further noted that 14 issue papers were originally circulated. Comments received assisted the Department to flesh out proposed rule language for the 8 that are now proposed for hearing. The other 6 issues will take more study before any proposals are carried forward.

Floyd Collins, representing the Association of Oregon Sewerage Agencies (AOSA), and John C. Hall, an Engineer/Attorney Consultant to AOSA, appeared to recommend that the Commission refer the matter back to the staff with instructions to discuss the issues further with their organization. Specifically, they wanted additional issues, including modifications to basin design criteria rules, added to the package. They also wanted further input on the Dissolved Oxygen and Antidegradation rules before they were sent out for public hearing. They expressed concern that some of the rules go beyond minimum federal requirements and could cost $200 - 500 million to implement. They stated that the rules need to be based on sound technical and economic requirements. They further stated that the public should be clearly advised if the state intended to go beyond minimum federal requirements.

Commissioner Castle noted that the Commission and Department have always taken public comment to heart and have frequently modified proposals based on testimony presented in hearings. Commissioner Castle further noted that he was troubled by the request of AOSA that the Commission act without the opportunity to consider the substance developed in the public hearing process.

Commissioner Lorenzen noted that the comments of AOSA appear to suggest that the proposed rules were not modified they way they had requested and they would like to discuss it further before any action is taken. He stated that others may differ with AOSA as to what should be in the rule. The informal process on the issue papers was not intended to replace the full rulemaking public involvement process.

Chairman Hutchison asked about the potential need for a new public hearing if the rules were modified substantially as result of the hearing process. Michael Huston advised that a new public notice and new hearing could be required if the initial public notice was drafted in a narrow fashion such that it does not cover the extent of changes proposed. In other cases, if changes are extensive enough, it may be desirable to return the matter for an additional hearing. The Department has done this in the past.

Steven E. Simonson, representing Tri City Sanitary District, offered comments on the proposed Dissolved Oxygen Standard amendments. He stated that the amendments are

difficult to read to the point of being unclear, and thus it would be difficult to offer meaningful testimony.

David J. Abraham, representing Clackamas County, expressed support for the position of AOSA.

Dan Hanthorn, representing the City of Corvallis, indicated that the rules as proposed are hard to interpret and thus it will be difficult to get meaningful comment.

Commissioner Castle expressed concern that persons testifying wanted to present their concerns to the Department in a one-on-one setting rather than presenting concerns in hearing testimony. He stated that he reads hearing testimony, and relies heavily upon it in evaluating and developing his position on an issue. He wants to see modifications based on public testimony, not one-on-one discussions.

Ross Peterson, representing the City of Portland Bureau of Environmental Services, noted that the City concurs with the comments of AOSA. He noted that they were frustrated by the minimal response to some issues raised by AOSA and by the lack of response to others.

John Pointer, representing Citizens Concerned with Waste Water Management, stated that he was not surprised that Portland wants discussions in private rather than in public. He stated his view that Portland is not properly operating its sewage treatment plant, and that DEQ is not taking appropriate enforcement action.

In response to testimony, Director Hansen noted that the Department values the efforts of AOSA to review the rules and provide input. The Department wants rules that are understandable. He noted further that the hearing authorization can be delayed if the Commission wishes, or the Department could move forward with part of the package and hold the Dissolved Oxygen and Antidegradation rules for further discussion. Lydia Taylor, Administrator of the Water Quality Division, stated that the Department was not perfect in its response. She also indicated that the Department was not opposed to exploring the concept of a Science Advisory Board as recommended in the letter from the Northwest Pulp and Paper Association.

Commissioner Castle noted his preference to defer the item until the next meeting, to give the Department time to do as it wishes in the interim. He specifically stated that he did not wish do give any specific direction to the Department for action in the interim. Commissioner Lorenzen indicated his only concern was in whether the rules were sufficiently clear. He stated that all other issues raised were more appropriately considered in the hearing process.

Chairman Hutchison indicated that it was the sense of the Commission to defer action on the item at this time. Director Hansen noted that staff reports for the November meeting are well into the drafting stage, thus it may be the December meeting before this item would be back to the Commission.

Public Forum

Harry Demaray stated that revisions to the Civil Penalty Rules approved in March are, in his opinion, unlawful because the changes were not specifically considered in the public hearing. He stated that the penalty matrix is meaningless for open burning violations. He further stated that he believes the Department is improperly applying the March 1990 rules to violations that occurred in 1989. He asked that the Commission designate an independent investigator to look into the matter.

Director Hansen noted that the changes in the Civil Penalty Rules adopted in March were fully discussed with the Commission prior to adoption.

Chairman Hutchison thanked Mr. Demaray for his testimony and advised him that the Commission did not intend to act on his request for an independent investigator.

John Pointer, Chairman of Citizens Concerned with Wastewater Management, stated that the public supports cleanup regardless of costs. He further stated that the public perception was captured in a Willamette Week article and that DEQ is covering up for industry and not levying enough fines. Mr. Pointer then reiterated a series of accusations against the Department and Commission that he had presented at previous commission meetings and stated he would like a response and the opportunity to rebut.

Chairman Hutchison stated that he disagreed with Mr. Pointer's characterization of the situation, and advised that the Commission declined to act.

Walter H. Drew, a landowner in the Clear Lake Watershed, advised the Commission that the Department failed to present a final recommendation on the Clear Lake Rule at this meeting as indicated in the earlier rulemaking hearing notice. He noted that the presiding officer at the hearing indicated that the matter was delayed for administrative reasons and would not be considered at the September meeting as originally intended. He expressed the view that the Department was being devious and was really delaying the matter to get a statement from a supportive group.

Dick Nichols, of the Water Quality Division, advised the Commission that the matter would probably be back to them at the December meeting. He disagreed with Mr. Drew as to the reason for the delay, noting that he had been assigned to higher priority issues in the interim.

Action Items

J. Method and Criteria for Setting Maximum Measurable Levels for Contaminants in Groundwater: (1) Presentation of Recommendation by the Technical Advisory Committee; and (2) Request for Authorization to Hold Public Hearings on Proposed Rules

This item proposed that the Commission receive the recommendations of the Groundwater Quality Technical Advisory Committee on a method and criteria for establishing Maximum Measurable Levels (MMLs) for contaminants in groundwater. The item further requested authorization to hold a rulemaking hearing on proposed rules recommended by the Advisory Committee.

The Chair of the Technical Advisory Committee, Clinton Reeder, presented an overview of the Committee's report, recommendations, and the proposed rules. His presentation was in three sections as follows:

a) He reviewed the organization of the Committee and how it functioned.

b) He reviewed the proposed rules by walking the Commission through Appendix I of the Committee's report, the schematic of the process for establishing an MML.

c) He reviewed some of the Committee's concerns as outlined starting on page 15 of their report and as expressed in the minority statements of Mary O'Brien, and David Chandler and Lolita Carter.

Chairman Hutchison recognized receipt of the Advisory Committee's Report and thanked Mr. Reeder for the effort he and the Committee put forth in developing the report, recommendations, and proposed rules.

Commissioner Lorenzen asked if Mr. Reeder had a feeling of the scope of groundwater problems in Oregon. Mr. Reeder noted that problems appear minimal except in a few defined areas.

Mr. Reeder closed by urging the Commission to handle groundwater matters with compassion. If this is done, the Commission will get broad support. If issues are handled in a purely regulatory fashion, there will be a backlash.

It was MOVED by Commissioner Lorenzen that the Department recommendation be approved. The motion was seconded by Commissioner Castle and unanimously approved.

K. North Albany Health Hazard Area: Approval of Final Alternative Plan to Annexation

This item requested Commission approval of the final alternative plan to mandatory annexation for alleviating a health hazard in the North Albany Area. The plan will allow expeditious provision of sewer service to the North Albany health hazard area by the City of Albany without the requirement of annexation.

Director Hansen explained that the Commission had reviewed and approved the Alternative Plan in a draft version at its January meeting and was required by statute to review and approve a final version before the Alternative Plan could be implemented.

Wastewater Finance Section Manager Martin Loring further explained that if the Commission chose not to approve the Final Alternative Plan, the proceedings for elimination of the health hazard in North Albany would revert to mandatory annexation. He indicated that the Alternative Plan was the outcome of excellent cooperation between Benton County, the City of Albany, and the residents of the health hazard area, and that it was the opinion of Department staff that it offered the most satisfactory and expeditious means of eliminating the health hazard. It was the recommendation of the Department that the Commission certify the Alternative Plan. Mr.Loring noted that Mr. Ron Hall of the Health Division, Mr. Jeff Condit, Benton County Counsel, and Richard Santner of the Wastewater Finance Section were available to answer questions.

It was MOVED by Commissioner Castle that the Department recommendation be approved. The motion was seconded by Commissioner Lorenzen and unanimously approved.

The Commission then proceeded to consider Agenda Item O and deferred consideration of items L, M, and N until later in the meeting.

O. City of Coos Bay and Charleston Sanitary District: (1) Petition from the City of Coos Bay Requesting Compliance Order and WPCF Permit for Charleston Sanitary District; and (2) Motion to Intervene to Specifically appeal Contest Jurisdiction, and Motion to Dismiss forwarded by Charleston Sanitary District

On August 13, 1990, the Department received a petition from the City of Coos Bay to the Environmental Quality Commission requesting that the Commission issue a compliance order to the Charleston Sanitary District approving a cost allocation of $892,000 for the district's share of construction costs for a sewerage system improvements project, requiring the district's financial participation in the improvement project, and making the district liable, along with the city, for meeting compliance dates in Commission Order WQ-SWR-88-72. In addition, the city requested that the Commission require that the district be issued a water pollution facilities discharge permit regulating the district's collection system.

On August 27, 1990, the Department received motions from the Charleston Sanitary District to the Environmental Quality Commission requesting that the district be allowed to intervene in the proceedings, and requesting that the petition be stayed pending circuit court review, and that the petition be ultimately dismissed after a final decision by the circuit court.

Coos Bay and Charleston were advised the matter would be placed on the agenda and that the Department would recommend that each be given 15 minutes to present their view to the Commission.

Paula M. Bechtold represented the City of Coos Bay. She stated that finance issues would be dropped from their request for EQC consideration since the City and District had agreed to arbitration on these issues. She covered many issues between the City and District, emphasizing the District's refusal to cooperated with the City on sewage treatment plant improvements. She stated that the City was unable to regulate the District, and that this should be done through DEQ by issuance of a WPCF permit. She stated that state law required that the District be regulated through a permit. She cited problems such as high flows and high strength wastes coming form the District to the City treatment plant. She also stated that an order should be issued to the District which would require the District to pay their fair share of construction costs, and hold the District equally responsible with Coos Bay for enforcement actions.

Lynn Heusinkveld represented the Charleston Sanitary District. He stated that the underlying contract between the City and the District should govern the relations between them, and that Commission action was not warranted. He stated that the District should not have to pay for any of the sewage treatment plant improvement costs, and cited the recently concluded arbitration to support his position. He believed that the

District should be part owners of the treatment plant and that plant operation decisions should be conducted through the operations committee as provided by the contract. He also indicated that the District has purchased land for construction of their own independent sewage treatment plant and had applied for a separate permit.

After a brief question and answer period, Chairman Hutchison stated the conclusions of the Commission as follows:

- The City and the District should go back and resolve issues at the local level through negotiations and arbitration if necessary. The City and the District both say that a regional solution is best. Grants can help to reduce the direct costs to local citizens. The public interest is best served by a speedy negotiated resolution of issues.

- If the issues cannot be resolved at the local level, the Commission and Department will need to consider the matter a two system problem, take such action as is necessary to secure jurisdiction over the Charleston Sanitary District, and take enforcement action as necessary against both parties. If progress is not made toward resolution of the issues soon, the Department should be ready to look at rule modifications necessary to secure control of the separate systems.

- The Commission strongly prefers a regional approach to sewage treatment. Anything less would be a disservice to the citizens.

Director Hansen noted that the Department has not yet made a determination on the Charleston permit application for a separate sewage treatment plant, however, the District should be aware that the Department strongly supports a regional approach and views separate smaller facilities to be unattractive from an operational standpoint and not cost effective and thus are not likely to be approved.

The Commission meeting was then recessed for lunch.

Upon reconvening the meeting, the Chairman proposed that final action be taken on Agenda Item C. The matter had been deferred earlier to allow Commission Members time to study amendments proposed by Mr. Demaray.

It was MOVED by Commissioner Castle that Agenda Item C be approved as originally circulated. The motion was seconded by Commissioner Lorenzen and unanimously approved.

Informational Items

L. Commission Member Reports

Chairman Hutchison reported that the Governor's Watershed Enhancement Board (GWEB) had not had a meeting since he became the member. He noted that a conference call was held on a rule amendment. Andy Schaedel advised that GWEB was awaiting applications for project funding assistance and were looking forward to initiating a watershed assessment process. He also noted that 4 of the 5 board members are new.

Commissioner Castle reported that he had appeared before the Board of Forestry to report on the Technical Specialist Panel. He indicated they were comfortable with the progress to date.

Harold Sawyer reported that he had attended the Quality of Life Benchmarks Working Group meeting for Commissioner Wessinger. The working group recommended that the Governor's office forward some generic comments to the Progress Board, and that each agency proceed to send in their individual comments by September 14, 1990.

M. Director's Report (Oral Report)

Pollution Control Bond Sale

The State Treasurer sold $6.77 million Pollution Control General Obligation Bonds on behalf of the Department on September 11. The interest rates on the bonds were 7.17% on the bonds for the City of Gresham and 7.12% for the bonds for the City of Portland. On September 27, DEQ will receive the money from the bond sale and purchase bonds issued by the cities of Gresham and Portland.

EPA Water Quality Division Audit

The Environmental Protection Agency; has issued a critical audit of the Water Quality Division's pretreatment program and enforcement. The Department agrees with many of the findings and has already increased staff to correct deficiencies in the pretreatment program.

Gramm-Rudman - Potential EPA Cuts

EPA reports that because of Gramm-Rudman, the agency is facing possible budget cuts. In the worst case, the cuts could be as much as 32%. The cuts could affect the amount of money DEQ receives from EPA.

Salt Caves Decision

The Department has informed the City of Klamath Falls that we will need more time to finalize our review of the new proposal for the Salt Caves Hydroelectric facility. The review is expected to be completed by October 9, 1990. The Department had originally hoped to complete the review by September 4, 1990, but needs more time to analyze information from public hearings and other sources. The project must receive a certification from DEQ pursuant to Section 401 of the Federal Clean Water Act that it complies with state water quality standards.

Heap Leach Mining

The Governor is preparing a response to the petition that the various natural resource agencies received regarding a moratorium on heap leach mining. A comprehensive approach is being developed involving the various agencies to pursue this issue. Dave Riley of the Governor's office will head up the effort.

Commissioner Lorenzen noted that DEQ appears to have the best handle of any of the state agencies regarding mining activities on federal lands. He expressed the desire to proceed to further discussions of this matter and the potential for establishing design and performance standards to protect the environment. He wondered how the Commission could have input to the joint agency coordinated process. Director Hansen noted that individual agencies would be expected to pursue their concerns and that the joint effort would be looking at how the gaps would be filled. He also noted that a work session discussion on mining was currently planned for the December meeting.

N. Legislative Update (Oral Report)

A memo report was handed out to the Commission.

Meeting Schedule

The Commission tentatively approved a schedule for meetings for 1991, as follows:

January 31-February 1, 1991	July 18-19, 1991
March 7-8, 1991	September 12-13, 1991
April 25-26, 1991	October 24-25, 1991
June 13-14, 1991	December 12-13, 1991

There was no further business and the meeting was adjourned.

Identified Corrections for September 20-21 EQC Minutes

Page 15

Third full paragraph -- the tax credit application number should be 2257 rather than 2451. The full paragraph should read as follows:

"It was MOVED by Commissioner Lorenzen that Application TC-2257 be approved. The motion was seconded by Commissioner Castle and approved with three yes votes and Chairman Hutchison abstaining."

Page 21

Fourth full paragraph under item O, fourth line -- the word "cooperated" should be replaced with the word "cooperate". The line should read as follows:

" ... District, emphasizing the District's refusal to cooperate with the City on ..."

Page 23

Next to last paragraph on the page, first line -- the semicolon after the word Agency should be eliminated. The line should read as follows:

"The Environmental Protection Agency has issued a critical audit ....."

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: November 1, 1990

TO: Environmental Quality Commission

FROM: Carolyn Young

SUBJECT: Environmental Education

Background - Carolyn
What we do now
What we are asking for

EPA Strategic Plan - Carolyn

Letter to Norma Paulus

Questions for Commission to Consider:

- Is Environmental Education a high priority?
- Is the Department direction correct?
- Should we create an Environmental Education Section?
- What about timing and consequences?
- Do we need to modify strategic plan?

ENVIRONMENTAL EDUCATION MATERIAL AVAILABLE FROM THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

Teacher's Guides

RE:Recycling

An easy to use K-12 Curriculum with classroom activities, games and graphics.

Clean Air Clint

A teacher's guide, aimed at middle grades, but with classroom activities that are adaptable to any grade level. Also included are a glossary and bibliography.

Classroom Activities

Environmental Cleanup Game

A colorful board game that can be played in the classroom. It introduces students to the concept of hazardous substances, recycling, leaking gas tanks, and household hazardous waste.

Pollution Prevention Packet (available January 91)

A teacher's packet that includes classroom activities, stickers, poster contest rules, glossary and visual aids.

Video Tapes (Available for loan)

Oregon's Willamette: A River Restored

18 minute video that traces the history of the Willamette River Cleanup and the beginning of environmental regulation in Oregon.

The Wastewater Video

An animated, lively and colorful introduction to wastewater treatment and its importance to our society. Produced by the Water Pollution Control Federation. Includes student workbook. 10:48 min.

Resource Materials

Brochures:

woodstoves, vehicle inspection, hazardous waste management, water quality, groundwater, environmental cleanup, recycling and solid waste.

Oregon Environmental Atlas

A 64 page, full-color book with maps, charts and photographs that illustrate the quality of Oregon's environment. Cost: $10, plus $3.75 shipping and handling. Available from Continuing Education Publications, Portland State University, P.O. Box 1394, Portland, OR 97207

How To Order

All materials except the Environmental Atlas are available from the DEQ Public Affairs Office, 811 S. W. Sixth Ave., Portland, OR 97204, or call (503) 229-5317 or toll-free in Oregon, 1-800-452-4011.

State of Oregon
EXECUTIVE DEPARTMENT PERSONNEL DIVISION

POSITION DESCRIPTION

This Position is:
- ☐ Management Service-Supe
- ☐ Management Service-Conf
- ☐ Classified
- ☐ Unclassified
- ☐ Executive Service

☐ New ☐ Revised

★ ★ ★ PLEASE READ INSTRUCTIONS BEFORE COMPLETING THIS FORM ★ ★ ★

SECTION 1. POSITION INFORMATION

DP112

a. Classification Title	b. Classification No.	c. Effective Date	d. Position No.
Information Representative	~~C0513D~~ 02111D	7-1-91 ~~7/31/90~~	1000
e. Working Title	**f. Work Unit**		**g. Agency No.**
Education Coordinator	Public Affairs Section		34000
h. Agency Name	**i. Employe Name**	**j. Work Location (City-County)**	
Department of Environmental Quality		Portland - Multnomah	

k. ☐ Permanent ☐ Seasonal ☐ Limited Duration ☐ Academic Year ☐ Full Time ☐ Part Time ☐ Intermittent ☐ Job Share

l. FLSA ☐ Exempt ☐ Non-Exempt

m. Eligible for Overtime Pay ☐ Yes ☐ No

SECTION 2. PROGRAM/POSITION INFORMATION

a. Describe the program in which this job exists. Include program purpose, who's affected, size, and scope. Include relationship to agency mission.

The Director's Office is responsible for providing policy formation and guidance, leadership and accountability for the entire agency's program efforts. The Public Affairs Section is responsible for agency wide public information and education programs throughout the state. The agency's mission requires an informed and educated public to meet the goals of environmental protection.

b. Describe the purpose of this position, and how it functions within this program.

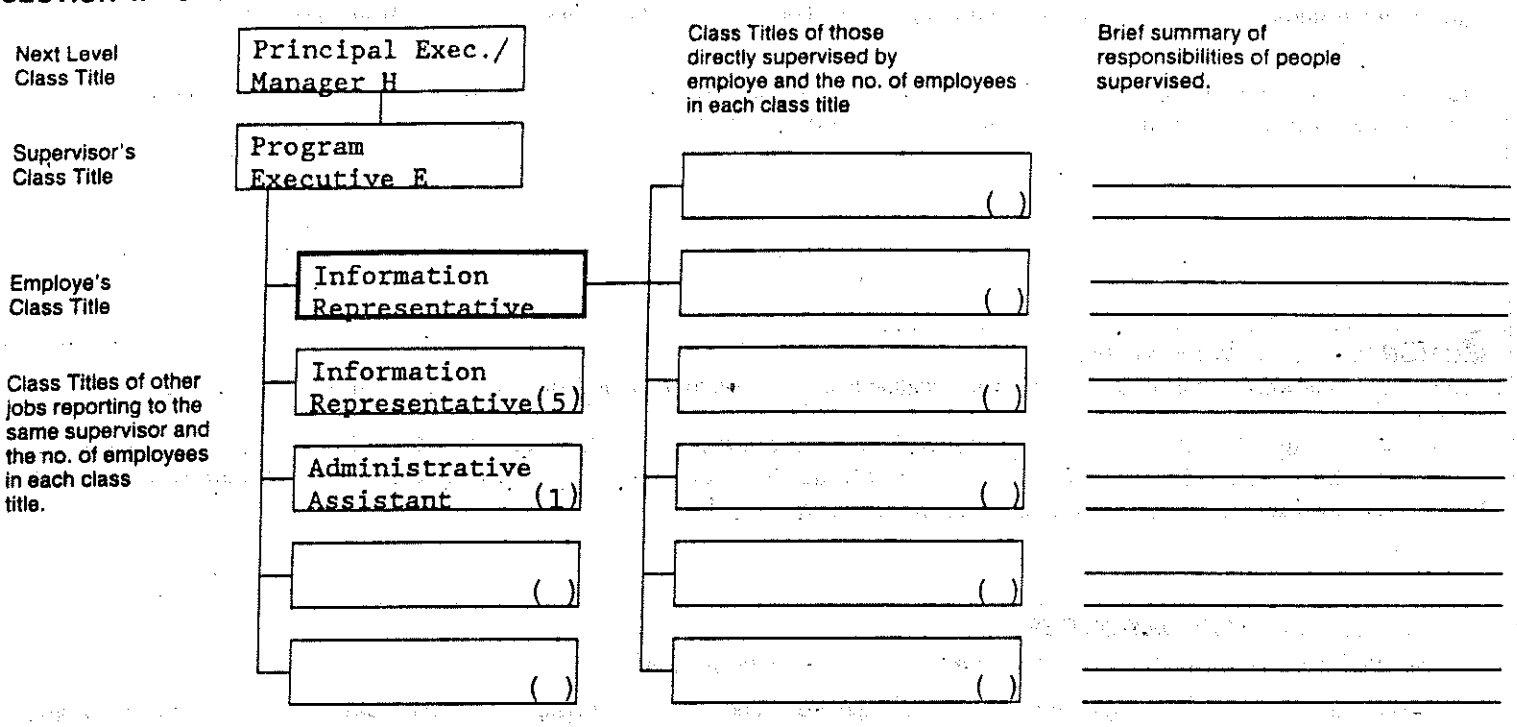
The position is responsible for providing public education on environmental programs and issues. The position will work with educators to encourage environmental education programs in schools and with the general public to promote environmental awareness and responsibility.

SECTION 3. DESCRIPTION OF DUTIES

List major duties. Note percentage of time these duties are performed. If this is an existing position, check which duties are new.

% of time	(✓)	DUTIES
50		I. EDUCATION a. Develops and evaluates long-term education goals for the agency. b. Writes and administers funding requests and contractual services agreements for education program development. c. Develops and disseminates educational curricula designed to accomplish long and short term education program goals and objectives. d. Develops and maintains liaison with Oregon educator associations and cooperating agencies for program implementation and promotion. e. Develops and maintains liaison with agencies and organizations in other states to facilitate program and resource sharing.
20		II. INFORMATION a. Develops and disseminates program support materials, including writing for newsletters, magazines and popular publications. b. Serves as a member of the public affairs team and assists in delivery of other Public Affairs programs.
20		III. PRESENTATIONS a. Designs and conducts workshops, oral presentations and training sessions for public audiences. b. Assists in planning, set-up and participation in public events, i.e., Environmental events, Sportsman's show, Homeshow, Zoo Conservation Days, etc.
10		IV. MEDIA RELATIONS a. Develops educational materials for distribution to the news media. b. Answers news media questions about educational programs and materials.
00%		

SECTION 4. ORGANIZATION CHART



SECTION 5. WORKING CONDITIONS

Describe special working conditions, if any, that are a regular part of this job. Include frequency of exposure to these conditions.

Limited outdoor work expected. Some overnight travel and after hours work is included.

SECTION 6. GUIDELINES

a. List any established guidelines used to do this job, such as state or federal laws or regulations, policies, manuals, or desk procedures.

Oregon Revised Statutes.
DEQ Policies and Procedures.

b. How are these guidelines used to perform the job?

State Statutes outline the requirements for implementing air quality programs.
DEQ policies and procedures.

SECTION 7. WORK CONTACTS

With whom outside of co-workers in this work unit must this position regularly come in contact?

WHO CONTACTED	HOW	PURPOSE	HOW OFTEN?
Division Administrator	In person	To receive/give information	Weekly
DEQ Staff	In person	To receive/give information	Daily/Weekly
Educators	In person/ phone, letters, newsletters	To discuss DEQ issues and projects	As needed
News media	In person, phone, letter	To provide information	Frequently/as needed

SECTION 8. JOB-RELATED DECISION-MAKING

Describe the kinds of decisions likely to be made by this position. Indicate affect of these decisions where possible.

Decisions to be made by this position are related to the type of public information and education materials and methods to be used. These decisions relate to content and frequency.

SECTION 9. REVIEW OF WORK

Who reviews the work of this position? (list classification title and position number) How? How often? Purpose of the review?

Carolyn Young, Z7008Z, PI0011, Principal Exec./Mgr. E, Public Affairs Manager, reviews the work of this position. Work is reviewed at weekly meetings; some work is reviewed on a daily basis to ensure information is accurate and timely.

SECTION 10. SUPERVISORY DUTIES

a. Which of the following supervisory/management activities does this job perform?

☐ Plans Work ☐ Assigns Work ☐ Approves Work ☐ Responds to Grievances ☐ Disciplines/Rewards

☐ Recommends Hiring ☐ Hires ☐ Recommends Salary Adjustments ☐ Prepares and Signs Merit Rating

b. What percentage of time does this position perform these duties? _____%

c. How many employes are directly supervised by this position? _____ Through Subordinate Supervisors? _____

SECTION 11. ADDITIONAL JOB-RELATED INFORMATION

Any other comments that would add to an understanding of this position:

Employe Signature	Date	Supervisor Signature	Date

★ ★ ★ **THIS SECTION FOR APPOINTING AUTHORITY ONLY** ★ ★ ★

SPECIAL REQUIREMENTS: List any special recruiting requirements for this position:

Dept. of Environmental Quality
RECEIVED
AUG 13 1990
HUMAN RESOURCES

BUDGET AUTHORITY: If this position has authority to commit agency operating money, indicate in what area, how much (annually) and type of funds:

Appointing Authority Signature Date

~~PI-IREDG~~ (8/90)
PI1000

State of Oregon
Department of Environmental Quality Memorandum

Date: October 15, 1990

To: Environmental Quality Commission

From: Fred Hansen

Subject: Agenda Item 2, November 1, 1990 Work Session

Operating Plans: First Quarter Report and Discussion

Attached are the current biennium **Operating Plans** for each Division, as acknowledged by the Commission at the June 1990 meeting, and with the status at the end of the first quarter (end of September) noted in the right hand column. Notes that were previously in this column have been retained but reflected in *italics* to distinguish them from the status.

In some cases, the wording of tasks, dates, etc. has been revised. Revisions are noted by striking through deletions and underlining additions. Since an operating plan must be dynamic, we have chosen to reflect the changes in this manner as a trial effort.

The Division Administrators will be present at the work session to provide further information as necessary and respond to any questions you may have.

FH:l

Department of Environmental Quality

Update 10/15/90

Air Quality Division Operating Plan

Priority Objectives related to Strategic Plan

Through June 30, 1991

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
A. Develop funding to maintain and expand Air Quality improvement efforts. (All Goals, All Programs High Priority 7, all AQ High Priorities)	Draft legislative concepts for Comprehension Emissions Fee and Woodsmoke Control Financial Incentive Programs	AQ - Planning	May 1990	*Pursue programs in parallel in case one or other fails to make it through process.* **Completed**
	Seek Governor's support of legislative concepts	AQ - Administrator	June 1990	*Governor Goldschmidt has authorized. If Governor-Elect authorizes, proceed with this and subsequent steps.* **Completed**
	Consult with affected parties, potential fee collection agencies and legislative counsel and draft bill. Identify implementation resource needs	AQ - Admin/Planning	Sept 1990	*Need to draft program to be compatible with Clean Air Act Reathorization which will establish industrial emission fees. Funds from programs will form air quality improvement fund to help reduce air pollution from woodstoves, industry, motor vehicles, field and slash burning and force emission sources. It will also help fund needed new DEQ resources to deal effectively with these sources.* **Much of work completed. Expect draft bill by end of October. See EQC Report for 10/11 meeting for more details.**
	Submit Bills to legislature	AQ - Administrator	~~[June]~~ January 1991	**In Progress (change is an error correction)**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
	Develop rule to increase VIP fee income to $10 (statutory limit) to offset increase program costs	VIP/Planning	January 1991	
	Rule Adoption	EQC/Planning	April 1991	
	Implement Fee Increase	VIP	July 1991	
B. Develop and implement highest priority control strategy programs to achieve and maintain healthful air quality. (Goals 2, 3 & 4, AQ high priority)	Request authorization to hold public hearings on draft PM10 SIP's in Grants Pass, Klamath Falls, and Medford	Planning	June 1990	**Completed**
	Work with local government in Klamath Falls and secure local mandatory curtailment ordinance and with Grants Pass to secure details of voluntary curtailment program	Planning	October 1990	*If Klamath Falls local government refuses to adopt ordinances, DEQ will be forced to rely on EPA and/or the Oregon Legislature to take appropriate action.* **K-Falls will not consider action until after November elections.**
	Seek EPA funding to support DEQ ambient monitoring/local government operation of curtailment programs	Planning/Technical Services	December 1990	*Depends on funding increases from reauthorized Clean Air Act.* **Completed**
	Adopt PM10 control plans and submit to EPA	EQC/Planning	November 1990	
	Develop interim parking facility offset program for Portland CBD with consensus of City and EPA on criteria for inclusion in offset rule	Planning	August 1990	**Completed**
	Request hearing authorization	Planning/EQC	September 1990	**Completed**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
	Adopt	EQC/Planning	December 1990	
	Draft long term CO/ozone maintenance plan for Portland area, coordinating with local governments/METRO and appropriate business interests (APP, PDC, BOMA)	Planning	July 1991	
	Hearing Authorization	Planning/EQC	January 1992	
	Adopt	EQC/Planning	April 1991	
	Develop revised slash smoke management plan with input from joint DEQ/ODOF Advisory Committee	Planning	November 1990	**Committee meeting regularly, still on schedule.**
	Hearing Authorization	Planning/EQC	January 1991	
	Adoption	EQC	May 1991	
C. Enhance Air Quality Regulations. (Goals 1, 2, 3 & 4; AQ high priority 2 & 3)	Draft air toxic control regulation for new and existing sources with aid of advisory committee	Planning	December 1990	*Integrate new Clean Air Act requirements into program, assuming Act reauthorization in October.* **A few months of delay expected because of CAA delay and staff vacancy.**
	Hearing Authorization	Planning/EQC	February 1991	
	Adoption	EQC	June 1991	
	Adopt underground piping requirement for Stage II Vapor Recovery	EQC	September 1991	**EQC agreed to skip this step and proceed to full Stage II with hearing authorization accelerated to December 1990.**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
	Hearing authorization for full Stage II implementation	Planning	January 1991	*Should not proceed until Clean Air Act is reauthorized to insure not loosing emission reduction credits for growth. Schedule assumes reauthorization by at least October 1990.*
	Adopt and implement	EQC/Program Operations	May 1991	*Funding for implementation could be permit fees, new federal funds or funding from comprehensive emission fee program.* **Still working on this.**
D. Enhance AQ control	Inhance implementation of Highest and Best Practicable Treatment and Control rule by reviewing other rules for obsolescence and initiating development of highest and best practicable guidance by source type	Program Operations	December 1990	*Coordination with Regional Operations and Planning Section required.* **On-going** *Rule development will follow based on outcome of this step.* **On-going**
	Hearing authorization on inclusion of continuous emission monitoring mannual in SIP	Planning/Technical Services	October 1991	
	Adopt	EQC/Planning	January 1991	

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
E. Implement environmental friendly product labelling program for products that offer low potential for polluting the indoor environment and which are manufactured and packaged using environmentally safe practices. (Goals 1, 2, & 5)	Develop conceptional program with input of Indoor Air Quality Task Force and EQC	Planning	September 1990	**Delayed until clear if EPA budget will contain funds for pollution prevention grants (EPA grant cuts possible under new federal budget cuts).**
	Submit grant application to EPA	Planning	October 1990	**Delayed until clear if EPA budget will contain funds for pollution prevention grants (EPA grant cuts possible under new federal budget cuts).**
	Finalize design of program	Planning	January 1991	*Proceed if grant for program design receive from EPA.*
	Support legislative authorization for increased resources	AQ - Administrator	April 1991	*Request authorization for 1 permanent FTE with general/federal or fee financing.*
	Implement	Planning	July 1991	
F. Develop and implement systematic approach to assess air quality statewide. (AQ priority 2)	Seek EPA funding for special project	Technical Services	July 1990	**Completed**
	Develop approach to area assessment. Include affected parties in approach design.	Technical Services, Planning, Lab, LRAPA, EPA	April 1991	
	Do initial AQ assessment	Technical Services	July 1991	
	Review results of initial assessment	TS, P&D, Lab, LRAPA, EPA, EQC	Beyond July 1991 ~~[1990]~~	**(Change is an error correction)**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
	Propose ambient monitoring network modifications	TS, P&D, Lab	Beyond July 1991	
	Seek funding for additional monitoring	AQ Administration	Beyond July 1991	
	Maintain/refine assessment	Technical Services	Ongoing	

Department of Environmental Quality

Update 10/15/90

Water Quality Division Operating Plan
Priority Objectives related to Strategic Plan
Through June 30, 1991

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
A. Development and maintenance of a Statewide Nonpoint Source Assessment ~~[Plan]~~ and Management Plan.	Develop Strategies to achieve implementation of land management practices to control nonpoint source water pollution that results primarily from forestry, agriculture, and urban land use activities.	Nonpoint Source Program staff~~[Manager]~~, Surface Water Section Manager, WQ Division Administrator~~[, EQC]~~	~~[July 1991]~~On-going	**MOA/AP** • **DOA 8/1/89** • **SCS 7/28/89** • **ASCS 8/1/89** • **USFS 7/9/90** • **BLM 4/9/90** • **DLCD** **Groundwater Monitoring ongoing in Malheur County and initiated in Umatilla and Morrow Counties; Groundwater Management Area Action Plan for Malheur County being completed; Committee being formed for lower Umatilla Area.**
	Support designated management agencies with the development and implementation of watershed management plans in conjunction with critical basin ~~[and]~~ TMDL activities and Federal land management.	Nonpoint Source Program ~~[Manager]~~ staff, ~~[Regional Staff,]~~ Basin Coordinators, Surface Water Manager, Division Administrator	On-going	**Plan Approval** • **Urban 8/10/90** • **USA 8/10/90** **Container Nursery Plan Drafted, Technical Specialist Panel Progress Report**
	Manage Section 319 federal grant funds to assist state and local efforts in controlling nonpoint sources of pollution through watershed enhancement and protection projects.	Nonpoint Source Program Manager, ~~[WQ Staff, Region Staff]~~ Surface Water Staff	On-going	**Administering $537,018 in 1990 grant funds covering 18 projects**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
B. Develop and implement an Oil Spill Contingency Plan for the Oregon Coast and estuaries, the Columbia River, and the Willamette River to Oregon City.	Develop strategies for the prevention and cleanup of spills in coastal and ocean waters and rivers with major transportation activities. Develop strategies for the commitment of sufficient resources to maintain oil spill cleanup equipment and provide for training.	~~[Nonpoint Source Program Manager]~~ Oil Spill Prevention Program staff, Surface Water Section Manager, WQ Division Administrator, ~~[EQC]~~	July 1991	• **Project scheduled, staff hired, work assigned.** • **Sensitive resource mapping underway.** • **Debris disposal strategy drafted and reviewed.**
	Coordinate with all affected local, state, and federal agencies, industry and the general public in the development and implementation of the plan.	~~[Nonpoint Source Program Manager]~~ Oil Spill Prevention Program staff, Surface Water Section Manager, Division Administrator	On-going	• **2 Advisory Committee Meetings held for Oil Spill Planning (SB 1039).** • **1 Advisiory Committee Meeting held for Financial Assurance (SB 1038).** • **On-going coordination with adjacent states and through State/BC Task Force.**
C. Improve the effectiveness and enforceability of Water Quality Permits.	Review standard permit conditions. Remove unessential conditions and add those which would improve readability and enforceability of the permits.	Industrial Permit Program Manager, HQ Staff, Regional Staff	June 1991	**Currently reviewing General Conditions (boilerplate) attached to each permit.** **Meeting with AOSA regularly.**
	Evaluate each major permit as renewed for readability, enforceability, and appropriateness of conditions.	Industrial Permit Program Manager, HQ Staff	On-going	• **Increased biomonitoring requirements being added during renewal.** • **General and Source Specific Permits are being revised to include groundwater quality protections.**
	Train all permit writers on writing effective permits and evaluation reports.	Industrial Permit Program Manager, HQ Staff	Annually	
D. Expand groundwater quality	Utilize groundwater management	Nonpoint Source Program	On-going	**Malheur Plan development**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
protection efforts.	area/area of concern program to develop groundwater protection strategies in cooperation with other state agencies.	Manager, Groundwater Section Manager, Other Agencies		**has involved other agencies including ODA, OSHD, WRD, SES, OSU, USGS, etc. and has spawned ideas for groundwater protection strategies for public education, pesticide collection/recycling, enhanced monitoring, and point source controls.**
	Develop guidance for implementation of groundwater rules.	Internal Committee, Point Source Program Manager, Groundwater Section Manager, WQ Division Administrator	September 1990	**Internal guidance document finalized and distributed 8/90.**
	Review Materials of prioritized permitted and unpermitted point sources to assess adequacy of groundwater protection.	Point Source Program Staff, Groundwater Section Manager, Regional Staff, WQ Staff	On-going	**8/90 guidance document includes priorities for implementation based on catagorization of sources based on risk.**
E. Establish updated management programs for the Columbia Basin with Washington ~~[Oregon]~~ and the Willamette Basin.	Initiate the Columbia River Study	Near Coastal Program Staff, Surface Water Section Manager, Division Administrator~~[Water Quality Planning Sect.]~~	October 1990	• **Interstate Agreement 4/90** • **Steering Committee Formed** • **Numerous public hearings held** • **4 year program plan drafted 10/90**
	Complete the Analysis of existing data	Water Quality Planning Sect.	March 1991	
	Initiate Data Collection	Water Quality Planning Sect.	April 1991	
	Establish the Willamette Basin Study Plan	Water Quality Planning Sect.	January 1991	

Department of Environmental Quality

Update 10/15/90

Hazardous and Solid Waste Division Operating Plan

Priority Objectives related to Strategic Plan
Through June 30, 1991

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
A. Develop hazardous waste program priorities for permitting and compliance activities and implement through the state/EPA agreement. (Goals 2, 4, 6, 7)	Prepare revised draft of hazardous waste permitting and compliance milestone priorities which include target outputs by calendar quarters.	Hazardous Waste Permits and Compliance Section (HWPC)	May 1990	**Completed**
	Finalize program priorities following comments from EPA.	HWPC	July 1990	**Completed**
	Track targeted milestones and prepare mid-year review report for permitting and compliance.	HWPC	January 1991	**In Progress**
	Prepare revised milestone if required for permitting and compliance.	HWPC	As needed	
	Prepare end of year review report on milestones targeted and completed for permitting and compliance.	HWPC	June 1991	
B. Develop Comprehensive Hazardous Waste Information System* (Goals 1, 2 & 8) (HSW High Priority 4)	Hire staff replacements	Hazardous Waste Reduction and Technical Assistance Section (HWRTA), Human Resources - MSD	~~[August 1, 1990]~~ January 1991	* *All target dates are contingent upon the timely hiring of qualified staff.*
	Draft new reporting forms	HWRTA	~~[September 15, 1990]~~ March 15, 1991	**Hiring a Consultant**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
	Finalize new reporting forms	HWRTA	~~[October 15, 1990]~~ April 15, 1991	
	Prototype new forms with regulated community	HWRTA, HWPC	~~[November 15, 1990]~~ May 15, 1991	
	Finalize forms and secure new reporting rule	HWRTA	~~[December 15, 1990]~~ June 15, 1991	
	Develop/modify information system to run all necessary reports	HWRTA, Information Systems	~~[July 1, 1991]~~ December 1, 1991	
	Modify system to include significant elements of EPA's biennial report	HWRTA, Information Systems	January 1, 1991	
	Incorporate/integrate elements of HW reduction and toxic reduction into system	HWTRA, Information Systems	~~[January 1, 1990]~~ January 1, 1991	(1990 was a typo)
	Incorporate new federal reporting requirements into information system (HWDMS,RCRIS and capacity assurance)	HWRTA, HWPC	Ongoing	
	Develop new reports and data categories to meet public, government and information needs	HWRTA	Ongoing	
C. Reorganize solid waste permit review work to improve efficiency and reduce the backlog of submittals. (Goals 1 & 8) (Agency-Wide High Priority #3)	Regional training on policies, permit instructions.	Headquarters Staff	May 13, 1990	**Completed**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
	Finalize woodwaste policy	Headquarters	June 15, 1990	**Deferred to December**
	Hire temporary staff to address industrial sites.	Headquarters	July 1, 1990	**Completed**
	Begin rulemaking on increased permit fees contingent upon legislative approval.	Solid Waste Staff	October 1, 1990	**Completed**
	Hire permanent staff to track permits/plans	Headquarters	October 1, 1990	**Recruitment begun; expected by January 1.**
	complete review and permit/plan approval on all "low-risk" landfills or transfer stations.	Regional Staff	November 1, 1990	**On Track**
	Review and evaluate new permit processing procedures with regional offices.	Headquarters/Regional Staff	February 1, 1991	
	Get approval from Legislature for additional technical staffing for solid waste.	HSW/MSD Staff	July 1, 1991	
	Hire new solid waste staff paid for with new higher permit fees adopted by rule.	Headquarters	August 1, 1991	
D. Adopt recycling goals and standards (Goal 2) (H&SW High Priority 2)	Develop draft rules for goals and standards	Solid Waste Reduction and Recycling Section (SWRR)	May 1, 1990	*Important for consensus* **Concept developed, rules to follow after legislative session.**
	Develop legislative concept	SWRR, HSW Planning Section	June 1, 1990	**Completed**
	Develop fiscal impact statement	HSW Planning Section,	June 1, 1990	**Completed**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
		MSD Budget Section		
	Identify potential funding source	HSW Planning Section, Agency Mgmt., DEQ Legislative Team	August 1, 1990	*New Fees or Increase existing fees*
	Obtain support for concept	HSW Management	August 1, 1990	**4 bills will be introduced with same concept**
	Executive approval	Director	July 1, 1990	**Completed**
	Draft Legislation	Legislative Counsel, DEQ Legislative Team	January 1, 1991	**Completed 10/1**
	Develop support documents	SWRR, HSW Planning Section, DEQ Legislative Team	January 1, 1991	
	Support legislative passage	DEQ Legislative Team	June 1, 1991	*Important for Advisory Committee to support*
	Develop Implementation Strategy	SWRR, HSW Planning Section, Agency Mgmt.	September 1, 1991	
	Develop Rules	SWRR, EQC	January 1, 1992	*Draft Rules will expedite development of final rules*
E. Implement UST financial assistance programs (Goal 4) (HSW High Priority 8)	Timely review of Grant reimbursement applications (strive for initial 14 day review)	UST Compliance	On-going	*Program Sunsets 8/31/92* **70 applications received; 55 awaiting additional information; 7 approved; 8 ineligible**
	Timely review of loan Guarantee applications (strive for initial 14 day review)	UST Compliance	On-going	*Program Sunsets 8/31/92* **23 applications received; 17 awaiting additional**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
				information; 5 certifictes issued; 1 guarantee approved
	Timely review of Interest Rate Subsidy applications (strive for initial 14 day review)	UST Compliance	On-going	*Program Sunsets 8/31/92* **See loan guarantee status above -- same status**
	Timely review of Pollution Control Facility Tax credits (within 120 days of receipt)	UST Compliance	On-going	*Program Sunsets 12/31/95* **88 approved; 42 staff reports in preparation**
	Interim Legislative committee program review	UST Compliance, Director	Periodic	*Between 89 and 91 sessions* **Status Reports given -- July 23, 1990 and September 12, 1990.**
	Legislative program review	UST Compliance, Director	January-June 1991	**No Activity**
	Regional Inspection of Loan Guarantee soil cleanups and issuance of "Notice of Soil Cleanup"	Regional Offices	On-going	**1 issued**
	Regional Inspection of Loan Guarantee upgrade and replacement UST projects and issuance of "Notice of Construction Completion"	Regional Offices	On-going	**1 issued**

Environmental Cleanup Division Operating Plan

Priority Objectives related to Strategic Plan

Through June 30, 1991

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
A. Enhance the cleanup process to include a non-complex cleanup program. (Goal 8) (ECD High Priority 1)	Develop Voluntary Cleanup Initiative (VCI) Plan	Program Development Section	July 1, 1990	**Completed 6/7/90**
	Prepare legislative budget proposal for Voluntary Cleanup Section	Program Development Section	July 7, 1990	**Completed 7/7/90**
	Request E-Board authorization for positions	Program Development Section	July 12, 1990	**E-Board Approved 7/13/90**
	Develop decision regarding cleanup criteria for soil contamination at Level 1 sites	Program Development Section	August 1, 1990	**Done. Will propose soil cleanup standards as rules.**
	Develop decision regarding procedures and policies for interim Level 1 sites, including: Request packet Letter agreement Model workplan Final report outline Certification letter	Program Development Section	September 1, 1990	**Request Packet and letter agreement done on schedule. Others under development.**
	Request public hearing authorization for rulemaking if cleanup criteria are developed	Program Development Section	July 1, 1991	**On Schedule**
	Propose rules for incidental hazardous substances and minor groundwater Level 2 LUST sites	Underground Storage Tank Cleanup Section	July 1, 1991	**On Schedule**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
	Request public hearing authorization for rulemaking on Level 2 hazardous substances sites	Voluntary Cleanup Section	January 1992	**On Schedule**
	Hire and train staff for Level 2 & 3 voluntary cleanups	Voluntary Cleanup Section	August 1990 - July 1991	**Recruitment underway for 7 positions approved at July 13, 1990 E-Board.**
B. Aggressively pursue responsible parties to pay for cleanup costs and maximize cost recovery of DEQ oversight costs. (Goal 4) (ECD High Priority 2)	(See also Priority #1: Voluntary Cleanup Initiative)			
	Develop overhead cost proposal for MSD review and approval	Program Development Section	July 1, 1990	**Done. Under revision. Expect final approval by December 1990.**
	Request E-Board authorization for Accountant position	Program Development Section	July 12, 1990	**E-Board approved 7/13/90.**
	Provide progress report on cost recovery and enforcement policy and procedures	Program Development Section	March 1, 1991	**On Schedule**
C. Complete site discovery rulemaking and implement on an agency-wide basis.	Propose site discovery rules for EQC adoption	Site Assessment Section	June 29, 1990	**EQC Adopted 6/29/90.**
	Prepare legislative budget proposal for regional positions	Program Development Section	July 7, 1990	**Completed 7/7/90.**
	Begin process for listing sites on Confirmed Release List and Inventory	Site Assessment Section	August 1, 1990	**Process underway. 48 sites proposed for CRL and Inventory by end of September 1990.**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
	Complete development of initial guidance to implement site discovery program department-wide	Site Assessment Section	August 15, 1990	**Projected to be completed by 10/15/90.**
	Begin training to implement site discovery program department-wide	Site Assessment Section	September 1, 1990	**Training for regional staff initiated.**
	Complete listing of sites on initial CRL & Inventory	Site Assessment Section	November 1990	**New target date December 1990.**
	Complete development of Hazard Ranking System and request public hearing authorization on rules	Site Assessment Section	November 2, 1990	**On schedule.**
	Propose Rules for EQC adoption	Site Assessment Section	January 25, 1991	**On schedule.**
	Begin ranking sites on inventory	Site Assessment Section	February 15, 1991	**On Schedule.**
D. Secure orphan site funding by receiving E-Board approval to sell Pollution Control Bonds to clean up a site. (Goals 1, 2) (ECD High Priority 4)	<u>McCormick and Baxter Goalposts</u>:			
	• Final Phase 1 RI/FS Workplan	Site Response Section	September 5, 1990	**Received final plan 9/7/90.**
	• Start Phase 1 work	Site Response Section	September 10, 1990	**Began work 8/1/90.**
	• If feasible, implement interim remedial action: Final Phase 2 RI/FS Workplan Start Phase 2 work Complete Phase 1 RI/FS work Final Phase 1 & 2 RI/FS Report Select Proposed Remedy Public Comment Record of Decision	Site Response Section	May 9, 1993	**On Schedule.**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
E. Implement Business Planning Project. (Goals 1 & 8) (All Programs High Priority 2)	Complete Feasibility Study; Executive Dept approval	MSD Information Systems	July 1, 1990	**Decision on whether to proceed by October 1990.**
	Award contract	MSD Information Systems	August 15, 1990	**Earliest possible date is February 1991.**
	Identify components for short term implementation	Program Development	September 1, 1990	**Completed.**
	Begin analysis of Business Requirements including Data Model	Program Development	October 1, 1990	**Begin in November 1990 if decision is to proceed.**
	Complete analysis of Business Requirements including Data Model	MSD Information Systems, Program Development	January 1, 1991	**Complete in March 1991.**
	Issue Contract or task order for one or more components of the Plan	MSD Information Systems, Program Development	March 1, 1991	**Issue in May 1991.**

Regional Operations Division Operating Plan

Priority Objectives related to Strategic Plan

Through June 30, 1991

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
A. Develop and implement an inspection ranking matrix which will focus on highest priority sources and incorporate unannounced inspections into scheduled workload. (Goal 4) (All Program High Priority 1)	Complete ranking of source inspections (AQ, WQ, SW, HW) based upon the matrix and current resource levels (short-term strategy)	RO Administrator, Regional Managers, Program Managers	August 15, 1990	**Completed.**
	Develop long-term application of inspection matrix. Identify desired inspection level and necessary resources.	RO Administrator, Regional Managers, Program Managers	August 15, 1990	**Completed.**
	Review inspection schedule with EPA.	Program Managers	To be decided	**Completed.**
	Implement short-term strategy (if approved by EPA).	Regional Managers	October 1, 1990	**Implemented for WQ. Working with EPA on AQ Matrix.**
B. Develop and implement a complaint response matrix which establishes priorities and identifies appropriate actions. (Goal 4, 8) (Resource reduction priorities all programs 4)	Form work group.	RO Administrator, Regional Managers	August 15, 1990	**Delayed while Adm. serves as Acting AQ Adm. Expect to initiate process before end of year.**
	Assess number and types of complaints. Evaluate various response options. Prepare draft matrix.	Work Group	September 15, 1990	**(See Note Above)**
	Submit draft matrix to regions/programs and Director for comment.	Work Group, Reviewers	October 15, 1990	**(See Note Above)**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
	Review comments and modify as necessary	Work Group	November 15, 1990	**(See Note Above)**
	Pilot test the matrix in the regions; review in 6 months.	Regional Managers	December 1, 1990 - May 30, 1991	**(See Note Above)**
	Refine as necessary.	Work Group	June 15, 1991	**(See Note Above)**
	Implement	Regional Managers	July 1, 1991	**(See Note Above)**
C. Establish a base employee training program. (Goal 6, 7) (All programs highest priorities 5)	Identify basic training needs for each program	RO Administrator, Regional Managers, Program Managers, Training Coordinator	October 1, 1990	**Behind schedule while Adm. serves as Acting AQ Adm. Regional Managers assigned to work with programs to identify basic training needs. Will review late in November.**
	Determine necessary resources, scheduling needs	RO Administrator, Regional Managers, Training Coordinator	November 15, 1990	
	Incorporate training requirement in employee work plans	Regional Managers, Supervisors	February 1, 1991	
	Implement		April 1, 1991	

Department of Environmental Quality

Update 10/15/90

Laboratory Division Operating Plan
Priority Objectives related to Strategic Plan
Through June 30, 1991

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
A. Increase the amount of waters assessed (based on data) to better identify threats to public health and the environment (Goal 2, Water Program Priority 1)	Develop budget proposals to enhance monitoring capabilities	Lab, WQ Program	Start March 1990, Complete July 1991	**On Track**
	RIVERS: Refine Rapid Biomonitoring Protocols (RPB) for assessing stream quality and non point source (NPS) impacts in rangeland (GWEB Projects) and urban (TMDL) areas	Lab	Start June 1990; Complete September 1991	**On Track**
	Transfer Protocols to targeted agencies to increase assessment capability	Lab	Initiate in 1991	**On Track**
	Utilize Protocols in DEQ ambient monitoring on prioritized streams (SCWS)	Lab	Start June 1990	*Budget dependent* **Somewhat delayed pendind additional protocol refinement, budget**
	ESTUARIES: Refine coverage of major shellfish growing bays to meet FDA requirements	Lab, WQ Program, Health Division	September 1990	**Complete**
	Develop approach for monitoring other bays	Lab, WQ Program, Health Division	January 1991	**On Track; OHD Coordinating**
	LAKES: Seek source of long term funding and support	WQ Program	June 1991	

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
	WETLANDS:			
	Develop assessment and monitoring capability	WQ Program, Lab	January 1991	**On Track**
	Develop implementation approach	WQ Program	July 1991	
	GROUNDWATER:			
	Develop ambient monitoring strategy and priorities	WQ Program, Lab	August 1991	**On Track**
	Initiate Strategy:	Lab		
	Grants Pass Area		July '88-June 1991	**On Track**
	Boardman Area		Start July 1990	**On Track**
	Bend Area		Start September 1990	**On Track**
B. Develop information on AQ in areas of the State which have not previously been evaluated, assayed, or monitored	Develop a priority ranking of areas by use of available monitoring information by pollutant and/or by use of source modeling work	AQ Program, Lab	Begin October 1990; Complete by (Part.) May 1991 (CO) Oct. 1991 (SO_2) July 1992	**Grant Applied for and Approved**
	Identify areas for survey and monitoring effort, costs and scheduling	AQ Program, Lab		
	Implement survey and monitoring schedules for PM_{10}, CO, SO_2, Ozone	Lab,	Start by October 1991	*Special Project, Budget dependent.*
	Develop a survey technique to identify areas of the State that have potential for impact from toxics	AQ Program, Lab	July 1991	**Possible Delay**
	Implement toxics monitoring network	AQ Program, Lab	(Not likely in 1990-1991)	

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
C. Improve NPDES/WPCF self-monitoring laboratory assessment & data Quality Assurance (Goal 2,4,8) (All program high priority 1,2).	List EPA QA requirements and applicable GLPs for NPDES & WPCF self-monitoring analyses.	Lab, WQ	September 1, 1990	**Delayed; In Progress**
	Develop list of permittees doing self-monitoring; laboratory doing work; analytes; contacts; etc.	Lab, WQ, RO	September 1, 1990	*Meet with each Region (?).* **Delayed; In Progress**
	Develop inspection check-list, report format, inspection criteria...	Lab	October 15, 1990	**On Track**
	Prioritize sources-laboratories for inspection; begin scheduling	Lab, RO, WQ	December 1, 1990	**Delayed; In Progress**
	Implement inspection schedule	Lab	January 1, 1991	*7 - 10 labs inspected/month; 50 labs inspected by June 30, 1991.*

Department of Environmental Quality

Update 10/15/90

Management Services Division Operating Plan

Priority Objectives related to Strategic Plan

Through June 30, 1991

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
A. Coordinate the development of a 1991-93 Operating Budget that reflects the Strategic Plan and proposes options for stable, long-term funding. (All Goals) (All Program High Priority 7)	Complete agency requested budget and submit to the Executive Department.	Division Administrators, Program Managers, Budget Office, Director, EQC.	August 28, 1990	**Complete**
	Revise based on Executive Dept. review and discussions. Submit Governor's Recommended Budget to the 1991 Legislature.	Division Administrators, Program Managers, Budget Office, Director, EQC.	January 8, 1991	
	Seek Legislative approval of the budget.	Division Administrators, Program Managers, Budget Office, Director, EQC.	January-June 1991	
B. Coordinate the development of a comprehensive data management system which is accessible and useful to all programs. (Goals 1 & 2) (All Program High Priority 2)	Improve program and regional office access to electronic data by installing additional needed workstations and communication equipment.	MSD Administrator, Information Systems Office, and Program Managers.	August 1990	*Each Program prioritizes data base programming needs independently* **Complete. In process of adding the Justice Dept. (Michael Huston)**
	Develop DEQ Information Technology Plans and submit 1991-93 request to the Executive Department.	Information Systems Office, Division Administrators.	August 1990	**Complete**
C. Revise the Health and Safety Plan as needed and implement. (Goal 7) (All Program High Priority 6)	Review existing Health and Safety Plan, update	Health and Safety Manager	June 1990	**Review Completed. Fourteen policy and procedures papers are in development. Manager resigned in August, slowing progress.**

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
	Formally adopt implementation strategy.	Division Administrators, Director	July 1990	**(See Note Above)**
	Begin Implementation.	Health and Safety Manager, Division Administrators, and Director.	August 1990	**(See Note Above)**
D. Ensure that a consistent approach reflecting Department Values is followed in dealing with the public, the regulated community, and co-workers. (Goal 6)	Review and revise the Conflict of Interest policy.	Division Administrators, Director	September 1990	**Review Started**
	Develop a training segment for new employees.	Human Resources Office, MSD Administrator	November 1990	
E. Provide training and development opportunities for staff. (Goals 4, 6, & 7) (All Program High Priority 5)	Coordinate with Divisions to deliver training and development programs.	Human Resources Office, MSD Administrator	On-going	*Each Division identifies and prioritizes training needs.*
F. Implement an employee recognition program. (Goal 7)	Recruit and fill the Human Resources Manager vacancy.	MSD Administrator	July 1990	**Position Filled August 1990**
	Implement the approved plan.	Human Resources Manager, Division Administrators, Director	September 1990	**Implementation started in October**
G. Encourage Affirmative Action in the workplace.	Review, update and approve the Department's Affirmative Action Plan.	Human Resources Manager, Division Administrators, Director	September 1990	**Review underway; Diversity in Workplace training provided to managers.**
	Implement the approved plan.	Human Resources Manager, Division Administrators, Director	October 1990	

Department of Environmental Quality

Update 10/15/90

Public Affairs Section Operating Plan

Priority Objectives related to Strategic Plan

Through June 30, 1991

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status	
Develop and implement new initiatives for informing the public about actions they can take to reduce pollution.	Develop set of educational objectives and priorities for the next year	Public Affairs Section	July 1, 1990	**Completed**	**(Pollution Prevention Theme)**
	Revise and update agency brochure to include information on actions the public can take to reduce pollution	Public Affairs Section	To the printer by September 1, 1990	**Draft Completed, Under Review**	
	Reprint and update the recycling curriculum - RE:Recycling. Include section on what the public can do to reduce pollution	Public Affairs Section	To the printer by September 1, 1990	**Completed**	
	Develop and implement a distribution plan for the Clean Air curriculum	Public Affairs Section	July 1, 1990	**Completed**	**Display at Science Teachers Association October 1990**
	Work with Tri-Met on developing a joint clean-air educational program	Public Affairs Section	September 1, 1990	**Completed**	**Ongoing project will be considered**
	Participate in public events with displays on what the public can do to reduce pollution:	Public Affairs Section		**Ongoing**	
	Jackson County Clean Air Fair		September 1990	**Completed**	
	Klamath County "Operation Big Push"		September 1990	**Canceled**	
	Zoo Project S.A.F.E.		June 1991.		

Priority Objectives	Significant Tasks	Responsible Unit	Target Date	1st Quarter Status
				Added: • **Environmental Education Association Conference 11/90** • **Childrens Fair 10/90** • **Salmon Festival 10/90**
	Develop a series of radio public service announcements to give the public car-care tips to reduce air pollution	Public Affairs Section	October 1, 1990	**Delayed to 1991**
	Facilitate a woodburning public education meeting with representatives of nonattainment areas	Public Affairs Section	August 1990	**Cancelled**
	Develop educational materials on household hazardous waste reduction	Public Affairs Section	Spring 1991.	
	Develop and produce a series of educational fact sheets on hazardous and solid waste reduction	Public Affairs Section	On-going	**Ongoing**
	Develop and Implement an educational campaign for Recycling Awareness Week	Public Affairs Section	Fall 1990	**Completed Oct. 6-13, 1990**
	Develop materials and participate in workshops on toxic use reduction	Public Affairs Section	Quarterly	**Completed Ongoing**
	Develop series of educationsal mewspaper ads with Newspaper Publishers Association	Public Affairs Section	November 1990	
	Develop series of educational factsheets on water quality	Public Affairs Section	On-going	
	Organize a DEQ staff Speakers Bureau	Public Affairs Section		**Completed**

NEIL GOLDSCHMIDT
GOVERNOR

Environmental Quality Commission

811 SW SIXTH AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

DATE: October 19, 1990

TO: Environmental Quality Commission

FROM: Fred Hansen, Director

SUBJECT: Out-of-State Waste Surcharge

The Commission will be considering Department recommendations on the out-of-state waste surcharge at its November 2 meeting (Agenda item G).

The Department would like to present a panel discussion on this issue during the November 1 work session. The panel discussion is scheduled for 2:15 and the Department has invited the following participants:

. Mark Berkman	NERA economic consultants
. Bruce Rettig	OSU professor of economics
. John DiLorenzo	Representing Tidewater Barge
. Laura Pryor or Louis Carlson	Gilliam or Morrow county
. Doris Bjorn	Oregon Waste Systems
. John Frewing	Chair, DEQ Solid Waste Adv. Committee
. Diana Godwin	Oregon Sanitary Services Institute
. Larry Edelman	Department of Justice

Representing the Department during the panel discussion will be Steve Greenwood, Manager of the Solid Waste Permits and Compliance Section.

AQ - Dog

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: October 26, 1990

TO: EQC Commission Members

FROM: Fred Hansen, Director

SUBJECT: Tax Credit Review Report for November 2 EQC Meeting

At the September 21 EQC meeting, the Commission provided the Department further direction in determining the percent allocable to pollution control of farm tractors. The Department was asked to develop a procedure, within statutory and administrative rule guidelines, which would better identify and define the portion of a tractor that is used for alternative methods to open field burning. This need is premised on the Commission's view that, as an essential general farm implement, only the portion of a tractor utilized as an alternative method should be certified for tax relief.

With assistance from the Department of Agriculture and OSU Agriculture Extension Service, Department staff has developed a methodology which uses a standard average annual operating hours for a farm tractor. This standard of 450 hours was determined based on information from the Extension Service. Using a calculation, the estimated annual hours of operation is determined for each implement used with the tractor as an alternative field sanitation practice. (A table is provided which states the average acres/hour use for various implements using tractors of different horsepower, identified as attachment A in this report.) The total annual use hours for each implement are summed and divided by the standard average annual total of 450 hours. This provides the percent of the tractor that is allocable to pollution control.

It is the Department's position that the new methodology accomplishes the Commission's objective to better document and certify the portion of a tractor that is actually used as an alternative method to open field burning. As a general farm implement, it is reasonable to expect occasional use of tractor to extend beyond the narrowly defined uses as alternative methods, regardless of the purpose for the investment. This approach provides greater accountability from a state budgetary perspective, and provides the farmer a more reasonable basis for obtaining maximum utilization from an investment.

Other changes have been made to the application procedure to facilitate the applicant in completing the application, and to provide the Commission with sufficient information on which to

base certification decisions (see attached application). The application has been tailored specifically for facilities used as alternative methods, which should provide greater ease for the applicant. Additional information is requested so that a description is provided of the applicant's overall plan to reduce open field burning, and to state the relationship of the facility to the plan. This information will also be included in staff review reports.

These new procedures have been applied to one of the eight tractor applications that were deferred at the August Commission meeting. The staff review for this report is attached for Commission action November 2. The remaining seven applications are scheduled for the December meeting.

In applying the new methodology to TC-3262, the percent allocable is 92%. The Department is recommending this percentage be certified by the Commission. In this situation, the applicant has stated that the tractor is solely used for alternative method application. Since the annual use does not constitute total maximization based on the standard annual use, the remaining 8% may be used for purposes unrelated to alternative method practices.

The Department of Agriculture does not concur with the Department's recommendation on TC-3262. When the investment in a tractor is solely for alternative method utilization, the Department of Agriculture believes a credit of 100% is appropriate regardless of the number of hours the tractor is used. In DEQ's view, this is counter to the Commission's intent to better justify the actual use of a tractor because of its broad application in general farming practices. The Department will be prepared to discuss this issue at the November 2 meeting.

novtc

TABLE A
Average Machinery Capacity by Tractor Size
(in acres/hour)

75 Horsepower Tractor		120 Horsepower Tractor		190 Horsepower Tractor		260 Horsepower Tractor	
Square Bales	4	Square Bales	4	Square Bales	4		
Stack Loader	3	Stack Loader	3	Stack Loader	3		
Flail Chop	5	Flail Chop	6	Flail Chop	7		
Harrow	7	Harrow	7	Harrow	7		
Propane Burn	10	Propane Burn	10	Propane Burn	10		
Fluff	7	Disc or Plow	6	Disc or Plow	7	Disc or Plow	8
Lely Thatcher	8	Flail & Loaf	5	Flail & Loaf	5		
		Round Bales	4				

Application No. TC-3262

State of Oregon
Department of Agriculture

TAX RELIEF APPLICATION REVIEW REPORT

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1. Applicant

Michael W. Kirk, Secretary
Kirk Century Farms, Inc.
33214 Seefeld Drive
Halsey, Oregon 97348

The applicant owns and operates a grass seed farm operation in Halsey, Oregon.

Application was made for tax credit for air pollution control equipment.

2. Description of Claimed Facility

The equipment described in this application is a used John Deere 2950 tractor with a John Deere 260 loader, located at 33214 Seefeld Drive, Halsey, Oregon. The equipment is owned by the applicant.

Claimed equipment cost: $32,200
(Accountant's Certification was provided.)

3. Description of farm operation plan to reduce open field burning.

The applicant farms approximately 800 acres of perennial grass seed varieties and 400 acres of annual ryegrass. The purchased equipment enables the applicant to treat the perennial fields by baling off the straw and flail chopping the remaining residue, enhancing its decomposition in the fields. Each year some fields are thatched to provide aeration and plant stimulation. The annuals are managed by baling off the straw, plowing under the stubble and preparing the ground for annual re-planting.

The applicant states that previous to the purchase of this tractor and the equipment certified in tax credit 3149, grass seed field sanitation and straw removal was accomplished by open field burning harvested fields. This was accomplished by registering 1200 acres annually, burning approximately 800 acres per year on a rotation to accomodate all fields.

4. Procedural Requirements

The equipment is governed by ORS 468.150 through 468.190, and by OAR Chapter 340, Division 16. The equipment has met all statutory deadlines in that:

Purchase of the equipment was substantially completed in September, 1989, and the application for final certification was found to be complete on October 23, 1990, within two years of substantial purchase of the equipment.

5. Evaluation of Application

a. The equipment is eligible because the principal purpose of the facility is to reduce a substantial quantity of air pollution.

This reduction is accomplished by reduction of air contaminants, defined in ORS 468.275; by reducing the maximum acreage to be open burned in the Willamette Valley as required in OAR 340-26-013; and, the facility's qualification as a "pollution control facility", defined in OAR 340-16-025(2)(f)(A): "Equipment, facilities, and land for gathering, densifying, processing, handling, storing, transporting and incorporating grass straw or straw based products which will result in reduction of open field burning."

b. Eligible Cost Findings

In determining the percent of the pollution control equipment cost allocable to pollution control, the following factors from ORS 468.190 have been considered and analyzed as indicated:

1. The extent to which the equipment is used to recover and convert waste products into a salable or usable commodity.

The equipment promotes the conversion of a waste product (straw) into a salable commodity by providing power to a previously certified round baler and other equipment used to collect and package straw for marketing and preparing the ground for the following growing season.

2. The estimated annual percent return on the investment in the equipment.

There is no annual percent return on the investment as applicant claims a negative average annual cash flow because annual operating costs exceed gross annual income.

3. The alternative methods, equipment and costs for achieving the same pollution control objective.

The method chosen is an accepted method for reduction of air pollution. The method is one of the least costly, most effective methods of reducing air pollution.

4. Any related savings or increase in costs which occur or may occur as a result of the purchase of the equipment.

   There is an increase in operating costs to annually maintain and operate the equipment. These costs were considered in the return on investment calculation.

5. Any other factors which are relevant in establishing the portion of the actual cost of the equipment properly allocable to the prevention, control or reduction of air pollution.

   The established average annual operating hours for tractors is set at 450 hours. To obtain a total percent allocable, the annual operating hours per implement used in reducing acreage open field burned is as follows:

Implement	Acres Worked	Machinery Capacity	annual operating hours
Round baler	1,120	4	280
Flail chopper	125	5	25
Stack loader	150	3	50
Plow	120	6	20
Harrow	140	7	20
Thatcher	160	8	20
Total annual operating hours			415

   The total annual operating hours of 415 divided by the average annual operating hours of 450 produces a percent allocable of 92%.

   The Department of Agriculture recommends that 100% of the actual cost of the tractor be allocated to pollution control because there is no other identified use and 415 hours represents total use of the equipment by the applicant. The applicant states that the tractor was purchased by the farm to be used solely for the removal of straw from fields following grass seed harvest and the subsequent plowing of straw into the soil profile to avoid field burning and the accompanying air pollution.

The actual cost of the equipment properly allocable to pollution control as determined by using these factors is 92%.

6. Summation

a. The equipment was purchased in accordance with all regulatory deadlines.

b. The equipment is eligible for final tax credit certification in that the principal purpose of the facility is to reduce a substantial quantity of air pollution and accomplishes this purpose by the reduction of air contaminants, as defined in ORS 468.275.

c. The equipment complies with DEQ statutes and rules.

d. The portion of the equipment that is properly allocable to pollution control is 92%.

7. Director's Recommendation

Based upon these findings, it is recommended that a Pollution Control Facility Certificate bearing the cost of $32,200, with 92% allocated to pollution control, be issued for the equipment claimed in Tax Credit Application Number TC-3262.

Jim Britton, Manager
Smoke Management Program
Natural Resources Division
Oregon Department of Agriculture
(503) 378-6792

JB:bmTC3262
October 25, 1990

DEPARTMENT OF ENVIRONMENTAL QUALITY
MANAGEMENT SERVICES DIVISION
811 SW Sixth Avenue
Portland, Oregon 97204

For DEQ Use Only

Appl. No. _____
Date Rec'd. _____
Fee Paid _____
Date Determined Complete _____
Air Quality Facilities _____

APPLICATION FOR CERTIFICATION OF A POLLUTION CONTROL FACILITY FOR TAX RELIEF PURSUANT TO ORS 468.155 ET. SEQ.

APPLICATION FOR APPROVED ALTERNATIVE METHODS FOR FIELD SANITATION AND STRAW UTILIZATION AND DISPOSAL

SECTION I. - IDENTIFICATION OF APPLICANT

(1) Name of Applicant:
(If corporation, exact name as specified in charter; if partnership or joint venture the names of all partners or principals):

Name: _____ Names of general partners or principals: –

Address: _____ _____

City, State, Zip Code: _____

_____ _____

(2) Status of Applicant:

__ Lessee __ Owner __ Individual __ Partnership __ Corporation __ Non-profit __ Co-op

(3) Person Authorized to Receive Certification:

Name: _____ Title: _____

Address: _____ Phone: _____

City, State, Zip Code: _____

(4) Person to Contact for Additional Details If Different From (3):

Name: _____ Title: _____

Address: _____ Phone: _____

City, State, Zip Code: _____

(5) Location of Claimed Facility:

Address: _____ City: _____

_____ County: _____

(6) Access Directions:
(Attach map if appropriate)

_____

_____

(7) Applicant's IRS Employer Identification Number: _____

(8) Applicant's Tax Year: Beginning date: _____ Ending date: _____

(9) Provide the Standard Industrial Classification (SIC) for your business. _____

SECTION II. - DESCRIPTION OF FARM OPERATION

(1) Provide information for the following:

a. Number of acres under grass-seed cultivation: Perennial _____ Annual _____

b. Number of acres registered for open burning for past 3 years:

Year 1 _____ Acres _____; Year 2 _____ Acres _____; Year 3 _____ Acres _____

c. Number of acres open field burned for past 3 years:

Year 1 _____ Acres _____; Year 2 _____ Acres _____; Year 3 _____ Acres _____

d. Number of acres propaned in past three years:

Year 1 _____; Year 2 _____; Year 3 _____

e. How has the straw been disposed of in the past three years. (Identify disposal method and tons)

Year 1 _____

Year 2 _____

Year 3 _____

f. Identify existing facilities/equipment used as alternative methods to field burning:

_____; _____; _____; _____

_____; _____; _____; _____

_____; _____; _____; _____

How many acres have been removed from field burning as a result of the above existing equipment? _____ Acres

(2) Describe in detail, the field sanitation and straw removal operations before the use of the facility subject to this application. Using the information above, identify the use of existing equipment on specific acreage as an alternative method to open burning.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(attach additional sheets if necessary)

III. - DESCRIPTION OF CLAIMED FACILITY

(1) Provide a technical description of the facility claimed for certification and describe its function as an alternative method to field burning for field sanitation, straw utilization and disposal.

(2) Why is this facility necessary to accomplish the stated alternative method to field burning for field sanitation, straw utilization and disposal? (Provide quantitative data).

(3) To be eligible for tax credit certification, a facility must meet a "principal" or "sole" purpose test according to ORS 468.155(1) and OAR 340-16-025(1).

(a) Is the facility's only or sole purpose to provide or apply an approved alternative method to open field burning? Yes ___ No ___ If no, explain other purposes:

(b) Is the facility's principal or primary purpose to comply with DEQ's requirement to reduce the amount of acreage that is open field burned? Yes ___ No ___

SECTION IV. - SIGNIFICANT DATES AND INFORMATION

(1) Does claimed facility replace an existing facility that has been certified as a pollution control facility? _____ Yes _____ No

(2) Identify the starting date of on-going construction of the claimed facility, or purchase date of equipment. _____

(3) Identify the date claimed facility was completed or placed into operation. _____

(4) Identify the useful life of the claimed facility. _____

(5) Has the claimed facility previously been certified by DEQ or the Department of Energy for tax credit? _____ Yes _____ No

SECTION V. - ALLOCATION OF COSTS

(This section must be completed if the claimed facility provides any gross annual income).

(1) Provide the following information regarding costs associated with the claimed facility. Fill out tables as designated.

a. Actual cost of the claimed facility. $_____

b. Salvage value of any facility removed from service as a result of the claimed facility. $_____

c. Calculation of annual cash flows:

YEAR	GROSS ANNUAL INCOME*	ANNUAL OPERATING EXPENSES*	ANNUAL CASH FLOW
1.			
2.			
3.			
4.			
5.			
TOTALS			

d. Average annual cash flow: $_____

Calculate by using the following formula:

$$\frac{\text{Total of Annual Cash Flows}}{5} = \text{Average Annual Cash Flow}$$

SECTION V. - ALLOCATION OF COSTS (continued)

e. Useful life of the claimed facility: _____ years
(Section IV (4))

f. Return on investment factor: $_____
Calculate by using the following formula:

$$\frac{\text{Cost of Facility}}{\text{Average Annual Cash Flow}} = \text{Return on Investment Factor}$$

g. Annual percent return on investment (ROI): _____ %
(Use Table 1, OAR 340-16-030)

h. Reference annual percent return on investment (RROI): _____ %
(Use Table 2, OAR 340-16-030)

i. Portion of actual costs properly allocable to pollution control: _____ %

Calculate by using the following formula:

$$\frac{\text{RROI} - \text{ROI}}{\text{RROI}} \times 100\% = \text{Percent Allocable}$$

* Attach calculations for each of the first five years.

(2)) What other methods or facilities were considered for achieving the same objective?
(Other alternative methods to field burning or other types of equipment)

_____

_____

_____

(3)) Identify other factors relevant in establishing the portion of the actual cost of the facility allocable to pollution control?

_____

_____

_____

(4)) Percent of claimed facility cost allocable to pollution control? _____ %
Explain how percent allocable was determined.
(Please use the calculation formula provided in Section VI for claimed tractors)

_____

_____

_____

_____

SECTION VI. - ALLOCATION OF TRACTOR COST

The percentage of a tractor allocable to pollution control is calculated by dividing the estimated annual average operating hours total by an established average annual operating hours:

PERCENT ALLOCABLE = ESTIMATED ANNUAL OPERATING HOURS ÷ AVERAGE ANNUAL OPERATING HOURS

Step 1: Determine annual operating hours for each implement used with the tractor as an alternative method to field burning. Table A provides the average acre/hours of operation for implements powered by various sized tractors. The averages were provided by the OSU Extension Service. The established average annual operating hours for tractors is set at 450 hours. To obtain a total percent allocable, the annual number of operating hours per implement must be determined as follows:

	Example	
Implement: _____	Implement:	Square Baler
a. Acres per hour from Table A: _____	Acres per hour from Table A:	4
b. Number of acres worked: _____	Number of acres worked:	400
c. b ÷ a = annual operating hours: _____	400 ÷ 4 = annual operating hrs.	100

Repeat this calculation for each implement powered by the tractor.

Step 2: Compute total actual hours of operation. Add the annual operating hour totals calculated in Step 1 for each of the implements powered by the tractor.

Example: (using a 120 hp. tractor)	Square Baler	-	100 hours	(400 acres at 4 hr/acre)
	Stack Loader	-	100 hours	(400 acres at 4 hr/acre)
	Flail Chop	-	67 hours	(400 acres at 6 hr/acre)
			267 Total annual operating hours	

Step 3: Determination of percent allocable. The percent allocable is calculated by the following formula:

TOTAL ANNUAL OPERATING HOURS ÷ AVERAGE ANNUAL OPERATING HOURS = PERCENT ALLOCABLE

Example: 267 ÷ 450 = 59%

Step 4: PERCENT ALLOCABLE x TRACTOR COST = DOLLARS ALLOCABLE TO POLLUTION CONTROL

(Please attach additional worksheets)

TABLE A
Average Machinery Capacity by Tractor Size
(in acres/hour)

75 Horsepower Tractor		120 Horsepower Tractor		190 Horsepower Tractor		260 Horsepower Tractor	
Square Bales	4	Square Bales	4	Square Bales	4		
Stack Loader	3	Stack Loader	3	Stack Loader	3		
Flail Chop	5	Flail Chop	6	Flail Chop	7		
Harrow	7	Harrow	7	Harrow	7		
Propane Burn	10	Propane Burn	10	Propane Burn	10		
Fluff	7	Disc or Plow	6	Disc or Plow	7	Disc or Plow	8
Lely Thatcher	8	Flail & Loaf	5	Flail & Loaf	5		
		Round Bales	4				

SECTION VII. - REQUIRED EXHIBITS

Attach the following exhibits to the application:

(1) As **EXHIBIT A:** attach a site map for storage sheds which shows the facility location in relation to streets, roads and other structures.

(2) As **EXHIBIT B:** attach a listing of the land, material, machinery, and equipment incorporated into the claimed facility together with the associated cost.

(3) As **EXHIBIT C:** attach a statement from an independent public accountant or certified publi accountant which gives a breakdown of the actual cost of the claimed facility and certifie that the total cost indicated is a true and correct representation of the actual cost of the facility. Provide reference to the listing of costs in Exhibit B.

NOTE: In cases where the total actual cost of the claimed facility is less than $20,000 and where the cost can be completely and thoroughly documented by copies of invoices, cancelled checks, etc., the Department of Environmental Quality may accept copies of such documentation in lieu of the accountant's certification.

SECTION VIII. - SUBMITTAL INSTRUCTIONS

(1) Each item on the application must be completed. Failure to complete all sections will delay processing time and may constitute a basis for denial of the certification.

(2) Include required fees with submittal.

(3) Submit <u>two</u> copies of application and exhibits to:

Management Services Division
Department of Environmental Quality
811 SW Sixth Avenue
Portland, OR 97204

SECTION IX. - APPLICATION SIGNATURE

I hereby certify that I have completed this application to the best of my ability, and that the information provided herein and in the attached exhibits is true and correct to the best of my knowledge, and that the facility described in this application was erected, constructed, or installed and will be operated to a substantial extent for the purpose of preventing, controlling, or reducing air, noise or water pollution or solid waste, hazardous wastes or used oil.

Signature: _____

Title: _____

Date: _____

DRAFT

APPENDIX A

INVENTORY RANKING PROCEDURE MANUAL

October 19, 1990

Oregon Department of Environmental Quality
811 S. W. Sixth Avenue
Portland, OR 97204

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

ACKNOWLEDGEMENTS

The Department of Environmental Quality (the Department) thanks the Environmental Cleanup Division Advisory Committee for its assistance in the preparation of the Inventory Ranking Procedure (IRP). The committee functioned in a review and advisory capacity throughout the IRP development process.

The Department also thanks the Washington Department of Ecology, Parametrix, Inc., and Science Applications International Corporation for assisting the Department in modifying the Washington Ranking Method (WARM) to develop the Inventory Ranking Procedure for Oregon's program.

INTRODUCTION

As part of its environmental cleanup program, the Department of Environmental Quality (Department) maintains an Inventory of facilities with confirmed releases of hazardous substances which require further investigation or cleanup to protect public health, safety, welfare, and the environment. Oregon's Environmental Cleanup Law, ORS 465.410, requires the Environmental Quality Commission to develop a procedure for ranking facilities on the Inventory based on the long- and short-term threats they pose to public health and the environment. The Commission has proposed an Inventory ranking rule, OAR 340-122-450, which establishes this procedure. The rule provides that the Department will rank facilities placed on the Inventory using a proposed Inventory Ranking Procedure (IRP), Appendix A of the rule. This document is the proposed IRP.

The Department lists facilities on the Inventory at the conclusion of preliminary site assessments or equivalent pre-remedial studies if they require further investigation or cleanup to protect public health and the environment. All facilities will be scored when placed on the Inventory using the proposed IRP.

The proposed IRP is a scoring system incorporating criteria to assess the relative threat associated with actual or potential releases of hazardous substances from a facility. It also serves as a users' manual with forms and instructions for assigning values to the factors incorporated into the IRP and calculating facility scores. The IRP is designed for use by the persons within the Department who will be scoring facilities to be added to the Inventory and by owners and operators of facilities, consultants, and other persons interested in scoring facilities or reviewing the Department's scoring.

GLOSSARY

Container: Any portable vessel used to contain hazardous substances (e.g., lab chemical containers, drums, fuel bowsers, etc.)

Detection Limit: The lower limit of concentration of a compound that may be identified by an analytical method. Compounds identified at or above this limit but below the quantification limit are reported as present with estimated concentrations.

Facility: Any building, structure, installation, equipment, pipe or pipeline including any pipe into a sewer or publicly owned treatment works, well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, above-ground tank, underground storage tank, motor vehicle, rolling stock, aircraft, or any site or area where a hazardous substance has been deposited, stored, disposed of, or placed or otherwise come to be located and where a release has occurred or where there is a threat of a release, but does not include any consumer product in consumer use or any vessel.

Food crop: Any domestic plant which is produced for the purpose of, or may be used in whole or in part for, consumption by people or livestock. This shall include nursery, root or feedstock to be used for the production of food crops.

Geomembrane: A flexible membrane liner made of high density polyethylene (HDPE), polyvinyl chloride (PVC), hypalon, or other impervious synthetic material.

Ground water: Any water, except capillary moisture, beneath the land surface or beneath the bed of any stream, lake, reservoir or other body of surface water within the boundaries of the state, whatever may be the geological formation or structure in which such water stands, flows, percolates, or otherwise moves.

Hazardous substance: As defined by ORS 465.200(9). "Hazardous substance" means:

(a) Hazardous waste as defined in ORS 466.005.
(b) Any substance defined as a hazardous substance pursuant to section 101(14) of the federal Comprehensive Environmental Response, Compensation and Liability Act. P.L. 96-510, as amended, P.L. 96-510 and P.L. 99-499.
(c) Oil.
(d) Any substance designated by the commission under ORS 465.400.

Permitted or Authorized Release: A release that is from an active facility and that is subject to and in substantial compliance with a current and legally enforceable permit issued by the Department, the United States Protection Agency, or the Lane Regional Air

Pollution Authority; is in conformance with Department rules or a control regulation in a State Implementation Plan; or is otherwise in conformance with the provisions of a State Implementation Plan [OAR 340-122-420(8)]

Preliminary Assessment: An investigation conducted in accordance with OAR 340-122-426 for the purpose of determining whether additional investigation, removal, remedial action, or related long-term environmental or institutional controls are needed to assure protection of present and future public health, safety, welfare, and the environment.

Quantification (or Reporting): The lowest value that can be reliably reported as the concentration of a compound detected by an analytical method.

Release: Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment including the abandonment or discarding of barrels, containers and other closed receptacles containing a hazardous substance, or threat thereof, but excludes:

(a) Any releases which results in exposure to a person solely within a workplace, with respect to a claim that the person may assert against the person's employer under ORS chapter 656;

(b) Emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine;

(c) Any release of source, by-product or special nuclear material from a nuclear incident, as those terms are defined in the Atomic Energy Act of 1954, as amended, if such release is subject to requirements with respect to final protection established by the Nuclear Regulatory Commission under section 170 of the Atomic Energy Act of 1954, as amended, or, for the purposes of ORS 465.260 or any other removal or remedial action, any release of source by-product or special nuclear material from any processing site designated under section 102(a)(1) or 302(a) of the Uranium Mill Tailings Radiation Control Act of 1978; and

(d) The normal application of fertilizer.

Sensitive environment: An area of particular environmental value, where a release could pose a greater threat than in other non-sensitive areas. Sensitive environments include: wetlands, critical habitat for endangered or threatened species, national or state wildlife refuge, breeding or feeding area for fish or shellfish, wild or scenic river, rookery, riparian area, big game winter range.

Surface water: Lakes, bays, ponds impounding reservoirs, springs, wells, rivers, streams, creek, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the state of Oregon and all other bodies, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

Tank: Any stationary vessel constructed of non-earthen materials used to contain hazardous substances.

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF FIGURES

1.0 INVENTORY RANKING PROCEDURE

Sites contaminated with hazardous substances pose risks to human and environmental health. To better evaluate these risks, the Oregon State Department of Environmental Quality (the Department) has developed an Inventory Ranking Procedure (IRP). The Inventory Ranking Procedure is a quantitative method for evaluating relative threats associated with actual or potential releases of hazardous substances from sites in Oregon. The model examines those risks posed to human health and the environment through four pathways (surface water, air, ground water, and direct contact). The model relies on information available from preliminary site assessments undertaken by the Department or other entities.

During site assessments, information is collected for three purposes:

- To identify the contaminants present in waste management areas and in the environment
- To determine the potential environmental pathways by which contaminants might leave the site
- To evaluate the potential human and environmental receptors present in the site vicinity.

This information is then compiled in a systematic way by using the Inventory Ranking Procedure Manual instructions and accompanying worksheets. Scores are calculated for each site, using equations explained in Section 1.2. The site scores provide a comparison of the risks posed by sites on the Inventory.

This chapter overviews the individual components of the Inventory Ranking Procedure, and explains why they were chosen for use in this methodology.

1.1 INVENTORY RANKING PROCEDURE STRUCTURE

The IRP is organized into the following hierarchy of components:

- **Routes.** The model has six routes: surface water-human health, surface water-environment, air-human health, air-environment, ground water-human health, and direct contact-human health. A ground water environmental route is not included because the environmental (non human) targets identified for ranking purposes would be impacted primarily by the contaminated ground water reaching either surface water or air. Impact on sensitive environments through direct contact is not managed as a route but through addition of bonus points to the appropriate site scores.

- **Modules.** Each route contains four modules or categories of data: Source Characteristics, Migration Potential, Targets, and Release.

- **Data Elements.** Each module contains a series of data elements, shown in Table 1. These data elements are the basic building blocks of the model from which route scores can be calculated.

Each data element is assigned a value. All the data element values are input into the route equations to generate route scores. The route scores are then combined to calculate site scores. The equations used to generate the route scores and site scores are described in Section 1.2.

To guide the scoring process, eight worksheets have been provided for the scorer. The worksheets also provide a place to summarize site scoring and the values for each data element. On Worksheet 1, the scorer can present a site description, note any special considerations not addressed by the model, and record the final site scores. Worksheet 2 is for the scorer to document the choices made in selecting the compounds, containment, and quantity to be used in scoring the various routes. Worksheet 3 assists the scorer in determining which compounds and substance management units to score at sites with multiple units. Worksheets 4, 5, 6, and 7 are for scoring the Surface Water, Air, Ground Water, and Direct Contact routes, respectively. On these sheets, the scorer lists information for each data element, its source, and the resulting value from the manual. The reference sources used in scoring are to be listed on Worksheet 8.

The modules included in each of the six exposure routes and the data elements within each module are described in the following sections.

1.1.1 Source Characteristics Module

The Source Characteristics Module identifies the risk characteristics of the hazardous substances present at the site: their toxicity, containment, and quantity. This module evaluates the inherent risk posed by a hazardous substance using toxicological data. It estimates the quantity of materials contaminated with hazardous substances present over an entire site, and evaluates how well those hazardous substances are contained.

1.1.1.1 Identifying Substances of Concern

To score a site, a scorer must identify the hazardous substances present at a site using the information available in the site

Table 1. Data elements contributing to each route score in the Inventory Ranking Procedure

MODULE	AIR ROUTE		SURFACE WATER ROUTE		GROUNDWATER ROUTE	DIRECT CONTACT ROUTE
	Human Health	Environmental	Human Health	Environmental	Human Health	Human Health
1. Source Characteristics	Human Toxicity	Environmental Toxicity	Human Toxicity	Environmental Toxicity	Human Toxicity	Toxicity
	Source Quantity	Source Quantity	Source Quantity	Source Quantity	Source Quantity	Source Quantity
	Containment	Containment	Containment	Containment	Containment	
2. Migration Potential	Mobility	Mobility	Surface Soil Permeability	Surface Soil Permeability	Mobility	Accessibility
			2-yr, 24-hr Rainfall	2-yr, 24-hr Rainfall	Net Precipitation	
			Flood Plain	Flood Plain	Subsurface Hydraulic Conductivity	
			Terrain Slope	Terrain Slope	Vertical Depth to Aquifer	
3. Targets	Nearest Population	Nearest Sensitive Environment	Distance to Surface Water	Distance to Surface Water	Aquifer Usage	Residences
	Population within 1/2 mile		Population Served by Intakes	Distance to Nearest Fish Resource	Distance to Nearest Drinking Water Well	Other structures or activities
	Predominant Land Use		Acres irrigated by Surface Water Intakes within 2 miles	Distance to Nearest Sensitive Environment	Population Served by Wells within 2 miles	
			Recreational Use		Area Irrigated by Wells within 2 Miles	
4. Release	Evidence	Evidence	Evidence	Evidence	Evidence	

file. Hazardous substances present at a site may be identified based on a number of information sources. Identification of hazardous substances based on direct information (such as waste analyses or environmental monitoring data) are preferred over indirect information sources. Examples of indirect sources of information are process knowledge and estimates of waste stream properties based on the industrial segment or Standard Industrial Code.

At some sites, several types of information must be used to develop an inclusive list of hazardous substances present at a site. Data sources that can be used to identify the hazardous substances present at a site include:

- **Waste analyses.** This would include data on the chemical composition of wastes present at the site as determined through chemical analyses.

- **Hazardous substance identification.** These data are wastes or substances present at the site that can be identified as hazardous substances based on the material identification via Material Safety Data Sheets or other documentation (e.g., degreasing solvent identified as trichloroethene).

- **Process knowledge or process control information.** These data are process information that identifies hazardous substances present at a site. For example, an electroplater generates a wastewater treatment sludge during wastewater treatment operations. Based on knowledge of site processes and discharge limitations for the wastewater treatment system, chromium, cadmium, zinc, and cyanide are identified as hazardous substances present in the wastewater treatment sludges.

- **Waste characterization.** This would include information based on site activities and characterization of waste streams for the industrial segment. For example, spent potliners from a specific primary aluminum production process are known to contain cyanides, polynuclear aromatic hydrocarbons and fluoride.

1.1.1.2 Identifying Substance Management Practices

In addition to determining the hazardous substances present at the site, the waste or substance management activities must be identified. Management practices to be evaluated may include:

- o Disposal
  - Landfills
  - Surface impoundments
  - Waste piles
  - Dry wells
  - Drain fields

- o Storage and/or treatment
  - Tanks
  - Containers (drums, tank trucks, and other portable storage units)
  - Surface impoundments
  - Stock piles, outdoor storage areas, waste piles

- o Spills, releases
  - Spills to soil, surface water
  - Contaminated soil, ground water, or surface water due to spillage or leakage from a source that has been removed or not identified
  - Unpermitted and unauthorized discharges to soil/ground water, surface water, or air
  - Releases or spills from process or operating areas to any environmental medium.

For each management practice identified at the site, the hazardous substances managed or present in each unit/activity should be identified. In addition, the total quantity of hazardous substances or materials containing hazardous substances present at the site should be determined or estimated as accurately as possible. The quantity estimated is identified as "source quantity" for scoring purposes. Any containment measures present are to be characterized to the extent possible, based on file information or observations made during the site assessment. Examples of containment measures to be considered are the presence and type of liners, secondary containment, and automatic volume controls.

1.1.1.3 Toxicity Data Element

Human toxicity values incorporate information on five types of toxicity-based measurements. These include (1) acute toxicity, (2) chronic toxicity, (3) carcinogenicity factors and EPA weight of evidence categories, (4) developmental and reproductive toxicity, and (5) dermal contact toxicity. Any substance used to score toxicity may have data available for none to all five of these measurements. The source of information for toxicity is the Oregon Hazardous Substance Database, which provides a single value between 1 and 14 for each chemical based on these measurements. The method by which the values are derived is shown below.

First, the toxicological properties of each chemical are specifically identified for oral, inhalation, or dermal contact

exposure pathways. These measurements are then fit into the ranges shown in Table 2 and each type of toxicity is categorized high, medium, or low. If data are not available for a substance, default values of medium are used for chronic and acute toxicity, and a default value of low is used for carcinogenicity.

Table 2. Ranges and toxicity categories for chronic, acute and carcinogenic toxicity.

CHRONIC TOXICITY

(Oral/Inhalation Reference Dose [RfD] in mg/kg-day)

Score	Reference Dose
High	$\leq 1 \times 10^{-3}$
Medium	$> 1 \times 10^{-3}$ to 1×10^{-1} or No Data
Low	$> 1 \times 10^{-1}$

ACUTE TOXICITY

(oral rat/mouse LD_{50} or LD_{Lo} in mg/kg)
OR
(Inhalation rat/mouse LC_{50} or LC_{Lo} in mg/kg)

Score	LD_{50}/LC_{50}
High	≤ 500
Medium	$> 500 - 2,500$ or No Data
Low	$> 2,500$

CARCINOGENICITY

(Oral/Inhalation Slope Factor in $[mg/kg\text{-}day]^{-1}$)

Score	Slope Factor
High	> 5
Medium	$> 0.01 - 5$
Low	≤ 0.01 or No Data

LD_{50} - Median Lethal Dose
LD_{Lo} - Lowest Lethal Dose
LC_{50} - Median Lethal Concentration
LC_{Lo} - Lowest Lethal Concentration

These three categories are then combined to provide a single initial toxicity score for each hazardous substance, as shown in Table 3.

Table 3. Toxicity scoring combinations and values for combined chronic, acute and carcinogenic toxicity.

Score Combination	Value
High High High	10
High High Med	10
High High Low	9
High Med Med	9
High Med Low	8
High Low Low	8
Med Med Med	7
Med Med Low	5
Med Low Low	3
Low Low Low	1

After the initial toxicity value is determined, additional bonus points are given to each chemical, if applicable, as shown below:

+2 points:	EPA Weight of Evidence Class A carcinogen
+1 point:	EPA Weight of Evidence Class B1 or B2 carcinogen
-1 point:	Evidence of non-carcinogenicity
+2 points:	Human developmental and reproductive toxicant (Surface Water, Air, and Ground Water Pathways)
+1 point:	Human developmental and reproductive toxicant (Direct Contact Pathway)
+1 point:	Chemicals likely to be absorbed via the skin as defined in ACGIH (See References) (Direct Contact Pathway)

Thus, the maximum value for any one chemical is 14 points. The scorer assigns an additional bonus point if three or more chemicals at a site have toxicity values of $\geq$ 10. The maximum toxicity score for any site is 15.

Environmental toxicity values for air and water (inhalation and ingestion measures of toxicity) are assigned as described in the scoring instructions for each route. For a measure of environmental toxicity in the air route, the model uses non-human mammalian acute inhalation LC_{Lo} and LC_{50} data.

In the surface water environmental route, acute water quality criteria for protection of aquatic life are used. Where standards for protection of aquatic life are not available, acute oral LD_{50} data are also used to determine a value for environmental toxicity. Both environmental toxicity measures have been assigned a default value of 10 if no toxicity data are available.

1.1.1.4 Containment Data Element

In the containment data element the methods by which hazardous substances are contained or managed on the site are evaluated. The surface water, air, and ground water pathway containment data elements include review of the following:

- Landfills
- Surface Impoundments
- Above-Ground Containers and Tanks
- Waste Piles
- Spills, Discharges, and Contaminated Soil

The scorer scores containment conditions as they exist at the time the Preliminary Assessment (or equivalent) is conducted, taking into account any actions which have occurred to mitigate releases from the site. In this way, a realistic assessment is made of the potential for substances to continue to migrate from the site.

The scoring instructions for each route question the scorer regarding each of these components, to create a value for containment data. The instructions address situations where containment is unknown for a given container or substance management unit type. For instance, it may be unknown if there is a liner for a landfill. Any unusual situations, such as dry wells and septic drainfield discharges, are also addressed.

The containment data element in the air route can rank potential migration of substances in both gaseous and particulate states. The scorer may assign a value to containment based on either gaseous or particulate transport potential, as determined by the substances identified in the Source Characteristics module of the route.

If multiple waste management units at a site contain wastes with different toxicity and mobility values, Worksheet 3 is used to determine the highest scoring combination of toxicity and containment values for scoring the surface water, air, and ground water routes. Within each route score, toxicity and containment values are multiplied in the Source Characteristics Module, and then multiplied by mobility in the Migration Module. Toxicity, mobility, and containment value combinations must be compared using Worksheet 3 under the following conditions:

- Multiple units or management practices are present at a site, with different hazardous substances managed in each; and

- The unit with the poorest containment (for the route under consideration) does not contain the substance with the highest toxicity/mobility value among those present at the site.

If the conditions are met, the selection of the waste management units or management practices to be used for scoring containment is a three-step process. First, the substances to evaluate for each unit are identified. Second, for the air and ground water routes the toxicity value is multiplied with the mobility value to obtain the toxicity/mobility product. For the surface water routes the toxicity value is simply obtained from the Hazardous Substance Database as mobility is not a data element in the routes. Third, the toxicity/mobility product or the toxicity value is multiplied by the containment value to obtain the toxicity/containment product. The substance with the highest toxicity/containment product is chosen for each route and is used to score containment.

Containment is not included as a data element in the direct contact-human health route. That route is scored only if hazardous substances are available on site for direct contact through soil ingestion or skin contact. If they are not, the score is zero for the direct contact route. Thus, containment is addressed before the assignment of values to data elements.

1.1.1.5 Source Quantity Data Element

Quantity calculations are dependent on the route being evaluated. The total source quantity for each route is determined by reading through the site file, determining how substances are contained in management units/activities on the site, and assigning a value based on the total quantity of materials contaminated with hazardous substances, not on each of its constituents as measured.

The scorer uses professional judgment to estimate the total quantity of materials on-site contaminated with hazardous substances. Typically, Preliminary Assessment data cannot support calculations involving estimation of the quantity of specific hazardous substances in complex mixtures. Thus, if a tank of petroleum is spilled on the ground, the total volume of petroleum in the tank is counted, rather than the quantity of benzene, toluene, xylene, and lead present. If different types of waste are present at a site, they are combined using the equivalent tables provided (see Tables 5, 20, and 32). For example, gallons of one type of waste can be combined with cubic yards of another type of waste by converting to a common unit of measurement. The scorer determines the source quantity value based on the estimate of the total quantity of materials.

Estimates of quantity, in the case of spilled substances, should be based on the quantity spilled, not the total volume of contaminated soil. Where there is no information to support an estimate of quantities spilled, the scorer assigns values based on the quantity of contaminated soil known or estimated to be present at the site, using a value-assignment table developed for this purpose and presented in the scoring description for each pathway (See Tables 6, 21, and 33).

Where little or no information on source quantity is available in the site file, the scorer makes a best estimate of source quantity, records the basis for that judgement on the scoring sheet, and uses the estimate for scoring. The scorer may select a default value of 3 (indicating that hazardous substances were known to be present, but in unknown volumes). This would reflect a maximum waste volume of 500 gallons or 5 cubic yards, a quantity known to be exceeded in many cases where a total waste quantity still cannot be determined.

1.1.2 Migration Module

The Migration Module is used to evaluate a hazardous substance's potential to migrate from its source. The parameters evaluated include substance mobility and various environmental parameters specific to each route. (See Table 1 for a list of the data elements of the migration module for each route.) The direct contact-human health route uses accessibility to the site as a substitute for migration potential.

Mobility is the inherent chemical/physical characteristics of a hazardous substance that governs its tendency to move into and through environmental media. Mobility is evaluated in the air route using substance volatility or the potential for particulate mobilization. In the ground water route, solubility and the coefficient of aqueous migration are used as measures of substance mobility.

For mobility in the air and the ground water routes the scorer determines substance mobility by multiplying the mobility value with the toxicity value for each substance. The mobility of the substance with the highest combination score for toxicity and mobility is to be used in scoring. For example:

Substance	Toxicity	Mobility	Combination
PCB	12	1	12
Toluene	1	4	4
Perchloroethene	8	4	32

In this example, the scorer would enter 4 on the worksheet for mobility.

The environmental parameters used to evaluate migration are route-specific. In surface water, the runoff potential is evaluated using rainfall, soil type, and terrain slope as indicators. In the ground water route, the hydraulic conductivity of the material in the vadose zone, net annual precipitation, and the depth to ground water are considered. Environmental parameters are not evaluated in the air route.

1.1.2.1 Air Route Migration Data Element

Substance mobility is the only migration parameter evaluated in the air route. For mobility, the scorer must first determine whether transport of a substance is more likely to occur as a particulate or a gaseous substance. For particulates, the mobility value is based on the type of soil and on a climatic factor that reflects average soil moisture values. Together, these determine the erodibility of the matrix containing the substance. If gaseous transport is the primary method of mobilizing a substance, mobility is based on a measure of volatility of the substance. The instructions describe when to use the vapor pressure of a substance or Henry's Law Constant as a measure of the mobility of a gaseous substance in air. The scorer uses the mobility value for the substance that yields the highest score for toxicity and mobility as described in Section 1.1.2.

1.1.2.2 Surface Water Migration Data Elements

Substance mobility is not evaluated in the surface water route. The migration module for the surface water route contains the following data elements:

- Surface soil permeability
- Maximum 2-year, 24-hour precipitation event
- Flood plain
- Terrain slope.

Surface soil permeability was chosen, in combination with the terrain slope and rainfall data, to demonstrate the tendency of a substance to infiltrate site soils or to run off into nearby surface water. Because the surface soil permeability is based on soil types, data should come from on-site soil samples or from Soil Conservation Service Soil Surveys for the state.

Two-year, 24-hour precipitation event data are available from National Weather Service publications for the State of Oregon. The precipitation data are determined from the isopleth map provided in the scoring instructions for the surface water pathway.

Flood plain information for the state of Oregon is available from the Flood Insurance Rate Maps. Most communities or counties in the state participate in the federal flood insurance program and, as such, must provide maps showing the areas within the community subject to 100 or 500-year floods. For some communities, more detailed information is available. However, because 100 and 500-year data were available for all areas of the state, these values were chosen for use in the model.

Instructions are given in the model for calculating the slope between the site and the nearest downslope surface water. Slope and the other data elements in the migration module provide a measure of how quickly a substance would be likely to reach surface water.

1.1.2.3 Ground Water Migration Data Elements

The Migration Module for the ground water route includes the following data elements:

- Mobility
- Net precipitation
- Subsurface hydraulic conductivity
- Vertical depth to the aquifer.

In the ground water route, substance mobility is determined separately for dissolved inorganic species (cations and anions), and for organic substances. Cations and anions are assigned mobility values based on their coefficient of aqueous migration. The index of values is based on the expected geochemical behavior of these cations and anions under moderately anaerobic and slightly acidic to slightly alkaline conditions. The mobility of all other compounds (including organics) depends on their solubility in water. These mobility values reflect broad classes of expected mobility in ground water systems. As in the air route, the scorer uses the mobility value that yields the highest combination score for both toxicity and mobility.

Net precipitation measures how effectively a substance may be driven into the ground water based on infiltration rates from precipitation alone. Annual net precipitation is used for this data element. The precipitation value is calculated by summing the net monthly precipitation values, using monthly total precipitation and evapotranspiration values averaged over a 30-year period. Where monthly net precipitation is less than zero, zero is added for that month for net precipitation. Monthly values were chosen for the model because they account for areas where evaporation exceeds precipitation for at least six months of the year, but where precipitation may cause contaminant migration in the winter. These data are available from National Weather Service and Oregon State University publications for the State of Oregon. Data sources for this element are Climatology of the United States No. 81 (By State) and Cuenca, H. et al., Consumptive Use and Net Irrigation Requirements for Oregon.

Subsurface hydraulic conductivity measures the ease with which a substance travels between the land surface and the water table. It is based on the geologic materials which underlie the site. In combination with net precipitation values, this element describes the potential for subsurface migration through site soils. Subsurface hydraulic conductivity data are found in site files and

in Oregon State and U.S. Geological Survey water resources and geologic reports.

The vertical depth to ground water also affects how quickly a substance might reach the water table, based solely on the distance a substance must travel. The distance is not measured automatically from the ground surface. Instead, vertical depth is measured from the bottom of the waste management unit, or the greatest depth of soil contamination known for a site. For those sites with verifiable releases to ground water, the distance is automatically 0 feet to maximize the value for this element.

1.1.2.4 Direct Contact Migration Data Element

In the direct contact-human health route accessibility is used as a substitute for migration potential. Accessibility is the potential for humans to move to the site and contact hazardous substances. Three levels of accessibility are considered.

The first category is no access control. The whole site or portions of the site are uncontrolled, permitting easy access. Incidental contact with hazardous substances is much more likely than for sites that would fall into the second and third categories.

The second category of accessibility addresses sites with fencing around the contaminated area. Access to the site involves a conscious decision to disregard the effort to control access to the site.

The third category of accessibility addresses sites with fencing and 24-hour security. Access to such a site is unlikely. In addition, if the fencing is breached, the amount of time spent at the site would be limited due to the 24-hour security.

1.1.3 Targets Module

The targets module for each route evaluates the potential for human and environmental receptors to be impacted by migration of hazardous substances from a contaminated site. In the case of the direct contact route, it evaluates the potential for humans to contact hazardous substances at the site.

1.1.3.1 Air Target Data Elements

The targets chosen for inclusion in the air route are those human and environmental targets directly affected by release of airborne gases or particulates from hazardous substance sites. Targets include the nearest and total population, predominant land use, and sensitive environments within 0.5 mile of the site.

Information regarding the nearest population may be obtained either from the site file, or from a USGS topographic map. Total

population within 0.5 mile may be obtained by counting buildings on the USGS map within 0.5 mile of the site, or by using the most recent Federal Census data. In some cases, the local city or county planning department or town clerk may be the best source of this information. This information usually supplies data on resident populations.

Predominant land use is a measure of the transient or worker population density, and type of uses near the site. This data element takes into account 8-hour exposures, where residential exposures are typically considered to be 24-hour exposures. It is designed to distinguish predominantly industrial or commercial areas.

Sensitive environments are listed in the model as federal and state designated natural areas; county or municipal parks; and wetlands; and critical habitats for endangered species. Sensitive environment information may be obtained from the Bureau of Land Management (BLM) Areas of Critical Environmental Concern, U. S. Fish and Wildlife Service (FWS) Coastal Ecological Inventory, FWS Wetlands Inventory, topographic maps, and road maps. If investigation of these sources does not identify a sensitive environment present within 0.5 mile of the site, information regarding the use of an area by any state endangered species can be obtained directly from the Oregon Department of Fish and Wildlife.

1.1.3.2 Surface Water Target Data Elements

The targets chosen for the surface water route include:

- Distance to the nearest surface water body
- Population served by surface water drinking water sources
- Acres irrigated by surface water intakes
- Fishery resources
- Sensitive environments
- Recreational use.

Distance to surface water data element indicates the proximity of contamination to surface water that, if contaminated, may result in exposures to both human and environmental receptors.

The population served by drinking water sources within 2 miles is designed to protect human health. The scorer must include all sources within 2 miles of lakes, and those within 2 miles downstream of the site for rivers and streams. The location of public and private supplies for which water rights have been filed is available from the Oregon Water Rights Information System (OWRIS) database. The population served for public water supplies is available from the Oregon Health Division Drinking Water System Section.

The acreage irrigated by surface water sources is designed to take into account the possible contamination of human or livestock food crops by hazardous substances. The acreage irrigated is available from the OWRIS database.

Fishery resources within 2 miles of the site are counted as areas vital for the spawning, feeding or migration of fish and shellfish. In Oregon, fishery resources are scored if the water body is suitable for anadromous fish (salt-and-fresh water species) or has high resource value for resident fish. This information is available from the Oregon Rivers database.

Sensitive environments other than fishery resources are discussed in Section 1.1.3.1.

Recreational use of the surface water body closest to the site is designed to address the potential for exposure through direct contact due to recreational activities such as boating and swimming. Data on recreational use is available from the Oregon Rivers database.

1.1.3.3 Ground Water Target Data Elements

Like the other routes, the ground water route targets are designed to take into account human targets affected by the release of hazardous substances into the environment. The ground water route does not address environmental targets. Targets for this route include:

- Distance to the nearest drinking water well
- Ground water usage types
- Total population served by wells in the section and adjacent sections
- Acreage irrigated by wells in the section and adjacent sections.

Sources of information for well locations and population served, and irrigation acreage are the same as for surface water (Oregon Health Division, Drinking Water Section, and OWRIS databases). In addition, private well log information is filed with the Oregon Water Resources Department. The ground water usage designation includes seven choices, ranging from federal sole source aquifer designation to ground water not usable due to naturally occurring substances which render it unusable.

1.1.3.4 Direct Contact Target Data Elements

The direct contact-human health route considers two targets:

- Residences on the site or on adjacent properties
- Other structures or activities on the site or on

adjacent properties that indicate the potential for the presence of sensitive populations.

The proximity of residences to the site is used in the model to address the potential for direct contact of humans, and children in particular, with hazardous waste or hazardous substances present at a site.

The other category of targets is also used to address the potential for direct contact primarily with sensitive populations such as children. The list of other structures and activities includes such structures as playgrounds, schools, and day care facilities, and locations such as parks.

The only data element included in the model to address direct contact for sensitive environments is the location of the site directly in a sensitive environment. The list of sensitive environments is the same as that for the surface water and air routes and also includes fisheries.

1.1.4 Release Module

The release module for each route has been designed to add points to a route score when a verified release has occurred. Route scoring instructions provide specific rules to determine whether releases have occurred for each route. In the air route, evidence must include direct visual evidence of particulate or gaseous releases, analytical evidence, or detectable odors which may be quantified by analytical evidence.

In the surface water route, visual or analytical evidence must be available. Visual evidence may include documentation of overland flow or the observance of a discolored plume from an identifiable source entering the surface water. Releases from outfalls are only included where the discharge is not permitted by and is not in substantial compliance with a U.S. Environmental Protection Agency or Department permit program.

In the ground water route, evidence of release can include evidence of direct dumping, such as an injection or dry well, the presence of the bottom of a waste management unit below the water table (i.e., the bottom of an impoundment containing hazardous substances in the water table), or analytical evidence from ground water monitoring wells.

In all three routes, analytical evidence must demonstrate that the concentration of the hazardous substance measured is at least three times expected or measured background if natural background concentrations are expected to be present in the environment, such as for metals.

1.2 INVENTORY RANKING PROCEDURE EQUATIONS AND SCORES

Six route scores are calculated by the IRP. From the six route scores, three site scores are generated: human health, environmental, and overall site score.

The six route scores are generated by entering data element values into the route score equation. The route score equation weights the Source Characteristics Module and the summation of the remaining three modules equally. The equation is normalized to generate a maximum score of 100 points for each route score. The route scores are described further below.

The three site scores are generated by combining the appropriate route scores as described (see Section 1.1.2) and adding bonus points for the direct contact-environment route when appropriate. The maximum score for each site score is normalized to 100.

1.2.1 Route Scores

Each route score is calculated using an equation which combines data element values. The scoring equations used to generate the route scores are presented in Table 4.

1.2.1.1 Source Characteristics Module

Surface Water, Air and Ground Water Pathways

In the Source Characteristics Module for the surface water, air, and ground water pathways, the toxicity and containment data element values are multiplied. The product of these values is added to the value for source quantity to generate the Source Characteristics module score. Because containment and toxicity values are multiplied, the Source Characteristics Module score is proportional to both data elements. Therefore, well-contained substances will generate relatively low module scores, even with significant toxicity values. Moderately or poorly contained substances will generate higher module scores for a given toxicity value, with the highest scores due to poorly contained, high toxicity substances.

The source quantity value is added to the product of containment and toxicity to elevate the module score of sites that have greater quantities of hazardous substances than do sites with similar conditions but lesser quantities of contaminants. This reflects the lower degree of reliability often associated with contaminant quantity determinations for sites. Risk may be more influenced by exposure factors not included in the model than the total quantity of hazardous substance(s) present at a site.

The resulting Source Characteristics Module score is multiplied by 50/165 to normalize the module's score from 0 to 50.

Table 4. Route equations for Inventory ranking with weighting and normalization factors.

Air Route - Human Targets

$AIR_H = [(SOU_{AH} \cdot 50/165 \cdot ((MIG_{AH} + TAR_{AH} + REL_{AH}) \cdot 50/50)] / 25$

where,

AIR_H = Route Score for Air-Human Health

SOU_{AH} = (Human Toxicity . Containment) + Source Quantity

MIG_{AH} = Mobility

TAR_{AH} = Distance to Nearest Population + Population within one-half mile + Predominant Land Use

REL_{AH} = Release to Air

Air Route - Environmental Targets

$AIR_E = [(SOU_{AE} \cdot 50/165) \cdot ((MIG_{AE} + TAR_{AE} + TAR_{AE} + REL_{AE}) \cdot 50/25)] / 25$

where,

AIR_E = Route Score for Air-Environmental

SOU_{AE} = (Env. Toxicity . Containment) + Source Quantity

MIG_{AE} = Mobility

TAR_{AE} = Distance to Nearest Sensitive Environment

REL_{AE} = Release to Air

Surface Water Route - Human Targets

$SW_H = [(SOU_{SH} \cdot 50/165) \cdot ((MIG_{SH} + TAR_{SH} + REL_{SH}) 50/64)] / 25$

where,

SW_H = Route Score for Surface Water-Human Health

SOU_{SH} = (Human Toxicity . Containment) + Source Quantity

MIG_{SH} = Soil Permeability + Rainfall Frequency + Floodplain + Slope

TAR_{SH} = Distance to Surface Water + Population Served by Surface Water + Acreage Irrigated + Recreational Use

REL_{SH} = Release to the Surface Water

Table 4. Route equations for Inventory ranking with weighting and normalization factors (Continued).

Surface Water Route - Environmental Targets

$$SW_E = [(SOU_{SE} \cdot 50/165) \cdot ((MIG_{SE} + TAR_{SE} + REL_{SE}) \cdot 50/64] / 25$$

where,

SW_E = Route Score for Surface Water-Environmental

SOU_{SE} = (Env. Toxicity . Containment) + Source Quantity

MIG_{SE} = Soil Permeability + Rainfall Frequency + Floodplain + Slope

TAR_{SE} = Distance to Surface Water + Distance to Fishery Resource + Distance to Sensitive Environment

REL_{SE} = Release to Surface Water

Ground Water Route - Human Targets

$$GWH = [(SOU_{GH} \cdot 50/165) \cdot ((MIG_{GH} + TAR_{GH} + REL_{GH}) \cdot 50/67)] / 25$$

where,

GW_H = Route Score for Ground Water-Human Health

SOU_{GH} = (Human Toxicity . Containment) + Source Quantity

MIG_{GH} = Mobility + Depth to Aquifer + Net Precipitation + Hydraulic Conductivity

TAR_{GH} = Aquifer Use + Well Distance + Population Served + Acreage Irrigated

REL_{GH} = Release to the Ground Water

Direct Contact Route - Human Targets

$$DC_H = [(SOU_{DH} \cdot 50/30) \cdot ((MIG_{DH} + TAR_{DH}) \cdot 50/30)] / 25$$

where,

DC_H = Route Score for Direct Contact - Human Health

SOU_{DH} = Toxicity + Source Quantity

MIG_{DH} = Accessibility

TAR_{DH} = Residences + Other Structures or Activities

Direct Contact Pathway

The direct contact-human health route Source Characteristics Module is managed in the same manner as for the surface water, air, and ground water routes except that toxicity is not multiplied by containment. Containment is not a data element in the route but is considered before scoring the direct contact route. The route receives a zero if the hazardous substances are not at ground surface or in surface water and thereby unavailable for direct contact.

The resulting Source Characteristics Module score in the direct contact route is multiplied by 50/30 to normalize the module's score from 0 to 50.

1.2.1.2 Migration Potential, Targets and Release Modules

The data elements in the Migration, Target, and Release Modules are added to produce a score for all three modules. The resulting score is multiplied by 50 and divided by the maximum score for each route to normalize the summation of the three modules from 0 to 50.

1.2.1.3 Route Score

The score for the Migration, Targets, and Release Modules is then multiplied by the Source Characteristics Module score to generate the route score. This equation generates a high route score only when the scores for all four modules are high. Intermediate scores are generated only when both the Source Characteristics Module score and the sum of the Migration and Targets Module scores are above the lower part of their possible ranges. A site with a low Source Characteristics Module score or low migration and targets, or available receptors, will have a low score.

Each route score generated by this process is divided by 25 to normalize the possible route scores to zero to 100.

1.2.2 Site Scores

Three site scores are generated by the procedure: a human health score, an environmental score, and an overall site score.

The human health score is calculated by taking the maximum human health score of the surface water, air or ground water routes, and adding it to the average of the other three route scores:

$$\text{Human Health Score} = [\text{Max. Human Health Score} + (\Sigma \text{ Other Route Scores}/3)]/2$$

The Environmental Score is produced by adding the two environmental route scores then adding 10 points if the site is located directly in a sensitive environment:

Environmental Score = (Air Route Score + Surface Water Route Score + Direct Contact Bonus Points)/2.1

For both the human health and environmental scores the equation is divided by the appropriate number to normalize the scores to 0 to 100.

The overall site score is obtained by taking the maximum route score, adding to it the average of the other five routes, and adding 10 bonus points if the site is located directly in a sensitive environment. The maximum route score can be any of the routes. Thus:

$$\text{Overall Site Score} = [\text{Maximum Route Score} + \Sigma \text{ Other Routes}/5)]/2.1$$

This Overall Site Score is then used to determine the site rank.

1.3 IMPLEMENTATION

During the site scoring, scorers may be required to use some sources of information other than those specified here. The scorer will also be required to exercise professional judgment when assigning values for certain data elements in the model. Spaces are provided on the worksheets for additional documentation for these areas.

In addition, the scorer may be aware of special site conditions indicating that the relative risk of contamination is not accurately represented by the route score(s). In such cases, the special characteristics and potential under- or over-representation of site risks should be described on the general information worksheet in the Special Considerations Section. Examples of this type of special consideration include direct contact exposure not addressed in the model, sites with large waste volumes, and sites where the population potentially affected by the contamination is very large.

2. SURFACE WATER ROUTES

2.1 SOURCE CHARACTERISTICS

The initial step in scoring the surface water routes is to review the site files and identify the waste management units of concern and the hazardous substances present. On Worksheet 2, list the management units and up to six hazardous substances chosen as representative of compounds of concern for the surface water routes. Score the two surface water routes using this information. Do not include in the evaluation management units that are permitted and in substantial compliance with the permit or that are otherwise authorized by statute or regulation.

2.1.1 Source Quantity

Deriving Source Quantity

Estimate the total quantity of materials contaminated with hazardous substances. Do not try to calculate the quantity of a specific substance within a complex mixture.

For tanks or impoundments periodically filled and emptied, calculate the volumes based on usage or on the once filled volume of the unit. Volumes will depend on the kind of information available in the site file.

If no information is available regarding waste quantity, use professional judgement to estimate a minimum quantity, and document the reasoning for the choice of value on Worksheet 4. Assign values for source quantity as shown in Table 5. For quantity determinations based on contaminated soils, refer to the following discussion and Table 6. If no quantity can be determined, enter a default value of 3 on Worksheet 4.

Use the following assumptions: 1.5 tons = 1 cubic yard = 4 drums = 200 gallons

Table 5. Surface water route source quantity values.

Gallons	Cubic Yards	Tons	Drums	Value
1-500	1-5	0-2	1-10	3
501-5,000	6-25	2.1-20	11-100	6
5,001-125,000	26-625	21-200	101-2,500	9
125,001-3.0 mil	626-15,600	201-1,000	2,501-10,000	12
>3.0 mil	>15,600	>1,000	>10,000	15

Quantity Determinations for Contaminated Soils

The following instructions are to be used when the source quantity is based on the amount of contaminated soil present at a site.

Where hazardous substances have been spilled, discharged, or dumped, and the quantity is known or can be estimated, assign a value based on the quantity of the substance discharged that resulted in soil contamination.

If the quantity of material causing soil contamination cannot be determined or estimated from existing information on the site, the source quantity value assignment should be made based on Table 6. If the area of contaminated soil at the site is not in the existing site information, estimate the area. This estimation should be made using the professional judgement of the scorer.

Factors that should be considered in estimating the area of contaminated soil include:

- Areal extent of indication of contamination (such as discolored soil or stressed vegetation)
- Practice that resulted in soil contamination and distribution of site features (e.g., drums emptied onto the ground would probably have occurred in an open area with ease of access rather than areas with physical barriers or covering vegetation such as woods or overgrowth)
- Extent of contamination inferred from sampling performed at the site.

Table 6. Source quantity scores based on areal extent of surface soil contamination.

Area in square feet	Area in acres	Value
≤ 5,000 or unknown	< 0.1	3
> 5,000 - 20,000	> 0.1 - 0.5	6
> 20,000 - 400,000	> 0.5 - 10	9
> 400,000 - 650,000	> 10 - 15	12
> 650,000	> 15	15

To combine contaminated soil with other on-site waste quantities, calculate a volume of contaminated soil using site information. If the depth of contamination is unknown, assume a depth of 0.5 ft. If the depth is more than 0.5 feet, a 0.5 foot depth is to be used regardless of the depth of contamination. It is assumed that

only the top 0.5 feet is available for surface runoff. Convert all the waste quantities to cubic yards and add the cubic yards together to obtain a measurement of source quantity. Use Table 5 to determine the value to record on Worksheet 4.

2.1.2 Containment

Containment values should be determined using the criteria shown in Table 7. Record the value on Worksheet 4.

Table 7. Surface water containment values.

	Value
A. Landfills	
Identify the type of run-on/runoff control systems present:	
Engineered, maintained run-on/runoff control system or engineered/maintained cover	0
Unmaintained run-on/runoff control system or cover	5
No run-on/runoff control or no cover	10

B. Surface Impoundments

Containment values for surface impoundments are based on two aspects of unit conditions: dike integrity and freeboard. Use the following definitions and matrix on the following page to assign containment scores.

1. Definitions

Dike Integrity

Regularly Inspected and Maintained - actions taken at the site to assure dike integrity, including inspection and repair of any weaknesses or potential problems, such as erosion, slumping, or other failure of dike materials.

Unmaintained, Apparently Sound - regular inspection and maintenance activities do not occur, but there are no indications of dike failure, such as erosion or slumping of dike materials or seepage.

Unsound - evidence of dike failure exists; erosion, or slumping of dike materials or release of contents due to seepage or breaching of the dike.

Freeboard

Automatic Freeboard Maintained - automatic level control devices are present to assure at least 2 feet of freeboard are maintained in the unit.

Manual Freeboard Maintained - flow is manually controlled to the unit to assure that at least 2 feet of freeboard is maintained in the unit.

Insufficient Freeboard - less than 2 feet of freeboard maintained in the unit. Evidence of insufficient freeboard may include overtopping due to overfilling or wave action, observed freeboard, observed stains on dikes marking past fluid levels in the impoundment.

	Dike Condition		
Freeboard	Inspected Maintained	Apparently Sound	Unsound
Automatically Maintained	0	2	8
Manually Maintained	2	4	8
Insufficient	6	8	10

C. Drums and Small Containers

Value

Add component scores for the following two questions to obtain a value for containment.

1. What type of secondary containment system is present?

Secondary containment with capacity for total volume of containers	0
Secondary containment with capacity for at least 110% of volume of the largest container	2
No secondary containment, or secondary containment for < 110% of volume of the largest container	5

2. How are containers managed?

	Value
Containers stored in single or double layers on pallets or in racks	0
Containers in multiple layers, unstable stacks	2
Containers open, leaking, or over-turned	5

D. Storage Tanks

Add component scores for the following two questions to obtain a value for containment.

1. What type of secondary containment system is present?

Secondary containment with capacity for 110% of total volume of tanks	0
Secondary containment with capacity for at least 50% of volume of all tanks	2
No secondary containment, or secondary containment for < 50% of volume of tanks	5

2. How are tanks managed?

Tanks maintained with automatic level controls	0
Tanks maintained without automatic level controls	2
Tanks are unmaintained (evidence may include overfilling, corrosion, tank failure or failure of ancillary equipment such as pipes and pumps)	5

E. Waste Piles

Identify the type of run-on/runoff control system present:

Maintained, engineered run-on/runoff control or waste pile is located in an enclosed structure	0
Run-on/runoff control present, but in unknown condition; waste pile located outside	4

	No run-on/runoff control; waste pile located outside	10

F.	Spills, Discharges, and Contaminated Soil	Value
	Containment values for spills, discharges or contaminated soil are based on the presence of surface contamination at a site and run-on/ runoff controls for contaminated areas.	
	(**Note:** Dry wells, drain fields, or leaking underground storage tanks are to be scored as surface contamination if spills/discharges have seeped to the surface. If contaminated soil has been excavated or disturbed and stored above grade, score the contamination as a waste pile.)	
	Spill, discharge, or contaminated soil occurs only in the subsurface at the site (including dry wells; drain fields; leaking underground storage tanks; or contaminated soil that has been covered by clean soil, asphalt, or a plastic cap, or partially excavated and filled with clean soil)	0
	Spill, discharge, or contaminated soil is present at the surface in an area with maintained run-on/runoff controls. (Note: storm drains that discharge to surface water without treatment are <u>not</u> runoff controls)	2
	Spill, discharge, or contaminated soil at the surface with unmaintained run-on/runoff control	4
	Spill, discharge, or contaminated soil at the surface with no run-on/runoff controls or unknown controls in a location where the surface slope prevents off-site migration.	5
	Spill, discharge, or contaminated soil at the surface with no run-on/runoff control or unknown controls at location where surface slope allows off-site migration.	10

2.1.3 Human Toxicity

Components of the human toxicity route for surface water include acute and chronic oral toxicity, oral carcinogenic potency factors and weight of evidence, and human developmental and reproductive toxicity for ingestion. On Worksheet 4, list the hazardous

substances chosen as representative of problems at the site for the surface water route. Obtain the oral toxicity value from the Oregon Hazardous Substance Database for each contaminant (a maximum of 14 points is possible for any one contaminant). For oral toxicity, choose the chemical with the highest value for the site (use this chemical also to determine containment). If three or more contaminants have values $\geq$ 10, add one additional bonus point to the total toxicity score for the site. The maximum possible toxicity score is 15. For a description of how the toxicity value for each contaminant is determined, see Section 1.1.1.3.

2.1.4 Environmental Toxicity

Environmental toxicity for the surface water route is based on the Clean Water Act Criteria for Protection of Aquatic Life. Because acute criteria are more often available than chronic criteria, use only the acute criteria. From the Oregon Hazardous Substance Database, obtain the water quality criteria concentration for acute toxicity for each substance chosen as being of concern through the surface water route. Use Table 8 to determine the environmental toxicity value for the substances. Enter the value of the substance with the lowest acute criteria on Worksheet 4. If no criteria have been promulgated for a substance, obtain the LD_{50} from the Oregon Hazardous Substance Database, then select a value for the LD_{50} from Table 8 to enter on Worksheet 4. If neither of these methods yields a value, enter a default value of 10.

Table 8. Surface water route environmental toxicity values.

Toxicity	Acute Standard for Protection of Aquatic Life (µg/l)	Acute Oral LD_{50} or LD_{Lo} (mg/kg-bw)	Value
Very High	$\leq$ 1.0	$\leq$ 50	15
High	> 1.0 to 10	> 50 to 100	12
Medium	> 10 to 10^2	> 100 to 1,000	9
Low	> 10^2 to 10^3	> 1,000 to 5,000	6
Very Low	> 10^3	> 5,000	3

2.2 MIGRATION POTENTIAL

2.2.1 Surface Soil Permebility

This is a measure of the tendency of a liquid (usually water) to permeate the soil. Obtain values for this data element from

Table 9. Soil types should correspond to surface soil information as observed on the site or to Soil Conservation Service soil types. If a site is completely paved, the route of runoff should be determined and soils between the site and surface water used to determine the value. If a paved site is directly adjacent to the surface water or run-off from the site enters a storm drain that discharges to surface water, the maximum value (7) should be used. If a site is partially paved, has culverts, or soil types vary, determine the most likely route to surface water and use the soil type most prevalent over that route. Record the value on Worksheet 4.

Table 9. Surface soil permeability values.

Soil Type	Permeability	Value
Sand, gravel, sandy gravel, well-graded sand, well-graded gravel, gravelly sand, gravelly sand loam, sandy loam, silty sandy loam	High	1
Poorly-graded sands with fines, silt-sand mixtures, loam, silt loam, sandy silt loam, clayey sand, clay sand loam	Medium	3
Clayey sands, sand-clay mixtures, clayey gravels, clay-sand-gravel mixtures, inorganic silts, clayey silt loam, silty clay loam, porous rock outcrop, sandy silty clay, sandy clay, sandy clay loam	Low	5
Clay (organic and inorganic), clay loam, rock outcrop, peat, peaty clay	Very low	7

2.2.2. Maximum 2-Year, 24-Hour Precipitation Event

Determine this value from Table 10, after reading a measurement from Figure 1 (NOAA Atlas 2, Volume IX, "Isopluvials of 2-yr, 24-hr Precipitation in Tenths of an Inch", U.S. Dept. of Commerce). Record the value on Worksheet 4.

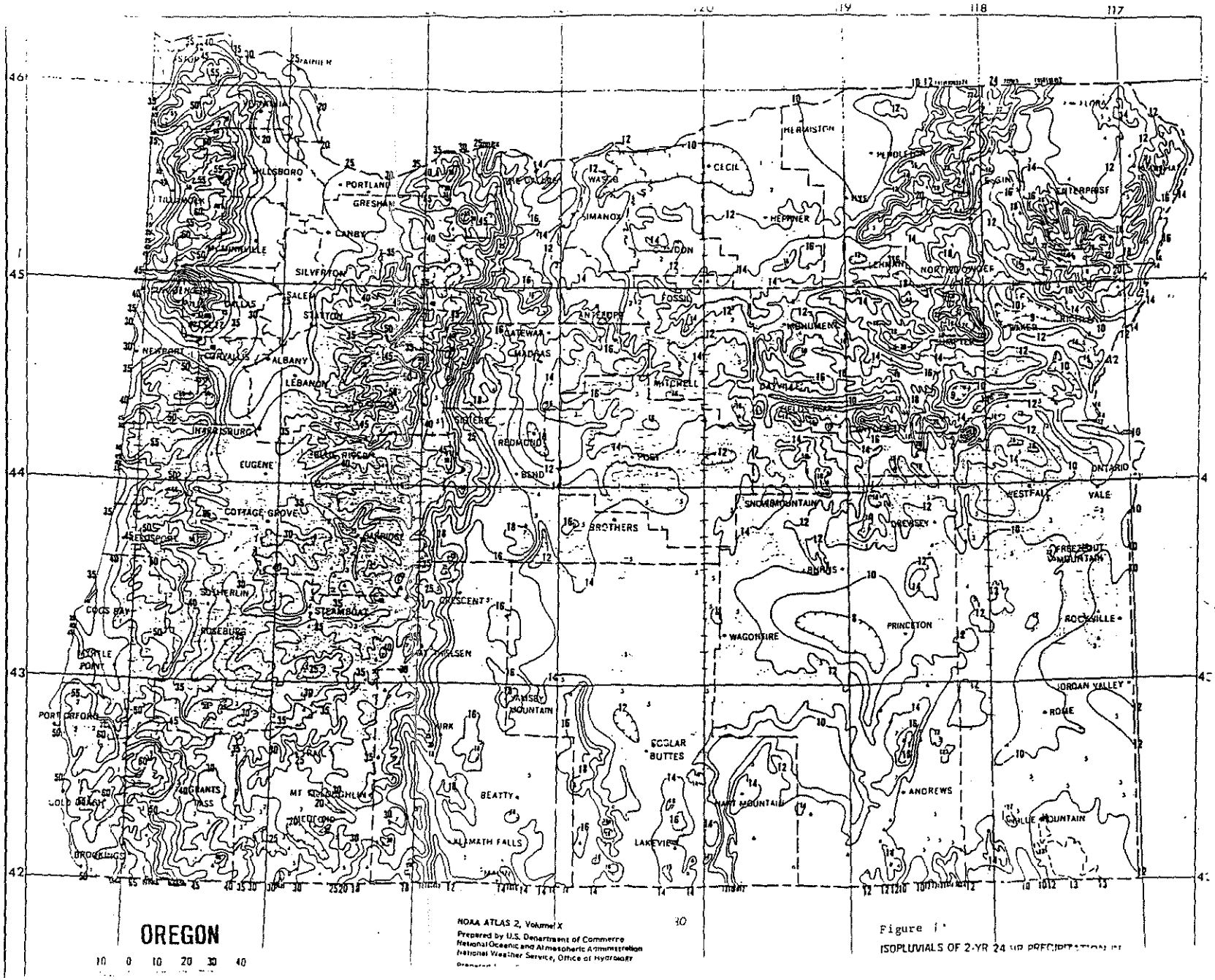

Figure 1.

ISOPLUVIALS OF 2-YR 24 HR PRECIPITATION IN

-30

Table 10. Maximum 2-year, 24-hour precipitation event values.

Precipitation (inches)	Value
≤ 1	1
> 1 - 2	2
> 2 - 3.5	3
> 3.5 - 5	4
> 5	5

2.2.3 Flood Plain

Determine whether the site is in a flood plain as designated by Flood Insurance Rate Maps for the area. The value should be determined from Table 11, and recorded on Worksheet 4.

Table 11. Flood plain values.

Classification	Value
Not in flood plain	0
In 500 yr flood plain	1
In 100 yr flood plain	2

2.2.4 Terrain Slope

To assign the value for terrain slope, the slope must be determined from a topographic map. The slope between the site and the nearest downgradient body of surface water is then used to determine the value. Surface water may be defined as any natural permanent or ephemeral (seasonal) body of water, including man-made tributaries (storm ditches) to those waters. Man made lakes, irrigation canals or ditches are considered surface waters if they connect with a natural surface water body. If more than one surface water body is present, use the one for which the shortest distance can be calculated. If surface water discharge is to a storm drain, assign a value of 3 for terrain slope. Record the value on Worksheet 4. If a topographic map is used to calculate terrain slope, use the following approach:

The slope of the terrain between the site and the nearest downgradient body of surface water is determined by the following steps:

- Determine the pathway runoff will follow from the site to surface water (downhill, perpendicular to topographic contours - see example sketch in Figure 2)

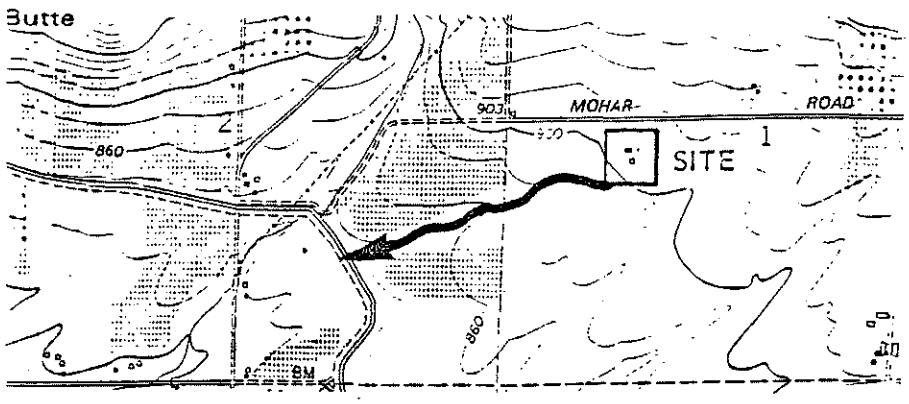

Figure 2: Example of terrain slope calculation

- Measure the distance along the flow path, assign this value to X.

- Subtract the surface water elevation from the site elevation (in the example above = 900 - 830 = 70 feet.) Assign this value to Y.

- Calculate the slope by the formula:

$$\text{Slope (percent)} = \frac{Y}{X} * 100$$

- Assign the slope value using Table 12. Record the value on Worksheet 4.

Table 12. Terrain slope values.

Terrain Slope	Value
≤ 2%	1
> 2% to 5%	2
> 5% to 8% (or piped/culverted)	3
> 8%	5

2.3 TARGETS

2.3.1 Distance to Surface Water

Determine the distance to the nearest fresh or marine surface water using a topographic map and following the overland flow route of a liquid to the nearest downgradient surface water. This should be the same distance used to determine terrain slope. Surface water is defined as lakes, rivers, ponds, streams, inland waters, salt waters, and all other surface waters and water courses within the state of Oregon or its jurisdiction. Man-made lakes, irrigation canals or ditches are considered surface waters if they are connected to natural surface waters. If more than one surface water body is potentially in the overland flow path, use the one for which the shortest distance can be calculated. If surface water discharge is to a storm drain, include the distance within the storm drain in evaluating distance to surface water. Obtain the appropriate value from Table 13, and enter it on Worksheet 4.

Table 13. Distance to surface water values.

Distance (feet)	Value
≤ 1,000	10
> 1,000 - 2,500	7
> 2,500 - 5,000	4
> 5,000 - 10,000	2
> 10,000	0

2.3.2 Population Served by Drinking Water Intakes

Identify the potential point of entry of hazardous substances to the nearest downgradient surface water (see Section 2.3.1). To find the population served by intakes, count all drinking water intakes within the sections where any part of the section is within a 2 mile radius of the area of contamination (not the point of entry to surface water). Obtain the data from the Oregon Water Rights Information Service (OWRIS). Consider all intakes located in lakes, and only those downstream of the site for intakes located in rivers. Obtain the population served with drinking water from these intakes from the Oregon Health Division's Drinking Water Systems Section.

An illustration of surface water measurements is shown in Figure 3. Using this method, within the circle on Figure 3 the following sections would be included in addition to the whole sections: in Example 1, Sections 14, 11, and 2; in Example 2, Section 10; and in Example 3, Sections 22, 15, and 16.

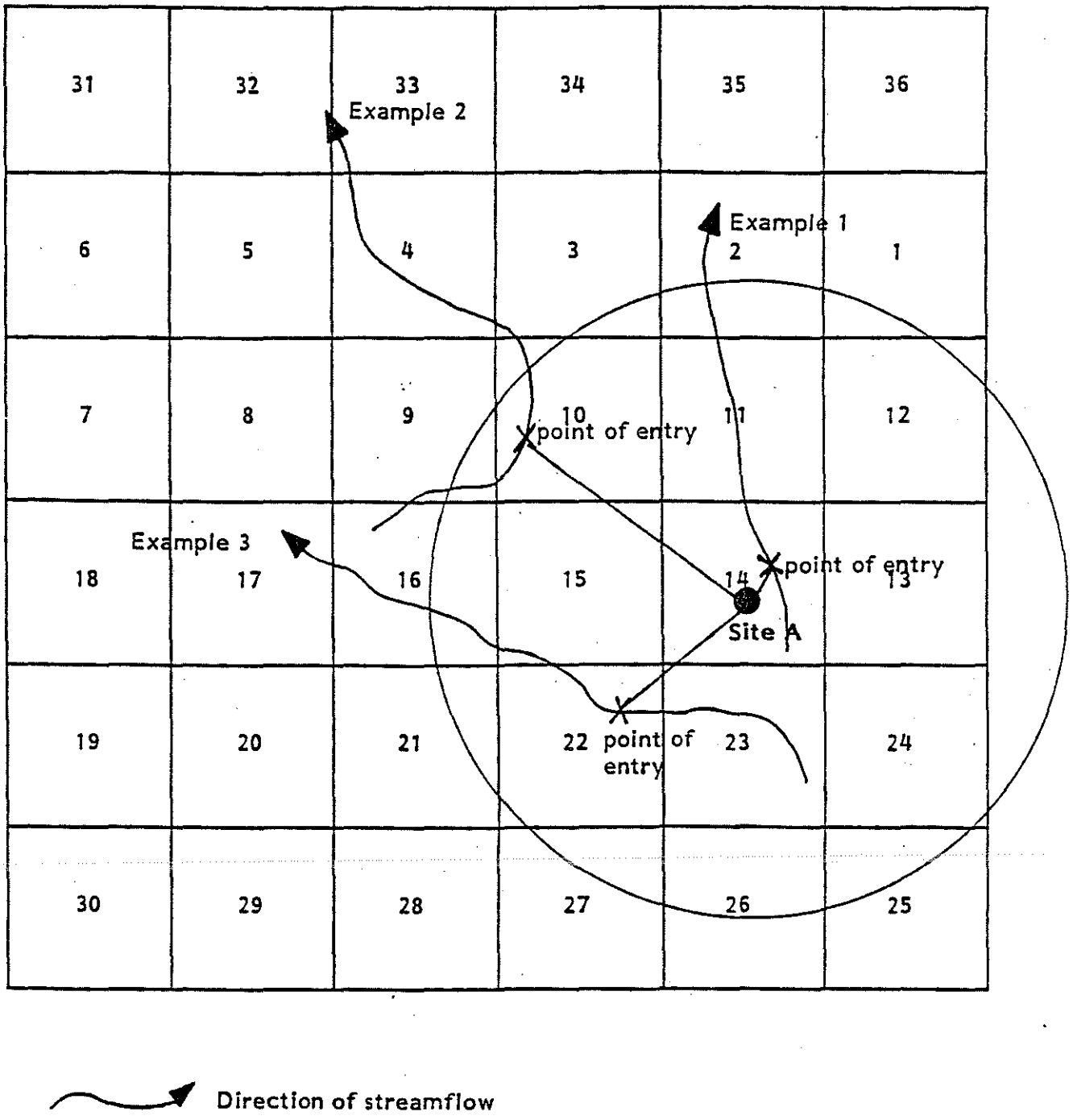

Figure 3

LOCATION OF SURFACE WATER INTAKES
FOR USE IN OREGON RANKING

Use Table 14 to obtain a population value to enter on Worksheet 4.

Table 14. Population served by surface water intakes values.

Population	Value
0	0
1 - 1,000	5
> 1,000 - 5,000	10
> 5,000 - 10,000	15
> 10,000	20

2.3.3 Acres Irrigated by Surface Water Sources Located Within 2 Miles

From the OWRIS database obtain the acreage irrigated by surface water sources located downgradient and within a 2 mile radius of the site. Use the same method as shown in Section 2.3.2. Note that the surface water intakes must be within 2 miles of the site and in the downstream direction for flowing surface water bodies; the acreage can be anywhere. The OWRIS database provides the location of the intake, not the location of the acreage. The total acreage irrigated by each intake is also listed. Use Table 15 to assign a value to record on Worksheet 4.

Table 15. Acreage irrigated by intakes values.

Acreage	Value
0	0
1 - 400	1
> 400 - 800	2
> 800 - 1,200	3
> 1,200 - 1,600	4
> 1,600	5

2.3.4 Distance to Nearest Fishery Resource

A fishery resource is defined as an area necessary for the maintenance of spawning or migratory pathways for anadromous or resident fish species. Obtain the data on the use of the surface water body as a fishery resource from the Oregon Rivers Study Database. On Worksheet 4, note the resource designation (anadromous, or resident fishery value). This data element is only scored if the reach is designated as "Yes" for anadromous fish, or the resident fish value is "1" or "2". Otherwise, enter a value of "0" on Worksheet 4. Distances are calculated as the overland flow to the nearest downgradient surface water (the distance used

in Section 2.3.1) plus the linear distance downgradient in the water body to the designated resource. Record the value from Table 16 on Worksheet 4.

Table 16. Distance to fishery resource values.

Distance (feet)	Value
≤ 1,000	15
> 1,000 - 2,500	12
> 2,500 - 5,000	8
> 5,000 - 10,000	3
> 10,000, or Not Applicable	0

2.3.5. Distance to Nearest Sensitive Environment

Identify the closest sensitive environment downgradient of the site and measure the distance from the site to that sensitive environment. Use the following data sources to identify sensitive environments within 2 miles of the site.

1. BLM Areas of Critical Environmental Concern
2. U.S. Fish & Wildlife Service Coastal Ecological Inventory
3. U.S. Fish and Wildlife Service Wetlands Inventory
4. 7.5 Minute Topographic Map (USGS Quadrangle Series)
5. Local Oregon Fish and Wildlife personnel for endangered species habitat.

Table 17 is the list of sensitive environments chosen for use in scoring sites.

Table 17. Sensitive environments.

- Critical habitat for federally designated endangered or threatened species
- National Park, Monument, National Marine Sanctuary, National Recreation Area
- National Wildlife Refuge, National Forest (campgrounds, recreation areas, game management areas, wildlife management areas)
- Designated Federal Wilderness Area
- Wetlands (freshwater, estuarine, or coastal - 5 acre minimum)
- Wild and Scenic Rivers
- State Parks
- State Wildlife Refuges
- Habitat designated for State endangered species
- State designated natural areas
- County or municipal parks

Use the data sources listed above to determine whether any sensitive environments listed in Table 17 are present, then measure the distance to the nearest sensitive environment. Use Table 18 to determine the value for the distance calculated and record on Worksheet 4.

Table 18. Distance to sensitive environment values.

Distance (feet)	Value
≤ 1000	15
> 1000 - 2500	12
> 2500 - 5000	8
> 5000 - 10,000	3
> 10,000	0

2.3.6 Recreational Use of Surface Water Body

From the Oregon Rivers Study Database, obtain data on the recreational use of the surface water body closest to the site and within 2 miles of the site. Use the matrix in Table 19 to determine the value for recreational use. Record this value on Worksheet 4.

Table 19. Recreational use of surface water values.

Overall Recreational Use	Other	Boating	Ranking Value
1	1	1	5
1	1	2	4
1	2	2	3
2	2	3	2
2	3	3	1
Higher values or no data			0

2.4 RELEASE

A release of a hazardous substance to surface water may be verified using visual or analytical evidence.

Visual evidence: Visual evidence may include direct observation of overland flow and discharge to a surface water or the observance of a discolored plume whose source can be verified as a hazardous substance from the site. Observation of discharges from an outfall may constitute a verified release only if the discharge is not a permitted or authorized release under the NPDES program.

Analytical evidence: Analytical evidence may be determined using surface water or aquatic sediment samples. It must demonstrate the presence of a hazardous substance at 3 times expected or measured background to account for sampling and analytical error and the natural variation in background. For compounds such as most metals, where the environmental background concentration is expected to be greater than detection limits, a site specific or regional background should be determined. A release may be verified when the substance is present at 3 times the site specific or regional background or more. Where the background concentration of a compound is expected to be below detection limits (most organic compounds), a release may be verified when the substance is present in surface water or sediment at 3 times the quantification limit (not the detection limit). In riverine systems, care should be taken to use those analytes for which there are no other suspected upgradient sources.

Seeps: Evidence of surface water contamination may also include a seep entering marine or fresh water. The seep must be documented as contaminated and have a source that can be documented either visually or analytically.

Documented Releases: These are reports of unpermitted spills or discharges that have reached surface waters found in the operating record or regulatory documents of the facility. They can be used as documentation of releases to surface water, if hazardous substances were present in the release.

(NOTE: Discharges to surface water in substantial compliance with an EPA or DEQ permit are not to be scored as a release to surface water).

If a release is determined to have occurred, record a value of 5 on Worksheet 4. If a release has not been verified, record a value of 0 on Worksheet 4.

3. AIR ROUTES

3.1 SOURCE CHARACTERISTICS

The initial step in scoring the air routes is to review the site files and identify the waste management units of concern to the routes and the hazardous substances present within those units. On Worksheet 2 list the management units and up to six hazardous substances chosen as representative of compounds of concern for the air routes. Score the two air routes using this information. Do not include in the evaluation management units that are permitted and in substantial compliance with the permit or that are otherwise authorized by statute or regulation.

3.1.1 Source Quantity

Deriving Source Quantity

Estimate the total quantity of materials on site contaminated with hazardous substances. Do not try to calculate the quantity of a specific substance within a complex mixture.

For tanks or impoundments periodically filled and emptied, calculate the volumes based on usage or on the filled volume of the unit. Volumes will depend on the kind of information available in the site file.

If no information is available regarding waste quantity, use professional judgement to estimate a minimum quantity and document the reason for the choice of value on Worksheet 5. Assign values for source quantity as shown in Table 20. If the quantity determination is based on the quantity of contaminated soil at the site, use the following discussion and Table 21 in making value assignments. If no quantities can be determined, enter a default value of 3 on Worksheet 5.

Use the following assumptions: 1.5 tons = 1 cubic yard = 4 drums = 200 gallons

Table 20. Air route source quantity values.

Gallons	Cubic Yards	Tons	Drums	Value
1-500	1-5	0-2	1-10	3
501-5,000	6-25	2.1-20	11-100	6
5,001-125,000	26-625	21-200	101-2,500	9
125,001-3.0 mil	626-15,600	201-1,000	2,501-10,000	12
>3.0 mil	>15,600	>1,000	>10,000	15

Quantity Determinations for Contaminated Soils

The following instructions are to be used when the source quantity is based on the amount of contaminated soil present at a site. Where hazardous substances have been spilled, discharged, or dumped, and the quantity is known or can be estimated, assign a value to the source quantity based on the quantity of the substance discharged that resulted in soil contamination.

If the quantity of material causing soil contamination cannot be determined or estimated from existing information on the site, the source quantity value assignment should be made based on Table 21. If the area of contaminated soil at the site is not in the existing site information, estimate the area. This estimation should be made using best professional judgement.

Factors that should be considered in estimating the area of contaminated soil include:

- Areal extent of indication of contamination (such as discolored soil or stressed vegetation)
- Practice that resulted in soil contamination and distribution of site features (e.g., drums emptied onto the ground would probably have occurred in an open area with ease of access rather than areas with physical barriers or covering vegetation such as woods or overgrowth)
- Extent of contamination inferred from sampling performed at the site.

Table 21. Air route source quantity values based on areal extent of surface soil contamination.

Area in square feet	Area in acres	Value
≤ 5,000	≤ 0.1	3
> 5,000 - 20,000	> 0.1 - 0.5	6
> 20,000 - 40,000	> 0.5 - 10	9
> 40,000 - 650,000	> 10 - 15	12
> 650,000	> 15	15

If contaminated soil quantity must be added to other waste quantities on-site, convert to cubic yards by assuming a 0.5 ft depth. Convert all other waste quantities to cubic yards, add the waste quantities, and use Table 20 to determine the appropriate value.

3.1.2 Containment

Determine whether the potential for air release is based primarily on the presence of particulates or vapors. Note this on Worksheet 4, and use the instructions in Table 22 for the appropriate release mechanism. After following instructions for the type of unit, enter the value obtained on Worksheet 5.

Table 22. Air route containment values.

	Value
A. Above-ground Tanks and Containers: (NOTE: Evaluate intact below-ground containers or tanks as a landfill. Evaluate leaking underground storage tanks as spills/ discharges).	
Containers sealed and in sound condition and protected from deterioration by weather. Unvented tank or tank equipped with automatically controlled/alarm-equipped vapor control system.	0
Containers sealed and in sound condition, but not protected from weather. Tank with manually controlled vents, which may or may not have alarms.	3
Containers deteriorated (including: evidence of corrosion that may affect structural integrity, evidence of mechanical damage such as dents or punctures, evidence of improper unit construction such as poorly fitted joints or seals), but no evidence of leakage. Containers may or may not be protected from weather. Vented or uncovered tank; material undisturbed in tank.	8
Containers leaking or liquid visible. Containers may or may not be protected from weather. Uncovered tank with aeration, mixing or heating of tank contents.	10
B. Landfills	
The containment score assignment for landfills is based on the method of transport in the air route. If hazardous substance mobility will be assigned based on particulate transport, use the containment scoring methods below for particulates. For cases where hazardous substance mobility will be assigned based on	

vapor pressure or Henry's Law Constant, use the containment scoring method below for vapor migration.

(NOTE: If contaminated materials have been excavated or disturbed and are stored above grade, the contaminated material is to be scored as a waste pile.)

Particulates

Uncontaminated soil cover > 6 inches thick present or discharge or spill occurred in subsurface only-- (including dry wells, drain fields, and leaks from underground storage tanks)	0
Uncontaminated soil cover < 6 inches thick	5
No cover or contaminated spill used as cover	10

Vapors

Uncontaminated soil cover > 6 inches thick and a functioning vapor collection system	0
No cover or cover < 6 inches thick, with a functioning vapor recovery system	4
Uncontaminated soil cover > 6 inches thick with no (or non-functional) vapor recovery system	6
No cover and no vapor recovery system	10

C. Waste Pile

Waste Pile located in fully enclosed, intact building	0
Waste Pile outdoors with intact, maintained cover	2
Waste Pile in non-intact building or three-sided, roofed structure	4
Waste Pile outdoors, with partial or unmaintained cover	8
Waste Pile outdoors, and uncovered	10

D. Surface Impoundments — Value

(NOTE: Score a dry surface impoundment as a waste pile.)

Surface Impoundment with maintained cover. (Cover may include enclosure on top of the impoundment, floating objects used to decrease surface area or a floating additive [such as non-volatile floating liquid] used to control volatilization.) — 0

Surface Impoundment with no cover, but no mixing or agitation processes used. — 8

Surface Impoundment with no cover, but mixing or agitation processes are present; these may include aeration, spraying, or other circulation processes. — 10

E. Spills, Discharges, and Soil Contamination

To determine the containment score for spills or areas of soil contamination at a site, the score assignment is based on the method of transport in the air route. If the hazardous substance mobility will be assigned based on particulate transport, use the containment scoring methods below for particulates.

For cases where hazardous substance mobility will be assigned based on volatility or Henry's Law Constant, use the containment scoring method below for vapor migration.

(NOTE: If contaminated materials have been excavated or disturbed and are stored above grade, the contaminated material is to be scored as a waste pile.)

Particulates

Clean soil, cover >2 feet thick present; OR plastic cover or cap present that completely covers the contaminated soil, OR discharge or spill occurred in subsurface only (including dry wells, drain fields, and leaks from underground storage tanks) — 0

Spill or surface contamination present in an area of limited susceptibility for particulate emissions, such as paved or vegetated areas — 2

Cover or cap over spill <2 feet thick or contaminated soil present, but may allow some surface exposure of contaminated soil.	4
No cover over contaminated soil or discharges/spills have occurred directly onto ground surface (including surface seeps from dry wells, drain fields, or underground tanks)	6
<u>Vapors</u>	
Cover or cap >2 feet thick that completely covers contaminated soil, OR a discharge/spill which occurred in subsurface only (including dry wells, drain fields, and leaks from underground storage tanks with no surface seeps), and a functioning vapor recovery system present	0
Cover <2 feet thick over contaminated soil OR surface discharge/spill, and with a functioning vapor recovery system present	2
Uncontaminated soil cover >2 feet thick OR spill or discharge occurred in subsurface with no or non-functional vapor recovery system	4
No cover or surface spill/discharge and no vapor recovery system (this category includes dry wells, drain fields, and underground tanks with releases that have reached the ground surface)	6

3.1.3 <u>Human Toxicity</u>

Components of the human toxicity route for air include acute and chronic inhalation toxicity, inhalation carcinogenic potency factors and EPA weight of evidence categories, and human developmental and reproductive toxicity for inhalation. On Worksheet 5, list the contaminants chosen as being representative of potential problems at the site for the air route. Obtain the <u>inhalation</u> toxicity value from the Oregon Hazardous Substance Database for each contaminant (a maximum of 14 points is possible for any one contaminant) and the mobility value from Section 3.2.1. Multiply the toxicity value by the mobility value for each contaminant. The <u>final</u> toxicity value to enter on the worksheet is the value present in the toxicity/mobility combination that scores highest. For example:

Substance	Toxicity	Mobility	Combination
Compound 1	8	5	40
Compound 2	10	3	30
Compound 3	7	3	21
Compound 4	10	2	20
Compound 5	10	1	10
Compound 6	3	5	15

In this example, a value of 8 for toxicity and 5 for mobility would be entered on Worksheet 5. A bonus point would then be given for toxicity because three compounds have values of 10. Therefore, the overall toxicity score will be 9.

For a description of how the toxicity value for each contaminant is determined, see Section 1.1.1.3.

3.1.4 ENVIRONMENTAL TOXICITY

If the closest sensitive environment is a terrestrial environment, use the following approach to determine environmental toxicity. Use non-human mammalian acute inhalation toxicity values and Table 23 to determine the environmental toxicity value. Enter the value on Worksheet 5. If no information is available, enter a default value of 10 on Worksheet 5.

Table 23. Air route environmental toxicity values.

Acute Toxicity	Acute Inhalation LC_{50} or LC_{Lo} (mg/m^3)	Inhalation Value
Very high	$\leq 10^2$	15
High	$> 10^2$ to 10^3	12
Medium	$> 10^3$ to 10^4	9
Low	$> 10^4$ to 10^5	6
Very low (simple asphyxiant)	$> 10^5$	3

NOTE: If the closest sensitive environment is a fishery resource, use the approach in Section 1.4 of the surface water pathway instructions to determine environmental toxicity.

3.2 MIGRATION POTENTIAL

3.2.1 Mobility Potential for Human Health

To determine the final mobility value to enter on Worksheet 5, list the substances used for human toxicity scoring. Then determine whether transport in air will be gaseous or particulate. If gaseous, determine the mobility value from Table 24. If particulate, determine the mobility value from Tables 25 and 26. Enter these values in the chart on Worksheet 5. Multiply the compound-specific toxicity by its mobility value. The final mobility value to enter on the worksheet is the value which is present in the toxicity/mobility combination which scores the highest. For example:

Substance	Toxicity	Mobility	Combination
Compound 1	8	5	40
Compound 2	10	3	30
Compound 3	7	3	21

In this example, a mobility value of 5 and a toxicity value of 8 would be entered on Worksheet 5.

Detailed instructions are given below.

- Determine whether emissions from the site will be gaseous or particulate. If the emissions are gaseous, use Table A-4 to determine mobility value.

- To use Table 24:

  - If the substance is in an aqueous solution (dilute wastewater, surface water, ground water), use Henry's Law Constant.

  - If the substance is a concentrated solution (e.g., a drum of trichloroethylene), use the vapor pressure.

  - If soil is contaminated, and gaseous transport appears more important than particulate transport, use the vapor pressure.

  - If you are not sure in what matrix the substance is contained, use the vapor pressure.

Table 24. Mobility potential for gases.

Vapor Pressure (mmHG at 20°C)	Henry's Law Constant	Value
> 10	$> 10^{-3}$	5
$> 10^{-3}$-10	$> 10^{-5}$ to 10^{-3}	3
$> 10^{-5}$-10^{-3}	$> 10^{-7}$ to 10^{-5}	2
$\leq 10^{-5}$	$\leq 10^{-7}$	1

- If emissions are particulates, use Tables 25 and 26 to determine mobility:
  - Determine the soil type at the site and look up its erodibility factor on Table 25.
  - Use Figure 4 to determine the climatic factor.
  - Look the resulting value up in Table 26.

Erodibility can be defined by determining the soil textural class as shown in Table 25. The predominant soil textural class should be obtained from on-site soil samples or the USDA Soil Conservation Service Soil Survey for the area.

Table 25. Erodibility factor.

Predominant soil textural class	Erodibility (tons/acre/yr)
Gravelly soil	22
Coarse sand	73
Very fine, fine, or medium sand	220
Loamy sand	134
Sandy loam	86
Clay	86
Silty clay	86
Loam	56
Sandy clay loam	56
Sandy clay	56
Silt loam	47
Clay loam	47
Silty clay loam	38
Silt	38

(Adapted from Cowherd, et al, 1988)

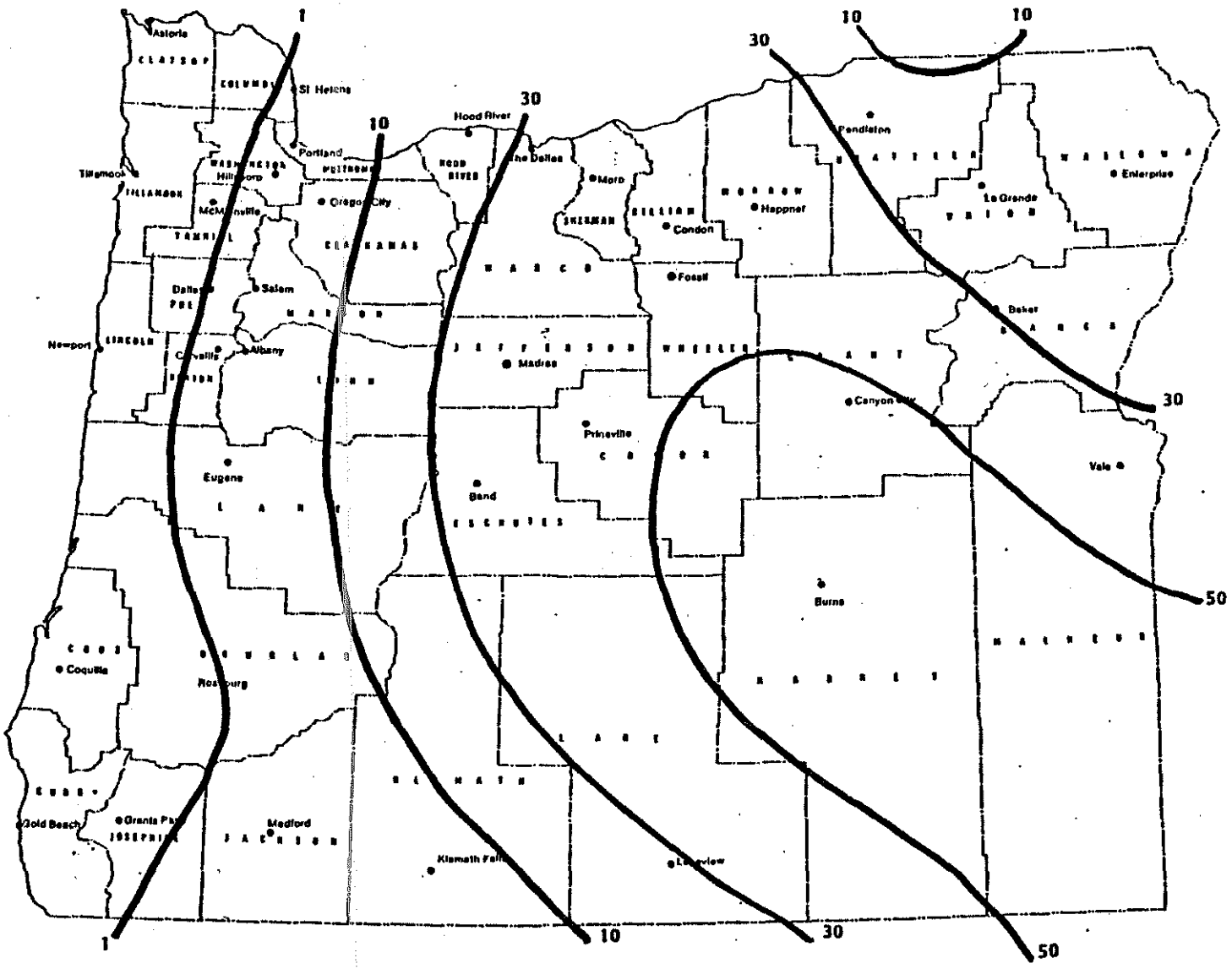

Figure 4-4

CLIMATIC FACTOR TO BE USED IN PARTICULATE MOBILITY MATRIX
(From Cowherd, et al, 1988)

Table 26. Particulate mobility potential

Erodibility (tons/acre/yr)	Climatic Factor ≤ 1	1 - 10	10 - 30	30-50
0 - 30	0	0	0	1
30 - 80	1	1	1	2
80 - 130	1	1	2	3
130 - 170	1	2	3	4
170 - 220	2	3	4	5

3.2.2 Mobility Potential for Environment

Using the chemical(s) chosen for environmental toxicity, evaluate mobility for these substances in the same manner as conducted for human health (Section 3.2.1). Enter the environmental route mobility value on Worksheet 5.

3.3 TARGETS

The proximity of hazardous substances to humans and potentially sensitive environments is scored for three targets. In determining distance, use the shortest straight line distance from the contaminant's location, not the property boundary, to the target of concern.

3.3.1 Distance to Nearest Population

The distance to the nearest population is the distance to the nearest dwelling, public building, park, or other area outside the facility boundary where people may potentially be exposed to hazardous substances daily or seasonally. Use the distances on Table 27 to determine this value. Enter the value on Worksheet 5.

Table 27. Distance to nearest population.

Distance (ft)	Value
0-500	10
> 500-1,000	8
> 1,000-1,500	6
> 1,500-2,000	4
> 2,000-2,640	2
> 2,640	0

3.3.2 Distance to Nearest Sensitive Environment

Identify the closest sensitive environment within 0.5 mile of the site and measure the distance from the site to that sensitive environment. Use the following data sources to identify sensitive environments within a radius of 0.5 mile of the site.

1. BLM Areas of Critical Environmental Concern
2. U.S. Fish and Wildlife Coastal Ecological Inventory
3. U.S. Fish and Wildlife Service Wetlands Inventory
4. 7.5 Minute Topographic Map (USGS Quadrangle Series)
5. Local Oregon Fish and Wildlife personnel for endangered species habitat

Table 28 is the list of sensitive environments chosen for use in scoring sites.

Table 28. Sensitive environments.

- Critical habitat for federally designated endangered or threatened species
- National Park, Monument, National Marine Sanctuary, National Recreation Area, National Wildlife Refuge, National Forest (campgrounds, recreation areas, game management areas, wildlife management areas)
- Designated Federal Wilderness Area
- Wetlands (freshwater, estuarine, or coastal - 5 acre minimum)
- Wild and Scenic Rivers
- State Parks
- State Wildlife Refuges
- Habitat designated for State endangered species
- Fishery resources, if designated in Section 2.3.4 of the surface water pathway
- State designated natural areas
- County or municipal parks

Use the data sources listed above to determine whether any sensitive environments listed in Table 28 are present within 0.5 mile of the site, then measure the distance to the nearest sensitive environment. Use Table 29 to determine the value for the distance calculated and record on Worksheet 5. Do not use the same distance entered on the Surface Water Worksheet 4. Use the linear distance from the site to the sensitive environment.

Table 29. Distance to nearest sensitive environment values.

Distance (ft)	Value
0-500	15
> 500-1,000	12
> 1,000-1,500	9
> 1,500-2,000	6
> 2,000-2,640	3
> 2,640	0

3.3.3 Population Within 0.5 Mile

The population within a 0.5 mile radius of the site should be determined using the most recent U.S. Census data available or by counting buildings on a 7.5 minute topographic map and assuming the most recent estimate of numbers of people per household in the county provided by the Portland State University Center for Population Research. Use Table 30 to determine the value to enter on Worksheet 5.

Table 30. Population within 0.5 mile values.

Population	Value
0	0
> 0 - 25	1
> 25 - 50	2
> 50 - 100	3
> 100 - 200	4
> 200 - 300	5
> 300 - 500	6
> 500 - 700	7
> 700 - 900	8
> 900 - 1,100	9
> 1,100 - 1,300	10
> 1,300 - 1,500	11
> 1,500 - 1,700	12
> 1,700 - 1,900	13
> 1,900 - 2,100	14
> 2,100 - 2,300	15
> 2,300 - 2,500	16
> 2,500 - 5,000	17
> 5,000 - 7,500	18
> 7,500 - 10,000	19
> 10,000	20

3.3.4 Predominant Non-Residential Land Use

Assign a value from Table 31 for the predominant non-residential land use classification within a 0.5 mile radius of the site.

Table 31. Predominant non-residential land use within 0.5 mile values.

Predominant Land Use within 0.5 Mile	Value
High density industrial/commercial areas inside a 0.5 mile radius of the site. (Generally includes areas of major work force concentrations in large urban areas; high density downtown office buildings typical of larger cities such as Portland, Eugene, or Salem).	10
Light industrial/moderately dense commercial areas inside a 0.5 mile radius of the site. (Generally includes areas zones for light industrial use, one and two story office buildings.)	8
Low density commercial areas inside a 0.5 mile radius of the site (such as store-front commercial areas in mixed commercial residential neighborhoods), OR areas with few permanent residents, but intensive seasonal use (such as parks).	5
Rural areas with some occupied buildings or dwellings within 0.5 mile of the site, OR areas with moderate seasonal use inside a 0.5 mile radius of the site.	3
Isolated areas with little or no working or transient population present within 0.5 mile.	0

3.4 RELEASE

Release of a hazardous substance to air from substances present at the site may be defined as follows:

Direct visual evidence: Examples include colored gases being released from a waste pile containing known hazardous substances, dead or stressed vegetation that can be linked with a substance release, or windblown dust from a waste pile containing known hazardous substances. Direct evidence of releases may also include documented discharges to air from

vessels or containers due to failure of valves, pipes, venting systems, or related equipment used to contain pressurized contents or volatile substances containing hazardous constituents.

Analytical evidence: The release documented must be at least 3 times the expected or measured background concentration to account for sampling and analytical error and the natural variation in background. Expected background concentrations may be obtained using regional air monitoring data. For compounds where the environmental background is expected to be greater than detection limits, a release may be verified when the substance is present at 3 times the site specific or regional background or more. Where the background concentration of a compound is expected to be below detection limits, a release may be verified when the substance is present at a minimum of 3 times the quantification limit (not the detection limit). Samples must include specific substance characterization or evidence from a field analytical screening device. If field analytical devices such as an organic vapor analyzer or photoionization detector are used, evidence must be provided that the source of total organic vapors detected is from hazardous substances at the site and not from interference sources, such as motor vehicle exhaust.

Detectable odors: Known sources must be identifiable and analytical data must be available.

(NOTE: Air discharges which are "permitted or authorized releases" are not scored. These releases include releases in substantial compliance with a permit issued by DEQ, EPA, or Lane County Regional Air Pollution Authority and releases in conformance with DEQ or EPA rules or the provisions of the State Implementation Plan.)

Where a release has occurred, enter a value of 5 on Worksheet 5. Where no verified release is documented, enter a value of 0 on Worksheet 5.

4. GROUND WATER ROUTE

4.1 SOURCE CHARACTERISTICS

The initial step in scoring the ground water route is to review the site files and identify the waste management units of concern to the routes and the hazardous substances present within those units. On Worksheet 2, list the management units and up to six hazardous substances chosen as representative of compounds of concern for the ground water route. Score the ground water route using this information. Do not include in the evaluation management units that are permitted and in substantial compliance with the permit or that are otherwise authorized by statue or regulation.

4.1.1 Source Quantity

Deriving Source Quantity

Estimate the total quantity of materials contaminated with hazardous substances. Do not try to calculate the quantity of a specific substance within a complex mixture.

For tanks or impoundments which are periodically filled and emptied, calculate the volumes based on usage or on the once filled volume of the unit. Volumes will depend on the kind of information available in the site file.

If no information is available regarding waste quantity, use best professional judgement to estimate a minimum quantity, and document the reasoning for the choice of value on Worksheet 6. Assign values for source quantity as shown in Table 32. For quantity determinations based on contaminated soils, refer to the following discussion and Table 33.

Use the following assumptions: 1.5 tons = 1 cubic yard = 4 drums = 200 gallons

Table 32. Ground water route source quantity values.

Gallons	Cubic Yards	Tons	Drums	Value
1-500	1-5	0-2	1-10	3
501-5,000	6-25	2.1-20	11-100	6
5,001-125,000	26-625	21-200	101-2,500	9
125,001-3.0 mil	626-15,600	201-1,000	2,501-10,000	12
>3.0 mil	>15,600	>1,000	>10,000	15

Quantity Determinations for Contaminated Soils

The following instructions are to be used when the source quantity is based on the amount of contaminated soil present at a site.

Where hazardous substances have been spilled, discharged, or dumped, and the quantity is known or can be estimated, assign a value to the source quantity based on the quantity of the substance discharged that resulted in soil contamination.

If the quantity of material causing soil contamination cannot be determined or estimated from existing information on the site, the source quantity value assignment should be made based on Table 33. If the area of contaminated soil at the site is not in the existing site information, estimate the area. This estimation should be made using best professional judgement.

Factors that should be considered in estimating the area of contaminated soil include the following:

- Areal extent of indication of contamination (such as discolored soil or stressed vegetation)
- Practice that resulted in soil contamination and distribution of site features (e.g., drums emptied onto the ground would probably have occurred in an open area with ease of access rather than areas with physical barriers or covering vegetation such as woods or overgrowth)
- Extent of contamination inferred from sampling performed at the site.

An assumption of 3 foot depth of contamination should then be made to calculate the volume of soil, if depth is unknown. If no determination of quantity can be made, a default value of 3 should be entered on Worksheet 6.

Table 33. Source quantity values for contaminated soils.

Cubic Yards	Value
1-100	3
101-5,000	6
5,001-100,000	9
100,001-500,000	12
>500,000	15

If contaminated soil quantities are to be combined with other waste quantities (measured in gallons, tons, etc.) on the site, convert all other waste quantities to cubic yards and then add them

together. Use Table 32 to find a final value for quantity, and record on Worksheet 6.

4.1.2 Containment

Containment should be evaluated using the criteria outlined in Table 34. Record the containment value on Worksheet 6.

Table 34. Ground water containment values.

A. Landfills

Add component scores for questions 1-4 to obtain a value for containment.

1. What type of liner system is present?

	Value
Double liner system, no evidence of improper installation or failure	0
Single liner with no evidence of improper installations or failures	1
No liner; or unknown if liner is present; or installed liners are defective or failing	3

2. What type of cover is present?

Maintained engineered cover without ponding	0
Compacted soil or low permeability cover installed, but with poor or unknown maintenance performed	1
No cover; or ponding of water observed on top of unit; or unknown if cover is present	2

3. What type of leachate collection system is present?

Maintained, functioning	0
Present, but in unknown condition or not functioning	1
None, or unknown if any collection system is present	2

4. Are containers of liquids or bulk liquids (such as from a tank truck) known to have been disposed in the landfill?

No liquids present	0
Possible free liquids in landfill	1
Free/bulk liquids documented to have been disposed	3

B. Surface Impoundments — Value

Add component scores for questions 1-4 to determine a containment value for surface impoundments.

1. What type of liner system is present?

Double liner system, no evidence of improper installation or failure.	0
Single liner with no evidence of improper installations or failures.	1
No liner; or unknown if liner is present; or installed liners are defective or failing.	3

2. What is the condition of diking for the impoundment?

Regularly inspected and maintained	0
Unmaintained, but apparently sound	1
Unsound, evidence of failure or leakage present or imminent	3

3. Is adequate freeboard maintained in the unit?

Sufficient freeboard (> 2 ft) automatically maintained	0
Sufficient freeboard (> 2 ft) manually maintained	1
Insufficient freeboard (liquid level within 2 feet of top of diking)	2

4. Is there any evidence of loss of fluid contents, through evaporation?

No evidence of losses	0

Mass balance or observed changes in fluid levels indicate possible releases to subsurface 2

C. Above-ground Containers and Tanks — Value

Add score for questions 1-3 to determine containment value for above-ground containers or tanks.

1. What type of containment system is present?

Containment system with capacity for total volume of containers or tanks 0

Containment system with capacity for at least 10% of volume of containers or tanks 1

No containment system present, or containment with capacity less than 10% of volume of containers or tanks 3

2. What type of base is present for the containment system?

Impervious base; regularly inspected and maintained 0

Impervious base; no evidence of failure, but not known to be regularly inspected or maintained 1

Impervious base with some evidence of problems (e.g., cracks), or semi-permeable construction (e.g., asphalt) 2

No base material present; or permeable base such as gravel; or base materials unknown 4

3. How are containers managed?

Containers stored in single layer, or in racks designed to hold containers or tanks 0

Containers stored in multiple layers, or overturned; open containers present, unstable stacking 1

Containers leaking in containment area 3

D.	Waste Piles	Value
	Add scores for questions 1-4 to obtain containment value for waste piles.	
	1. What type of liner/base is present?	
	Double liner, or waste pile located in a fully enclosed building with an impervious base	0
	Single geomembrane or clay liner	1
	No liner, or unknown whether liner is present	3
	2. What type of cover is present?	
	Maintained cover or waste pile is located in a fully enclosed structure	0
	Unmaintained cover, or waste pile is located in a roofed structure with three or fewer walls	1
	No cover	2
	3. What type of leachate collection system is present?	
	Maintained, functioning leachate collection system, or waste pile is located in a fully enclosed building	0
	Present; unknown condition or not functioning	1
	None; or unknown if collection system is present	2
	4. What type of run-on/runoff control system is present?	
	Maintained, functioning system or waste pile is located in a fully enclosed building	0
	Present, unknown condition or not functioning	1
	None, or unknown if system is present	3

E. Spills, Discharges, and Contaminated Soil	Value
If contaminated soil has been excavated and stored above grade, score the stored soil as a waste pile.	
Spills or discharges of soils; or contaminated soil resulting in surficial soil contamination (<1 foot depth) with cover or cap present over contaminated material	3
Spills or discharges of solids; or contaminated soil due to surficial soil (< 1 foot depth) contamination with no cover present over contaminated material	4
Spills or discharges of solids; or soil contamination from solid materials with contamination extending to a depth > 1 foot.	5
Spills or discharges of liquids; or soil contamination due to liquid wastes with a functioning ground water and/or product recovery system in place	6
Spills or discharges of liquids; or soil contamination due to liquid wastes with no ground water and/or product recovery system in place (including leaking underground storage tanks, dry wells, septic drainfields)	10

4.1.3 Toxicity

Components of the human toxicity route for ground water include acute and chronic oral toxicity, oral carcinogenic potency factors and weight of evidence, and human developmental and reproductive toxicity for ingestion. On Worksheet 6, list the contaminants chosen as being representative of problems at the site for the ground water route. Obtain the oral toxicity value from the Oregon Hazardous Substance Database for each contaminant (a maximum of 14 points is possible for any one contaminant) and the mobility value from Section 4.2.1. Multiply the toxicity value by the mobility value for each contaminant. The final toxicity value to enter on the worksheet is the value which is present in the toxicity/mobility combination which scores the highest. For example:

Substance	Toxicity	Mobility	Combination
Compound 1	8	5	40
Compound 2	10	3	30
Compound 3	7	3	21
Compound 4	10	2	20
Compound 5	10	1	10
Compound 6	3	5	15

In this example, a toxicity value of 8 and a mobility value of 5 would be entered on Worksheet 6. One additional bonus point would then be given for toxicity because three compounds have values of 10. Therefore, the overall toxicity score is 15. For a description of how the toxicity value for each contaminant is determined, see Section 1.1.1.3.

4.2 MIGRATION POTENTIAL

4.2.1 Mobility

Mobility is a measure of the tendency of a substance to migrate through soil to ground water. Use Table 35 to score mobility for inorganic contaminants, and Table 36 for organic contaminants and for inorganic contaminants not listed in Table 35. To determine the final mobility value to enter on Worksheet 6, list the substances used for human toxicity scoring. Then use Table 35 or 36 to determine the mobility of each substance. Enter these values in the chart on Worksheet 6. Multiply the compound-specific toxicity by its mobility value. The final mobility value to enter on the worksheet is the value which is present in the toxicity/mobility combination which scores the highest. For example:

Substance	Toxicity	Mobility	Combination
Compound 1	8	5	40
Compound 2	10	3	30
Compound 3	7	3	21

In this example, a mobility value of 5 and a toxicity value of 8 would be entered on Worksheet 6.

Detailed instructions are given in Table 35.

Table 35. Mobility values for cations and anions.

Cations and Anions	Coefficient of Aqueous Migration (K)	Mobility Value
Aluminum, Chromium, Thallium, Thorium, Tin	Less than 0.1	1
Barium, Beryllium, Cobalt, Copper, Lead, Manganese, Nickel, Phosphorus	0.1 to 1.0	3
Antimony, Arsenic, Boron, Bromine, Cadmium, Fluorine, Iodine, Magnesium, Mercury, Molybdenum, Radium, Radon, Selenium, Silver, Uranium, Vanadium, Zinc	Greater than 1.0	5

Note:

A. For chromium, nickel, lead, cobalt, and copper, increase the mobility factor by one point if:

- Evidence of acidic leachate is present (pH < 3)

OR

- The metals are present in solution in liquid hazardous substances at the site (e.g., plating wastes).

B. Decrease by one the assigned mobility value for a metal in areas with alkaline soils (pH > 8), if it can be determined that the metal is present in solid form. Do not assign a value less than 1. **(Note: This does not apply to selenium and arsenic, which are more mobile under alkaline conditions).**

Table 36. Mobility values for organic substances and inorganic substances not listed in Table 35.

Water Solubility Range (mg/l)	Mobility Value
≤ 10	1
> 10 - 100	2
> 100 - 1,000	3
> 1,000	5

Note:

A. If the concentration of a substance in a mixture is known, and indicates a higher concentration than the solubility in water, substitute the substance concentration (mg/l) for the solubility in the above table.

B. If the substance or material is present as a free liquid (as a separate layer) in the aquifer, always assign the maximum value (5), regardless of the compound's solubility.

4.2.2 Net Precipitation

This is a measure of total precipitation minus total evapotranspiration. Use monthly values for calculation of this value, using the total precipitation and evapotranspiration for all 12 months of the year. Where monthly net precipitation is less than zero, add zero for that month for net precipitation. Ranges of net annual precipitation are shown on Table 37. Record the value on the Worksheet 6.

Table 37. Net precipitation values.

Inches	Value
0	0
0.1 - 10	1
10.1 - 20	2
20.1 - 30	3
30.1 - 40	4
> 40.1	5

4.2.3 Subsurface Hydraulic Conductivity

Subsurface hydraulic conductivity is a measure of the ease with which substances may move from the land surface to the aquifer. Where information regarding multiple subsurface layers is available, use the least permeable layer to score if it appears to be continuous under the site and free of fractures, faults and has a minimum thickness of 15 feet. If this layer is not thought to be continuous, use information regarding the most prevalent geologic materials at the site. Use Table 38 to determine a value for this data element. Enter the value on Worksheet 6.

Table 38. Subsurface hydraulic conductivity values.

Description	Hyd. Cond. (cm/sec)	Value
Unfractured igneous or metamorphic rock (including dense, competent basalt) unfractured shales, claystones, mudstones,clay, slightly silty clay, low permeability till	$\leq 10^{-7}$	1
Clayey silt, silty clay, moderately permeable till, silty shale, siltstone, slightly fractured igneous or metamorphic rock, welded/lithified volcanic rock	$> 10^{-7} - 10^{-5}$	2
Sandy silt, silty sand, permeable till, clayey sand, cemented sandstone, fractured rock, shale, porous volcanic rock	$> 10^{-5} - 10^{-3}$	3
Well sorted sand, sand and gravel, gravel, highly fractured rock, lava tubes, slightly silty sand, poorly lithified sandstone	$> 10^{-3}$	4

4.2.4 Vertical Depth to Ground Water

This depth is measured from the ground surface, or from the deepest point of known contamination or bottom of landfill or surface impoundments to the water table. Record the value from Table 39 on Worksheet 6. Where ground water quality data indicate a verified release to ground water, record the maximum value (8) on Worksheet 6.

Table 39. Vertical depth to ground water values.

Depth (feet)	Value
0 - 25	8
> 25 - 50	6
> 50 - 100	4
> 100 - 200	3
> 200 - 300	2
> 300	1

4.3 TARGETS

For interconnected aquifers, use the most conservative (highest) ground water usage value and the distance to the nearest drinking water well in either aquifer. Population and area irrigated should be added for each interconnected aquifer and values assigned based on the sum of all services. For ground water not interconnected with the shallow ground water, target values are based on usage of the uppermost ground water that may be affected by the site.

4.3.1 Ground Water Usage

The uses or potential uses of an aquifer determine what populations may be at risk. Public water supplies (greater than three connections or 10 users) are defined by Oregon Division of Health, Drinking Water Section. Record the value for ground water usage within 2 miles from Table 40 on Worksheet 6. If no information is available to score otherwise, assume that no alternate supplies are available.

Table 40. Ground water usage values.

Definition	Value
Federally-designated sole source aquifer	10
Public supply (greater than 3 connections or 10 users) no alternate unthreatened sources available with minimal hookups	9
Private supply, no alternate unthreatened sources available	5
Public supply, but alternate sources available with minimum hookup requirements	4
Private supply, but alternate sources available with minimum hookup requirements	4
Ground water used solely for irrigation of food crops or livestock watering	3
Ground water not used, but usable	2
Ground water used solely for irrigation of non-food vegetation crops (parks, golf courses, tree farms and nurseries)	2
Ground water not usable (high dissolved solids, brackish, etc.) (This does not include ground-water made unusable due to contamination - this should be scored as it was used prior to contamination)	1

4.3.2 Distance to Nearest Drinking Water Well

The distance to the nearest drinking water well should be determined using available well logs and public supply information. Use the distances in Table 41 to determine the value and record it on Worksheet 6. Use distance from the boundary of hazardous substances to the well, not from center of site or property boundary. If the nearest well is on-site (located within the contaminated area) or is contaminated with a hazardous substance which can be attributed to the site, the value recorded on Worksheet 6 should be the maximum value (5). Wells at a facility that are not in the contaminated area should be scored based on the minimum distance between the known extent of contamination and the well. Wells that have been abandoned, and are documented as such, are not to be used in scoring the distance to the nearest well.

Table 41. Linear distance to nearest drinking water well values.

Distance (feet)	Value
≤ 0.5 mile	5
> 0.5 mile - 1 mile	3
> 1 mile - 2 miles	1
> 2 miles	0

4.3.3 Population Served by Drinking Water Wells

Determine the population served by drinking water wells located in the same section in which the site is located, and in the adjacent sections (see Figure 5). For private wells, determine the population served by each well by using the most current estimate of population per household for the county provided by the Portland State University Center for Population Research. For public supply wells, contact the Oregon Division of Health, Drinking Water Section to determine the number of users on the system. If ground water users have an alternate interim supply of water, these users are not to be counted in the population served, if the alternate supply is not located within the 9 square miles surrounding the site (See Figure 5). Use Table 42 to determine the value for population and record this value on Worksheet 6.

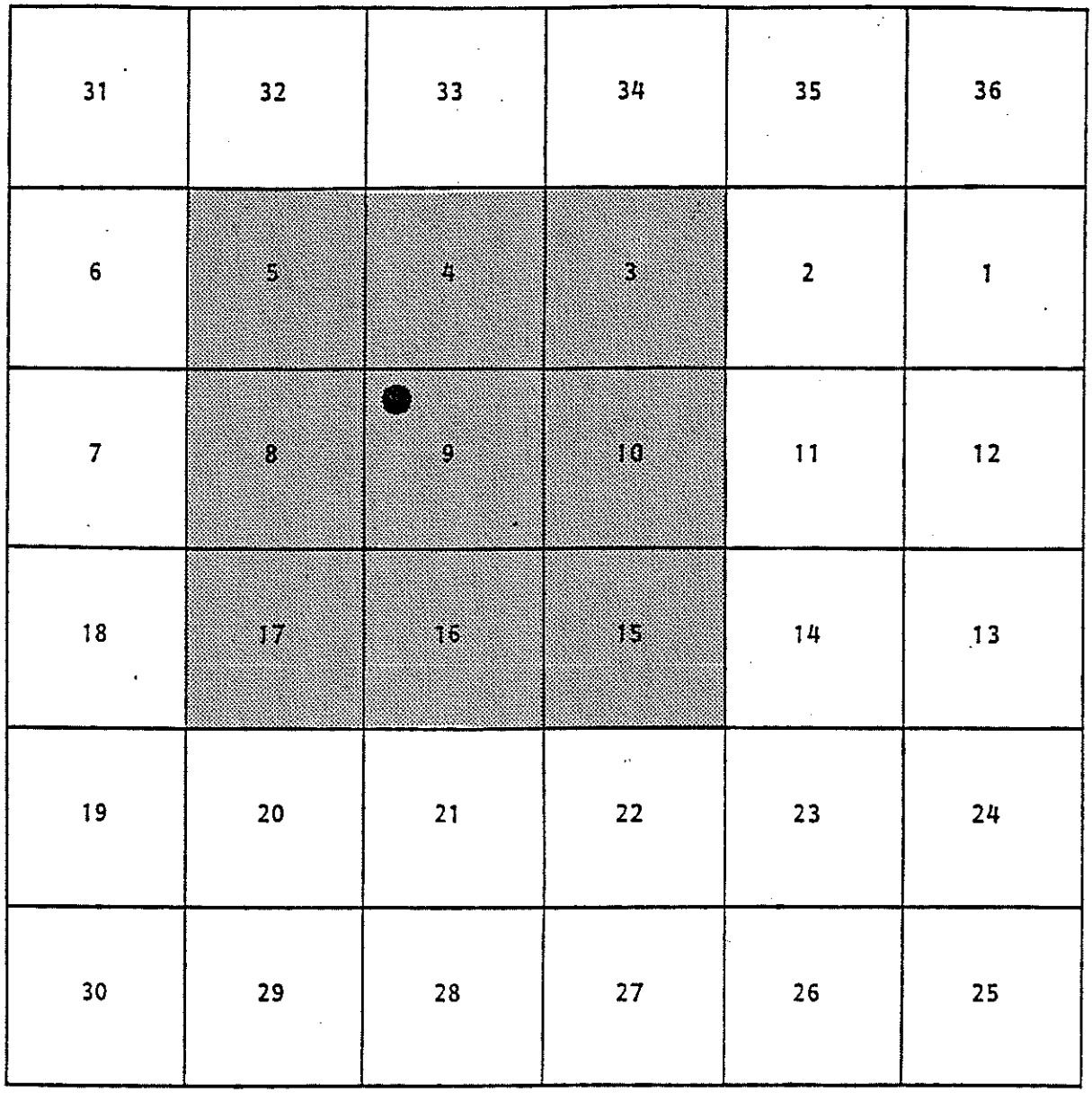

Figure 5

LOCATION OF WELLS
FOR USE IN OREGON RANKING

Table 42. Population served by drinking water from wells values.

Population	Value
0	
> 0 - 25	1
> 25 - 50	2
> 50 - 100	3
> 100 - 200	4
> 200 - 300	5
> 300 - 500	6
> 500 - 700	7
> 700 - 900	8
> 900 - 1,100	9
> 1,100 - 1,300	10
> 1,300 - 1,500	11
> 1,500 - 1,700	12
> 1,700 - 1,900	13
> 1,900 - 2,100	14
> 2,100 - 2,300	15
> 2,300 - 2,500	16
> 2,500 - 5,000	17
> 5,000 - 7,500	18
> 7,500 - 10,000	19
> 10,000	20

4.3.4 Acreage Irrigated by Wells

Determine the acreage irrigated by wells located within the same section as the site and adjacent sections from the OWRIS database (see Figure 4). Note that the wells must be within the same section as the site or adjacent sections; the acreage may be anywhere. The OWRIS database notes the location of the wells, not the location of acreage. The total acreage irrigated by each well is listed in the database. Use Table 43 to obtain a value and record it on Worksheet 6.

Table 43. Acreage irrigated by wells values.

Acreage	Value
0	0
1 - 100	1
> 100 - 1,500	2
> 1,500 - 3,000	3
> 3,000 - 4,500	4
> 4,500	5

4.4 RELEASE

A release to the aquifer may be verified by one of the following:

Direct disposal or discharge into the aquifer: Information is available to document disposal or discharge of hazardous substances down an injection well or dry well.

Presence of a waste management unit in the aquifer: The bottom of a waste management unit is located below the top of the aquifer, or leaking containers are known to have been buried below the top of the aquifer.

Analytical evidence of a release from ground water monitoring wells at the site: For substances that may have a background concentration due to natural conditions (such as metals and other inorganic compounds), a release may be verified by the presence of the compound at three times the expected or measured background. Three times expected or measured background accounts for sampling and analytical error and the natural variation in background. If the compound is not detected in background samples, the presence of the compound at three times the quantification limit (not the detection limit) may be used to verify a release. For compounds not expected to be present in background samples (such as synthetic organic chemicals), the presence of the compound in site samples may be used to verify a release, if the release can be attributed to on-site sources. If the compound is present in ground water at the site at levels comparable to those found in the site vicinity but cannot be attributed to specific sources on-site, a release should not be verified.

(NOTE: Where ground water contamination has been identified at a site, and seeps that discharge to surface waters or discharges directly to surface waters have been identified, the site should be scored with a release to both ground water and surface water.)

If a verified release is determined to have occurred, record a value of 5 on Worksheet 6. Otherwise, record a value of 0 on Worksheet 6.

5. DIRECT CONTACT

5.1 Source Characteristics

The initial step in scoring the direct contact route is to review the site files and identify the waste management units and the hazardous substances present within those units. If hazardous substances are not available for direct contact on site, record 0 on Worksheet 1 and do not use Worksheet 7. If it is determined that hazardous substances are present such that direct contact with hazardous substances or hazardous waste is possible, list on Worksheet 2 the management units and up to six hazardous substances chosen as representative of compounds of concern for the direct contact route. Score the direct contact route using this information.

5.1.1 Source Quantity

Use the same approach used to obtain an estimate of source quantity in the air routes. See Section 3.1.1 of the air route description.

5.1.2 Toxicity

Components of the human toxicity route for direct contact include acute and chronic oral toxicity, oral carcinogenic potency factors and EPA weight of evidence categories, human developmental and reproductive toxicity for ingestion, and chemicals likely to be absorbed via the skin. On Worksheet 6, list the contaminants chosen as being representative of direct contact problems at the site. Obtain the oral toxicity/dermal contact value from the Oregon Hazardous Substances Database for each contaminant (a maximum of 14 points is possible for any one contaminant). One additional bonus point is assigned if three compounds have values of 10 or greater.

5.2 MIGRATION POTENTIAL

Accessibility is the only data element used in the migration potential module of the direct contact route. Accessibility is used to evaluate the potential for humans to enter the site and contact hazardous substances directly rather than through air or water. Use Table 44 to determine the value to enter on Worksheet 7 for accessibility.

Table 44. Site accessibility values.

Site Condition	Value
No site control, such as fencing	10
Fencing around the contaminated area	5
Fencing and 24-hour security	1

5.3 TARGETS

The targets analysis for the direct contact-human health route includes consideration of activities on site or on adjacent properties that indicate the potential presence of sensitive populations, such as children. The direct contact-environment approach only considers location of the site directly in a sensitive environment.

5.3.1 Residences

If residences are located on the site or on adjacent property, enter 10 on Worksheet 7 for residences. The adjacent property line must be within 1,000 feet of the contaminated area for the residence to be considered. If residences are not present on the site or on adjacent property, or the adjacent property is greater than 1,000 feet from the contaminated area, enter "0" on Worksheet 7.

5.3.2 Other Structures or Activities

Other structures or activities to be considered as potential concerns for direct contact of humans with hazardous substances located on site are shown in Table 45. If any of the structures or activities listed in Table 45 are located on the site or on adjacent properties, enter "10" on Worksheet 7 for other structures. If not, enter "0" on Worksheet 7. The adjacent property line must be within 1,000 feet of the contaminated area for the structure to be considered.

Table 45. Other structures or activities.

Parks
Schools
Day Care Facilities
Playgrounds

If other activities or structures not listed in Table 45 are present on site or on adjacent properties that are known to attract people to the site, enter "10" on Worksheet 7. Explain the situation unique to the site and the justification for the scoring.

5.3.3 Sensitive Environments

If the site is located directly in a sensitive environment, enter "10" on Worksheet 7 for sensitive environments. Table 46 presents the list of sensi- tive environments that are to be considered. If the site is not located in one of the sensitive environments listed in Table 46 enter "0" on Worksheet 7.

Table 46. Sensitive environments.

- Critical habitat for Federally designated endangered or threatened species
- National Park, Monument, National Marine Sanctuary, National Recreation Area, National Wildlife Refuge, National Forest (campgrounds, recreation areas, game management areas, wildlife management areas)
- Designated Federal Wilderness Area
- Wetlands (freshwater, estuarine, or coastal - 5 acre minimum)
- Wild and Scenic Rivers
- State Parks
- State Wildlife Refuges
- Habitat designated for State endangered species
- Fishery resources, if designated in Section 2.3.4 of the surface water pathway
- State designated natural areas
- County or municipal Parks

6. WORKSHEETS FOR SCORING

The following eight worksheets are to be used to document the scoring for each site.

WORKSHEET 1
SUMMARY SCORE SHEET

Site Name:

Site Location: (City, County, or Section/Township/Range)

Site Description: (Include management areas, compounds of concern, and quantities)

Special Considerations: (Include limitations in site file data, data which cannot be accomodated in the model, but which are important in evaluating the risk associated with the site)

ROUTE SCORES:

Ground Water/Human:	_____	Overall Human Health:	_____
Surface Water/Human:	_____	Overall Environment:	_____
Air/Human:	_____	Overall Score:	_____
Surface Water/Environmental:	_____		
Air/Environmental:	_____		

WORKSHEET 2
ROUTE DOCUMENTATION

SURFACE WATER ROUTE

List substances to be considered for scoring. Source: _____

Explain basis for choice of substances to be used in scoring.

List management units to be considered in scoring: Source: _____

Explain basis for choice of unit used in scoring.

AIR ROUTE

List substances to be considered for scoring. Source: _____

Explain basis for choice of substances to be used in scoring.

List management units to be considered in scoring: Source: _____

Explain basis for choice of unit used in scoring.

GROUND WATER ROUTE

List substances to be considered for scoring. Source: _____

Explain basis for choice of substances to be used in scoring.

List management units to be considered in scoring: Source: _____

Explain basis for choice of unit used in scoring.

WORKSHEET 3
SUBSTANCE CHARACTERISTIC WORKSHEET
FOR MULTIPLE UNIT/SUBSTANCE SITES

	Combination 1	Combination 2	Combination 3
Unit: Substance: <u>AIR ROUTE</u> Human Toxicity/Mobility Value: Environmental Toxicity/ Mobility Value: Containment Value:			
Air Human Subscore: Air Environmental Score:			
<u>SURFACE WATER ROUTE</u> Human Toxicity Value: Environmental Toxicity Value: Containment Value:			
Surface Water Human Subscore: Surface Water Environmental Subscore:			
<u>GROUND WATER ROUTE</u> Human Toxicity/Mobility Value: Containment Value:			
Ground Water Subscore:			

WORKSHEET 4
SURFACE WATER ROUTE

1. SOURCE CHARACTERISTICS

1.1 Source Quantity (explain basis) Source: ____ Value: _____

_____

_____

1.2 Containment _____ Source: ____ Value: _____

1.3 Human Toxicity

Substance	Value
1.	
2.	
3.	
4.	
5.	
6.	

+Bonus Point: _____
Total Toxicity Score: _____

1.4 Environmental Toxicity Value: _____

Compound	Acute Toxicity Value
1.	
2.	
3.	
4.	
5.	
6.	

Source: ____ Value: _____

Compound Chosen: _____

2. MIGRATION POTENTIAL

2.1 Surface Soil Permeability: _____ Source: ____ Value: _____

2.2 2-year 24-hr Rainfall: _____ Source: ____ Value: _____

2.3 Flood Plain: _____ Source: ____ Value: _____

2.4 Terrain Slope: _____ Source: ____ Value: _____

3. TARGETS

3.1 Distance to Surface Water: _____ Source: ____ Value: _____

Name: _____

3.2 Population Served: _____ Source: ____ Value: _____

3.3	Acres Irrigated: _____	Source: ___ Value: _____
3.4	Distance to Fishery Resource:	
	Anadromous (Y/N) _____	Source: ___
	Resident 1 or 2 (Y/N) _____	Source: ___
	Distance: _____	Source: ___ Value: _____
3.5	Distance to Nearest Sensitive Environment:	
	Name _____	Source: ___
	Distance _____	Source: ___ Value: _____
3.6	Recreational Uses	
	Type: Other _____	Source: ___ Value: _____
	Boating _____	
	Overall _____	

4. RELEASE Value: _____

WORKSHEET 5
AIR ROUTE

1. SOURCE CHARACTERISTICS

1.1 Source Quantity (explain basis) Source: ___ Value: _____

_____

_____

1.2 Containment _____ Source: ___ Value: _____

(circle one: particulate, vapor)

1.3 Human Toxicity

Substance	Toxicity	Mobility	Toxicity X Mobility
1.			
2.			
3.			
4.			
5.			
6.			

Enter toxicity value of substance with highest toxicity/mobility value: _____

+ Bonus Point: _____

Total Toxicity Value: _____

1.4 Environmental Toxicity

Substance	Toxicity	Mobility	Toxicity X Mobility
1.			
2.			
3.			
4.			
5.			
6.			

Compound Chosen: _____ Toxicity Value: _____

2. MIGRATION

2.1 Mobility Potential for Human Health Value: _____

(from 1.3 above)

2.2 Mobility Potential for Environment Value: _____

(from 1.4 above)

3. TARGETS

3.1 Nearest Population: _____ Source: ____ Value: _____

3.2 Nearest Sensitive Environment: _____ Source: ____ Value: _____

3.3 Population Within One Mile: _____ Source: ____ Value: _____

3.4 Predominant Non-Residential Land Use: _____ Source: ____ Value: _____

4.0 RELEASE

WORKSHEET 6
GROUND WATER ROUTE

1. SOURCE CHARACTERISTICS

1.1 Source Quantity (Explain basis) Source: ___ Value: _____

_____

_____

1.2 Containment: _____ Source: ___ Value: _____

1.3 Human Toxicity

Substance	Toxicity	Mobility	Toxicity X Mobility
1.			
2.			
3.			
4.			
5.			
6.			

Enter toxicity value of substance with highest toxicity/mobility value: _____

+ Bonus Point: _____

Total Toxicity Value: _____

2. MIGRATION POTENTIAL

2.1 Mobility (see 1.3 above) Value: _____

2.2 Net Precipitation: _____ Source: ___ Value: _____

2.3 Hydraulic Conductivity: _____ Source: ___ Value: _____

2.4 Vertical Depth to Ground Water: _____ Source: ___ Value: _____

3. TARGETS

3.1 Ground Water Usage: _____ Source: ___ Value: _____

3.2 Distance To Nearest Drinking Well: _____ Source: ___ Value: _____

3.3 Population Served by Wells: _____ Source: ___ Value: _____

3.4 Acres Irrigated by Wells: _____ Source: ___ Value: _____

4.0 RELEASE: _____ Source: ___ Value: _____

1.0 SOURCE CHARACTERISTICS

1.1 Source Quantity (explain basis) Source: _____ Value: ____

1.2 Toxicity

	Value
1. 2. 3. 4. 5. 6.	

+ Bonus Point: ____
Total Toxicity Score: ____

2.0 MIGRATION POTENTIAL SUBSTITUTE

2.1 Accessibility: _____ Source: _____ Value: ____

3.0 TARGETS

3.1 Residences Source: _____ Value: ____

3.2 Other Structures or Activities Source: _____ Value: ____

WORKSHEET 8
SOURCES USED IN SCORING

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

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This copy corrects mistakes and omissions of Issue Paper 3 10/23/90 revisions.

ISSUE PAPER #3
DISSOLVED OXYGEN
Revised as of 11/2/90

I. INTRODUCTION

Dissolved oxygen is an important indicator of water quality and the ability of a waterbody to support a healthy aquatic community. Primary sources of dissolved oxygen include photosynthesis and diffusion from the atmosphere. Oxygen is consumed in normal biological and chemical processes that occur in the water column and benthic sediments. Oxygen may also be bound to benthic sediments or lost to the atmosphere.

II. CURRENT RULE

DEQ has adopted several dissolved oxygen water quality standards to protect designated beneficial uses (OAR 340, Division 41, Tables 2-19). For basins in western Oregon the standards are:

340-41-(river basin) 2(a)(A)

(i) Fresh waters shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes.

(ii) Non-salmonid fish producing waters: The DO concentration shall not be less than 6 mg/l.

340-41-(river basin) 2(a)(B)

Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

340-41-(river basin) 2(a)(C)

Columbia River: DO concentrations shall not be less than 90 percent of saturation.

340-41-(river basin) 3

Where the natural quality parameters of water of the ____ basin are outside the numerical limits of the above assigned water quality standards, the natural water quality shall be the standard.

These standards are applied to the following basins: North Coast-Lower Columbia, Mid Coast, Umpqua, South Coast, Rogue, portions of the Willamette, Sandy, Hood, Deschutes, and portions of the Klamath.

The seasonal low dissolved oxygen standards for the salmonid producing streams (340-41-(river basin) 2(a)(A) in eastern Oregon basins is 75% of saturation. This standard is applicable in the following basins: John Day, Umatilla, Walla, Grande Ronde, Powder, Malheur, Owyhee, Malheur Lake, Goose and Summer Lakes.

The Willamette and Klamath River Basins have several river reach specific dissolved oxygen standards. Specifically, the dissolved oxygen standards for the Willamette River Basin (340-41-445) are:

Multnomah Channel to Willamette Falls...5 mg/l
Willamette Falls to Newberg.....6 mg/l
Newberg to Salem.....7 mg/l
Salem to the confluence of tributaries..90 % saturation
Upper tributaries (spawning areas).....90 or 95% saturation
Non-salmonid producing waters.....6 mg/l

The dissolved oxygen standards for the Klamath River Basin (340-41-965) are:

Mainstem Klamath from Klamath Lake to Keno Dam.....5 mg/l
Mainstem Klamath Keno Dam to California Border.....7 mg/l
All other basin waters (spawning).....90 or 95% saturation
Non-salmonid producing waters.....6 mg/l

III. CONCERNS WITH THE CURRENT RULE

Dissolved oxygen standards expressed as a percent of saturation may be unnecessarily stringent during winter months and potentially unprotective during summer months (Chapman, 1986). The U.S. Environmental Protection Agency (EPA) has developed numerical dissolved oxygen criteria for

the protection of salmonid and nonsalmonid fisheries (EPA< 1986) that are also specific for the life stage of each fishery and the length of exposure. These criteria are shown below. Early life stage (ELS) refers to all embryonic, larval and juvenile fish to 30 days old, and other life stages (OLS) refers to all older fish.

	Coldwater		Warmwater	
	ELS	OLS	ELS	OLS
30 day mean	NA	6.5	NA	5.5
7 day mean	9.5	NA	6.0	NA
7 day mean min.	NA	5.0	NA	4.0
1 day min.	8.0	5.0	5.0	3.0

30 and 7 day mean values are then calculated from daily means, which are (daily maximum + daily minimum values)/2. The 7 day mean minimum is calculated from seven consecutive daily minimum values.

Included in the EPA Ambient Water Quality Criteria for Dissolved Oxygen document (Chapman, 1986) is a table identifying the level of fishery resource protection offered at various dissolved oxygen concentrations. These impairment values are listed below.

1. Salmonid Waters

   a. Embryo and Larval Stages

   - No Production Impairment (NPI) =11* (8)
   - Slight Production Impairment (SPI) = 9* (6)
   - Moderate Production Impairment = 8* (5)
   - Severe Production Impairment = 7* (4)
   - Limit to Avoid Acute Mortality = 6* (3)

(*Note: These are water column concentrations recommended to achieve the required intergravel dissolved oxygen concentration shown in parentheses. The 3 mg/l difference is discussed in the criteria document).

   b. Other Life Stages

   - No Production Impairment = 8
   - Slight Production Impairment = 6
   - Moderate Production Impairment = 5
   - Severe Production Impairment = 4
   - Limit to Avoid Acute Mortality = 3

2. Nonsalmonid Waters

a. Early Life Stages

- No Production Impairment = 6.5
- Slight Production Impairment = 5.5
- Moderate Production Impairment = 5
- Severe Production Impairment = 4.5
- Limit to Avoid Acute Mortality = 4

b. Other Life Stages

- No Production Impairment = 6
- Slight Production Impairment = 5
- Moderate Production Impairment = 4
- Severe Production Impairment =3.5
- Limit to Avoid Acute Mortality = 3

3. Invertebrates

- No Production Impairment = 8
- Some Production Impairment = 5
- Limit to Avoid Acute Mortality = 4

From: Chapman, 1986, Water Quality Criteria for Dissolved Oxygen

Specific concerns with existing Oregon water quality standards include:

1. The percent of saturation standards, most notably the 75 percent saturation standards, may not fully protect older salmonids exposed to warmer water temperatures. These standards need to be modified to include acceptable mean and minimum dissolved oxygen concentrations and length of exposures for each.

2. Standards for some portions of the Willamette and Klamath Rivers are less than the EPA 30 day mean criterion for nonspawning salmonids. The existing 5 mg/l dissolved oxygen minimum standard is the same as the EPA seven day minimum mean and will protect persisting fish populations, but as written could allow for considerable loss of production. This 5 mg/l standard is also equal to the one day minimum criterion for the early life stages of nonsalmonid populations. Expansion of the standard to include acceptable long-term and short-term exposure concentrations is necessary.

3. The 6 mg/l minimum standard for the Willamette River above Willamette Falls offers a higher level of protection for salmonids and risks only slight impairment of production. This standard also offers more protection to all life stages of warm water fish in the river. Minimum and mean values and acceptable exposure periods should be established.

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

The following proposed revisions to the dissolved oxygen standards were prepared for public comment to address the Department's concerns with the existing rules. Language proposed to be deleted is bracketed and new language is underlined. Specific basin standards, or rules, which are affected by each recommendation are identified following the proposal.

340-41-___(2)(a)

Dissolved Oxygen (DO):

(A)(i) Salmonid producing waters:

[Fresh waters shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
<u>Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.</u>

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(A)	340-41-205-(2)(a)(A)(i)
Mid Coast	340-41-245(2)(a)(A)	340-41-245-(2)(a)(A)(i)
Umpqua	340-41-285(2)(a)(A)	340-41-285-(2)(a)(A)(i)
South Coast	340-41-325(2)(a)(A)	340-41-325-(2)(a)(A)(i)
Roque	340-41-365(2)(a)(A)	340-41-365-(2)(a)(A)(i)
Willamette	340-41-445(2)(a)(E)(i)	340-41-445-(2)(a)(A)(i)
Sandy	340-41-485(2)(a)(B)	340-41-485-(2)(a)(A)(i)
Hood	340-41-525(2)(a)(B)(i)	340-41-525-(2)(a)(A)(i)
Deschutes	340-41-565(2)(a)(B)	340-41-565-(2)(a)(A)(i)
Klamath	340-41-965(2)(a)(C)(i)	340-41-965-(2)(a)(A)(i)

340-41-___(2)(a)

(A)(i) Salmonid producing waters:

[DO concentrations shall not be less than 75% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
John Day	340-41-605(2)(a)(B)	340-41-605(2)(a)(A)(i)
Umatilla	340-41-645(2)(a)(B)	340-41-645(2)(a)(A)(i)
Walla Walla	340-41-685(2)(a)	340-41-685(2)(a)(A)(i)
Grande Ronde	340-41-725(2)(a)	340-41-725(2)(a)(A)(i)
Powder	340-41-765(2)(a)	340-41-765(2)(a)(A)(i)
Malheur	340-41-805(2)(a)	340-41-805(2)(a)(A)(i)
Owyhee	340-41-845(2)(a)	340-41-845(2)(a)(A)(i)
Malheur Lake	340-41-885(2)(a)	340-41-885(2)(a)(A)(i)
Goose and Summer Lakes	340-41-925(2)(a)(A)	340-41-925(2)(a)(A)(i)

340-41-___(2)(a)

(A)(ii) Non-salmonid fish producing waters:

[The DO concentration shall not be less than 6 mg/l].
The 30 day mean dissolved oxygen concentrations shall be 6.0 mg/l or greater with one day minimum concentrations of not less than 4.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 5.0 mg/l. Dissolved oxygen concentrations in spawning areas shall have seven day mean water column concentrations of 6.5 mg/l or greater and one day minimum concentrations of 5.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
Willamette	340-41-445(2)(a)(E)(ii)	340-41-445(2)(a)(A)(ii)
Hood	340-41-525(2)(a)(B)(ii)	340-41-525(2)(a)(A)(ii)
Klamath	340-41-965(2)(a)(C)(ii)	340-41-965(2)(a)(A)(ii)
North Coast		340-41-205(2)(a)(A)(ii)
Mid Coast		340-41-225(2)(a)(A)(ii)
Umpqua		340-41-285(2)(a)(A)(ii)
South Coast		340-41-325(2)(a)(A)(ii)
Roque		340-41-365(2)(a)(A)(ii)
Sandy		340-41-485(2)(a)(A)(ii)
Deschutes		340-41-565(2)(a)(A)(ii)
John Day		340-41-605(2)(a)(A)(ii)
Umatilla		340-41-645(2)(a)(A)(ii)
Walla Walla		340-41-685(2)(a)(A)(ii)
Grande Ronde		340-41-725(2)(a)(A)(ii)
Powder		340-41-765(2)(a)(A)(ii)
Malheur		340-41-805(2)(a)(A)(ii)
Owyhee		340-41-845(2)(a)(A)(ii)
Malheur Lake		340-41-885(2)(a)(A)(ii)
Goose and Summer Lakes		340-41-925(2)(a)(A)(ii)

340-41-___ (2)(a)

(B) Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(B)	340-41-205-(2)(a)(B)
Mid Coast	340-41-225(2)(a)(B)	340-41-225-(2)(a)(B)
Umpqua	340-41-285(2)(a)(B)	340-41-285-(2)(a)(B)
South Coast	340-41-325(2)(a)(B)	340-41-325-(2)(a)(B)
Roque	340-41-365(2)(a)(B)	340-41-365-(2)(a)(B)

340-41-___(2)(a)

(C) When natural environmental conditions limit dissolved oxygen concentrations to less than 110 percent of the applicable numerical standard, 90 percent of the natural dissolved oxygen concentration shall be the standard.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast		340-41-205(2)(a)(C)
Mid Coast		340-41-225(2)(a)(C)
Umpqua		340-41-285(2)(a)(C)
South Coast		340-41-325(2)(a)(C)
Roque		340-41-365(2)(a)(C)
Willamette		340-41-445(2)(a)(B)
Sandy		340-41-485(2)(a)(B)
Hood		340-41-525(2)(a)(B)
Deschutes		340-41-565(2)(a)(B)
John Day		340-41-605(2)(a)(B)
Umatilla		340-41-645(2)(a)(B)
Walla Walla		340-41-685(2)(a)(B)
Grande Ronde		340-41-725(2)(a)(B)
Powder		340-41-765(2)(a)(B)
Malheur		340-41-805(2)(a)(B)
Owyhee		340-41-845(2)(a)(B)
Malheur Lake		340-41-885(2)(a)(B)
Goose and Summer Lakes		340-41-925(2)(a)(B)
Klamath		340-41-965(2)(a)(B)

Additional Proposed Deletions:

340-41-___(2)(a)

(C) [Columbia River: DO concentrations shall not be less than 90 percent of saturation].

RULE REFERENCES BY BASIN

Basin	Old Rule
North Coast	340-41-205(2)(a)(C)
Willamette	340-41-445(2)(a)(F)
Sandy	340-41-485(2)(a)(A)
Hood	340-41-525(2)(a)(A)
Deschutes	340-41-565(2)(a)(A)
John Day	340-41-605(2)(a)(A)
Umatilla	340-41-645(2)(a)(A)

340-41-445(2)(a)

(A) [Multnomah Channel and Main stem Willamette River from mouth to the Willamette Falls at Oregon City, river mile 26.6: The DO concentration shall not be less than 5 mg/l.

(B) Main stem Willamette River from the Willamette Falls to Newberg, river mile 50: The DO concentration shall not be less than 6 mg/l.

(C) Main stem Willamette River from Newberg to Salem, river mile 85: The DO concentration shall not be less than 7 mg/l.

(D) Main stem Willamette River from Salem to the confluence of the Coast and Middle Forks, river mile 187: The DO concentration shall not be less than 90% of saturation.]

340-41-925(2)(a)

(B) [Goose Lake:DO concentrations shall not be less than 7 milligrams per liter.]

340-41-965(2)(a)

(A) Main stem Klamath River from Klamath Lake to Keno Dam, (river miles 255 to 232.5): DO concentrations shall not be less than 5 mg/l.

(B) Main stem Klamath River from Keno dam to Oregon-California Border (river miles 232.5 to 208.5): DO concentrations shall not be less than 7 mg/l.

New standards proposed above are also applicable to these water bodies.

V. PUBLIC COMMENT RECEIVED ON ISSUE PAPER AND AGENCY RESPONSE

DEQ received numerous comments on the proposed dissolved oxygen (DO) standard. The issues will be described and the Department's response will follow each issue. Generally, the questions and comments were related to the following four issues:

1. Need for change: Why are revisions being proposed? Has use impairment been documented under existing standards and what documentation is available to demonstrate that the Willamette River fishery is "under stress" and to show that the stress is related to the current D.O. (dissolved oxygen) standards? Will the proposed revisions maintain, improve or attain the designated use?

RESPONSE

The reasons for proposing revisions to the dissolved oxygen standards are as described in the Issues Paper. They include:

a) Concern that the percent saturation standards, specifically the 75 percent saturation standards which currently apply to many Eastern Oregon streams, may not protect older salmonids exposed to warmer water temperatures. As EPA pointed out to DEQ in their review of Oregon's list of streams identified as potentially water quality limiting and as presented in their 1986 guidance document, D.O. standards expressed as a percent of saturation may be unnecessarily stringent during winter months and potentially not protective during summer months. Also, the current standards do not express an acceptable mean and minimum and length of exposure for each.

b) Some existing standards are less than EPA criteria for no production impairment, and some standards established to protect the same sensitive use differ between some basins and stream segments. Revisions are proposed to address these anomalies.

The proposed revisions are aimed at protecting the designated beneficial uses by identifying the instream quality dissolved oxygen values that provide for "no production impairment" levels of the most sensitive designated uses of the water.

2. EPA Criteria: What beneficial uses are to be protected, what are the proposes values based on, and why weren't EPA national criteria used? Some recommended the EQC direct the DEQ to produce a detailed scientific basis for the proposal or utilize EPA's recommended approach for setting dissolved oxygen standards. Some asked whether EPA had been consulted regarding DEQ's departure from recommended criteria and how DEQ evaluated the factors EPA considered in setting the national criteria's D.O. levels.

RESPONSE

The proposed values are intended to protect the three beneficial uses most sensitive to dissolved oxygen. These include coldwater fish, warmwater fish and aquatic life. Coldwater fisheries are further categorized in the state's Beneficial Use Tables (OAR 340, Division 41) as Anadromous Fish Passage, Anadromous (Shad and Sturgeon) Fish Spawning, Salmonid Fish Rearing and Salmonid Fish Spawning. Coldwater fish include salmonids of the genera Coregonus, Oncorhyncus, Prosopium, Salmo, Salvelinus, Stenodus and Thymallus.

Even though standards are expressed in terms of salmonid and nonsalmonid producing waters, it is intended that the numerical values proposed for salmonid producing waters also apply to other coldwater fish. Oregon Fish and Wildlife may also have suggestions as to other sensitive species that need to be protected under the category of "salmonid producing" waters.

Salmonid producing waters may be identified as spawning and early life stage areas (the early life stage includes egg, embryo, larval and juvenile forms up to 30 days after hatching) where a higher seasonal D.O. standard would be applicable. The lower standard for salmonid producing waters would be applied in spawning areas when spawning adults or early life stages are not present and for rearing areas and migration routes. The salmonid producing waters standard would also apply to coldwater tributaries which support macroinvertebrate communities upon which the young salmonids feed. The warmwater, or nonsalmonid DO standard will not adequately protect these sensitive communities.

The nonsalmonid standard applies to all warmwater environments which support all nonsalmonid fish populations and the plant and animal life characteristic of these communities.

The proposed numerical values are based on EPA qualitative effects level criteria. The 7-day average (mean) values proposed for coldwater and warmwater fisheries spawning areas and seasons and the 30-day average (mean) values for nonspawning areas and seasons are equivalent to EPA's criteria for "no production impairment" at constant exposures levels. EPA recommends a 7-day averaging period for spawning waters and use of the "no production impairment" value as the mean where slight production impairment or a small but undefinable risk of moderate production impairment is unacceptable". They also recommend the "slight production impairment" values as minima to provide this level of protection.

EPA defines slight production impairment as a 10% reduction in productivity and a moderate production impairment as a 20% reduction in productivity. These values were generated primarily with laboratory data corroborated with limited field information.

In comparison and as EPA notes, the "national criteria" present averages which represent conditions **between** no production and slight production impairment. They do not represent an assured no-effect level. In situations where criteria conditions are just maintained for considerable periods, the criteria represent some risk of production impairment according to EPA.

After again reviewing EPA guidance in consideration of the public's comments, the Department has prepared an alternate proposal (Option 2) for public hearing. This proposal is suggested for public hearing comment in addition to the original proposal (Option 1). Under Option 2 all 1-day minima are proposed at the "slight production impairment" level as compared to Option 1 where some are at the "moderate production impairment" level. Under this Option, a return frequency (recurrence interval) of violations of the 1 day minima of once every 10 years would be used to evaluate compliance. In addition, Option 2 proposes to apply the more protective warmwater fisheries values for spawning periods and areas to all nonsalmonid fish producing waters yearround. A comparison of Option 1 (the 9/21/90 proposal) and Option 2 (a new 11/2/90 proposal) and EPA criteria are presented in Tables 1(A) through 1(D). Proposed rule language coinciding with Option 2 is presented in the revised attachment of proposals for public hearing.

3. TMDLs: Are the proposed values achievable in natural waters and how will compliance with the standards be evaluated. Will the change in standards necessitate a change in instream monitoring requirements? Will dynamic or statistical modeling be used to establish TMDLs that maintain dissolved oxygen standards? Will the basin standards for biochemical oxygen demand (for sewage treatment systems) be revised if TMDLs based on proposed standards do not justify as stringent levels of technology?

RESPONSE

Existing ambient data collected during intensive diurnal monitoring efforts on the Willamette River indicate that the proposed standards are attainable. Nevertheless, when natural conditions such as temperature, elevation, and natural allocthonous input limits the solubility of oxygen in water to less than 110% of the numerical standard, 90% of the natural condition would be the minimum standard.

Attainment of water quality standards will continue to be evaluated using ambient monitoring data. If based on the ambient data the waterbody is found to not meet water quality standards special intensive studies would be conducted to assess the point and non point sources contributions and to establish the Total Maximum Daily Loads and Waste Load Allocations.

As related above, upon review of the public comment, the Department has prepared an alternate proposal (Option 2) for public hearing. Higher values are proposed as the daily minima to provide better assurance that even with limited monitoring data, uses will be protected. Though the proposed 30-day and 7-day mean values are aimed at "no production impairment", the Department relies on data which must be considered representative of the 1-day minima in assessing compliance with standards.

The Department, with the aid of a Technical Advisory Committee, has not yet selected the model for the Willamette River. A stoichastic model will be used to make preliminary sensitivity checks. Depending on the sensitive checks a dynamic model may be used. If a dynamic model is to be used, a significantly greater amount of effort will be needed for data collection than can be provided with available resources.

The Department is not proposing a change in the basin treatment criteria, though effluent limits may be made more stringent if necessary to achieve water quality standards or address the policies of the EQC, including the antidegradation policy.

4. Effect of the Change: What will be the effect of the proposed standards on dischargers? Some commented that the proposed dissolved oxygen values would result in virtually all discharges on the Willamette River in violation of the proposed values and compliance with the proposed dissolved oxygen standard will cost hundreds of millions of dollars. Others suggested that additional investigations be performed by the Department before adopting numerical concentrations as regulatory standards or that the EPA "national" criteria" be adopted until the Willamette River study is complete. Others asked if upgraded treatment is needed, how much and will a schedule of compliance be provided?

RESPONSE

The Department does not anticipate treatment requirements any more stringent than would be needed to meet existing water quality standards for dissolved oxygen. Compliance schedules are typically developed for permittees required to achieve effluent limits more stringent than specified in their current permit.

VI. PROPOSED RULE AMENDMENT: Dissolved Oxygen Option 1 & Option 2

OPTION 1 - Dissolved Oxygen

The following presents the first of two alternate dissolved oxygen standards proposals for which the Department is requesting public comment. The numerical values proposed as the 30-day average for salmonid waters and the 7-day averages for salmonid spawning and nonsalmonid waters are based upon U.S. EPA criteria for "No Production Impairment" to the specific fisheries at constant exposure values. Option 1 differs from Option 2 primarily in the 1-day (instaneous) minima values proposed to protect the uses. Also, proposed dissolved oxygen values for nonsalmonid producing waters (warmwater fisheries) differentiate between nonspawning areas and periods and spawning areas and periods under Option 1.

Existing rule language proposed to be deleted is bracketed and proposed new language is underlined. Specific basin standards, or rules, which are affected by each recommendation are identified following the proposed new language.

340-41-___(2)(a) Dissolved Oxygen (DO):

(A)(i) Salmonid producing waters:

[Fresh waters: DO concentrations shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(A)	340-41-205-(2)(a)(A)(i)
Mid Coast	340-41-245(2)(a)(A)	340-41-245-(2)(a)(A)(i)
Umpqua	340-41-285(2)(a)(A)	340-41-285-(2)(a)(A)(i)
South Coast	340-41-325(2)(a)(A)	340-41-325-(2)(a)(A)(i)
Roque	340-41-365(2)(a)(A)	340-41-365-(2)(a)(A)(i)
Willamette	340-41-445(2)(a)(E)(i)	340-41-445-(2)(a)(A)(i)
Sandy	340-41-485(2)(a)(B)	340-41-485-(2)(a)(A)(i)
Hood	340-41-525(2)(a)(B)(i)	340-41-525-(2)(a)(A)(i)
Deschutes	340-41-565(2)(a)(B)	340-41-565-(2)(a)(A)(i)
Klamath	340-41-965(2)(a)(C)(i)	340-41-965-(2)(a)(A)(i)

340-41-___(2)(a)

(A)(i) Salmonid producing waters:

[DO concentrations shall not be less than 75% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].

Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 5.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
John Day	340-41-605(2)(a)(B)	340-41-605(2)(a)(A)(i)
Umatilla	340-41-645(2)(a)(B)	340-41-645(2)(a)(A)(i)
Walla Walla	340-41-685(2)(a)	340-41-685(2)(a)(A)(i)
Grande Ronde	340-41-725(2)(a)	340-41-725(2)(a)(A)(i)
Powder	340-41-765(2)(a)	340-41-765(2)(a)(A)(i)
Malheur	340-41-805(2)(a)	340-41-805(2)(a)(A)(i)
Owyhee	340-41-845(2)(a)	340-41-845(2)(a)(A)(i)
Malheur Lake	340-41-885(2)(a)	340-41-885(2)(a)(A)(i)
Goose and Summer Lakes	340-41-925(2)(a)(A)	340-41-925(2)(a)(A)(i)

340-41-___(2)(a)

(A)(ii) Non-salmonid fish producing waters:

[The DO concentration shall not be less than 6 mg/l].
The 30 day mean dissolved oxygen concentrations shall be 6.0 mg/l or greater with one day minimum concentrations of not less than 4.0 mg/l and the mean of seven consecutive daily minima equal to, or greater than 5.0 mg/l. Dissolved oxygen concentrations in spawning areas shall have seven day mean water column concentrations of 6.5 mg/l or greater and one day minimum concentrations of 5.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
Willamette	340-41-445(2)(a)(E)(ii)	340-41-445(2)(a)(A)(ii)
Hood	340-41-525(2)(a)(B)(ii)	340-41-525(2)(a)(A)(ii)
Klamath	340-41-965(2)(a)(C)(ii)	340-41-965(2)(a)(A)(ii)
North Coast		340-41-205(2)(a)(A)(ii)
Mid Coast		340-41-225(2)(a)(A)(ii)
Umpqua		340-41-285(2)(a)(A)(ii)
South Coast		340-41-325(2)(a)(A)(ii)
Roque		340-41-365(2)(a)(A)(ii)
Sandy		340-41-485(2)(a)(A)(ii)
Deschutes		340-41-565(2)(a)(A)(ii)
John Day		340-41-605(2)(a)(A)(ii)
Umatilla		340-41-645(2)(a)(A)(ii)
Walla Walla		340-41-685(2)(a)(A)(ii)
Grande Ronde		340-41-725(2)(a)(A)(ii)
Powder		340-41-765(2)(a)(A)(ii)
Malheur		340-41-805(2)(a)(A)(ii)
Owyhee		340-41-845(2)(a)(A)(ii)
Malheur Lake		340-41-885(2)(a)(A)(ii)
Goose and Summer Lakes		340-41-925(2)(a)(A)(ii)

340-41-___ (2)(a)

(B) Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(B)	340-41-205-(2)(a)(B)
Mid Coast	340-41-225(2)(a)(B)	340-41-225-(2)(a)(B)
Umpqua	340-41-285(2)(a)(B)	340-41-285-(2)(a)(B)
South Coast	340-41-325(2)(a)(B)	340-41-325-(2)(a)(B)
Roque	340-41-365(2)(a)(B)	340-41-365-(2)(a)(B)

340-41-___(2)(a)

(C) When natural environmental conditions limit dissolved oxygen concentrations to less than 110 percent of the applicable numerical standard, 90 percent of the natural dissolved oxygen concentration shall be the standard.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast		340-41-205(2)(a)(C)
Mid Coast		340-41-225(2)(a)(C)
Umpqua		340-41-285(2)(a)(C)
South Coast		340-41-325(2)(a)(C)
Roque		340-41-365(2)(a)(C)
Willamette		340-41-445(2)(a)(B)
Sandy		340-41-485(2)(a)(B)
Hood		340-41-525(2)(a)(B)
Deschutes		340-41-565(2)(a)(B)
John Day		340-41-605(2)(a)(B)
Umatilla		340-41-645(2)(a)(B)
Walla Walla		340-41-685(2)(a)(B)
Grande Ronde		340-41-725(2)(a)(B)
Powder		340-41-765(2)(a)(B)
Malheur		340-41-805(2)(a)(B)
Owyhee		340-41-845(2)(a)(B)
Malheur Lake		340-41-885(2)(a)(B)
Goose and Summer Lakes		340-41-925(2)(a)(B)
Klamath		340-41-965(2)(a)(B)

Additional Proposed Deletions:

340-41-___(2)(a)

[(C) Columbia River: DO concentrations shall not be less than 90 percent of saturation].

RULE REFERENCES BY BASIN

Basin	Old Rule
North Coast	340-41-205(2)(a)(C)
Willamette	340-41-445(2)(a)(F)
Sandy	340-41-485(2)(a)(A)
Hood	340-41-525(2)(a)(A)
Deschutes	340-41-565(2)(a)(A)
John Day	340-41-605(2)(a)(A)
Umatilla	340-41-645(2)(a)(A)

340-41-445(2)(a)

[(A) Multnomah Channel and Main stem Willamette River from mouth to the Willamette Falls at Oregon City, river mile 26.6: The DO concentration shall not be less than 5 mg/l.

(B) Main stem Willamette River from the Willamette Falls to Newberg, river mile 50: The DO concentration shall not be less than 6 mg/l.

(C) Main stem Willamette River from Newberg to Salem, river mile 85: The DO concentration shall not be less than 7 mg/l.

(D) Main stem Willamette River from Salem to the confluence of the Coast and Middle Forks, river mile 187: The DO concentration shall not be less than 90% of saturation.]

340-41-925(2)(a)

[(B) Goose Lake:DO concentrations shall not be less than 7 milligrams per liter.]

340-41-965(2)(a)

[(A) Main stem Klamath River from Klamath Lake to Keno Dam, (river miles 255 to 232.5): DO concentrations shall not be less than 5 mg/l.

(B) Main stem Klamath River from Keno dam to Oregon-California Border (river miles 232.5 to 208.5): DO concentrations shall not be less than 7 mg/l.]

New standards proposed above are also applicable to these water bodies.

PROPOSED RULE AMENDMENTS

OPTION 2 - Dissolved Oxygen

The following presents the second of two alternate dissolved oxygen standards proposals for which the Department is requesting public comment. The numerical values proposed as the 30-day average for salmonid waters and the 7-day averages for salmonid spawning and nonsalmonid waters are based upon U.S. EPA criteria for "No Production Impairment" to the specific fisheries at constant exposure values. Option 2 differs from Option 2 primarily in the 1-day (instaneous) minima values proposed to protect the uses, though they differ in several other aspects as well.

Existing rule language proposed to be deleted is bracketed and proposed new language is underlined. Specific basin standards, or rules, which are affected by each recommendation are identified following the proposed new language.

340-41-___(2)(a) Dissolved Oxygen (DO):

(A)(i) Salmonid producing waters:

[Fresh waters: DO concentrations shall not be less than 90% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(A)	340-41-205-(2)(a)(A)(i)
Mid Coast	340-41-245(2)(a)(A)	340-41-245-(2)(a)(A)(i)
Umpqua	340-41-285(2)(a)(A)	340-41-285-(2)(a)(A)(i)
South Coast	340-41-325(2)(a)(A)	340-41-325-(2)(a)(A)(i)
Roque	340-41-365(2)(a)(A)	340-41-365-(2)(a)(A)(i)
Willamette	340-41-445(2)(a)(E)(i)	340-41-445-(2)(a)(A)(i)
Sandy	340-41-485(2)(a)(B)	340-41-485-(2)(a)(A)(i)
Hood	340-41-525(2)(a)(B)(i)	340-41-525-(2)(a)(A)(i)
Deschutes	340-41-565(2)(a)(B)	340-41-565-(2)(a)(A)(i)
Klamath	340-41-965(2)(a)(C)(i)	340-41-965-(2)(a)(A)(i)

340-41-___(2)(a)

(A)(i) Salmonid producing waters:

[DO concentrations shall not be less than 75% of saturation at the seasonal low, or less than 95% of saturation in spawning areas during spawning, incubation, hatching, and fry stages of salmonid fishes].
Freshwaters shall have 30 day mean dissolved oxygen concentrations of 8.0 mg/l or greater with one day minimum concentrations of not less than 6.0 mg/l. Dissolved oxygen concentrations in areas of salmonid spawning shall have seven day mean water column concentrations of 11.0 mg/l or greater and one day minimum concentrations of 9.0 mg/l or greater during spawning, egg incubation, hatching and early life stages up to 30 days post hatch.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
John Day	340-41-605(2)(a)(B)	340-41-605(2)(a)(A)(i)
Umatilla	340-41-645(2)(a)(B)	340-41-645(2)(a)(A)(i)
Walla Walla	340-41-685(2)(a)	340-41-685(2)(a)(A)(i)
Grande Ronde	340-41-725(2)(a)	340-41-725(2)(a)(A)(i)
Powder	340-41-765(2)(a)	340-41-765(2)(a)(A)(i)
Malheur	340-41-805(2)(a)	340-41-805(2)(a)(A)(i)
Owyhee	340-41-845(2)(a)	340-41-845(2)(a)(A)(i)
Malheur Lake	340-41-885(2)(a)	340-41-885(2)(a)(A)(i)
Goose and Summer Lakes	340-41-925(2)(a)(A)	340-41-925(2)(a)(A)(i)

340-41-___(2)(a)

(A)(ii) Non-salmonid fish producing waters:

[The DO concentration shall not be less than 6 mg/l]. Dissolved oxygen concentrations shall have seven day mean water column concentrations of 6.5 mg/l or greater and one day minimum concentrations of 5.5 mg/l or greater.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
Willamette	340-41-445(2)(a)(E)(ii)	340-41-445(2)(a)(A)(ii)
Hood	340-41-525(2)(a)(B)(ii)	340-41-525(2)(a)(A)(ii)
Klamath	340-41-965(2)(a)(C)(ii)	340-41-965(2)(a)(A)(ii)
North Coast		340-41-205(2)(a)(A)(ii)
Mid Coast		340-41-225(2)(a)(A)(ii)
Umpqua		340-41-285(2)(a)(A)(ii)
South Coast		340-41-325(2)(a)(A)(ii)
Roque		340-41-365(2)(a)(A)(ii)
Sandy		340-41-485(2)(a)(A)(ii)
Deschutes		340-41-565(2)(a)(A)(ii)
John Day		340-41-605(2)(a)(A)(ii)
Umatilla		340-41-645(2)(a)(A)(ii)
Walla Walla		340-41-685(2)(a)(A)(ii)
Grande Ronde		340-41-725(2)(a)(A)(ii)
Powder		340-41-765(2)(a)(A)(ii)
Malheur		340-41-805(2)(a)(A)(ii)
Owyhee		340-41-845(2)(a)(A)(ii)
Malheur Lake		340-41-885(2)(a)(A)(ii)
Goose and Summer Lakes		340-41-925(2)(a)(A)(ii)

340-41-___ (2)(a)

(B) Marine and estuarine waters (outside of zones of upwelled marine waters naturally deficient in DO): DO concentrations shall not be less than 6 mg/l for estuarine waters, or less than saturation concentrations for marine waters.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(a)(B)	340-41-205-(2)(a)(B)
Mid Coast	340-41-225(2)(a)(B)	340-41-225-(2)(a)(B)
Umpqua	340-41-285(2)(a)(B)	340-41-285-(2)(a)(B)
South Coast	340-41-325(2)(a)(B)	340-41-325-(2)(a)(B)
Roque	340-41-365(2)(a)(B)	340-41-365-(2)(a)(B)

340-41-___(2)(a)

(C) When natural environmental conditions limit dissolved oxygen concentrations to less than 110 percent of the applicable numerical standard, 90 percent of the natural dissolved oxygen concentration shall be the standard.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast		340-41-205(2)(a)(C)
Mid Coast		340-41-225(2)(a)(C)
Umpqua		340-41-285(2)(a)(C)
South Coast		340-41-325(2)(a)(C)
Roque		340-41-365(2)(a)(C)
Willamette		340-41-445(2)(a)(B)
Sandy		340-41-485(2)(a)(B)
Hood		340-41-525(2)(a)(B)
Deschutes		340-41-565(2)(a)(B)
John Day		340-41-605(2)(a)(B)
Umatilla		340-41-645(2)(a)(B)
Walla Walla		340-41-685(2)(a)(B)
Grande Ronde		340-41-725(2)(a)(B)
Powder		340-41-765(2)(a)(B)
Malheur		340-41-805(2)(a)(B)
Owyhee		340-41-845(2)(a)(B)
Malheur Lake		340-41-885(2)(a)(B)
Goose and Summer Lakes		340-41-925(2)(a)(B)
Klamath		340-41-965(2)(a)(B)

Additional Proposed Deletions:

340-41-___(2)(a)

[(C) Columbia River: DO concentrations shall not be less than 90 percent of saturation].

RULE REFERENCES BY BASIN

Basin	Old Rule
North Coast	340-41-205(2)(a)(C)
Willamette	340-41-445(2)(a)(F)
Sandy	340-41-485(2)(a)(A)
Hood	340-41-525(2)(a)(A)
Deschutes	340-41-565(2)(a)(A)
John Day	340-41-605(2)(a)(A)
Umatilla	340-41-645(2)(a)(A)

340-41-445(2)(a)

[(A) Multnomah Channel and Main stem Willamette River from mouth to the Willamette Falls at Oregon City, river mile 26.6: The DO concentration shall not be less than 5 mg/l.

(B) Main stem Willamette River from the Willamette Falls to Newberg, river mile 50: The DO concentration shall not be less than 6 mg/l.

(C) Main stem Willamette River from Newberg to Salem, river mile 85: The DO concentration shall not be less than 7 mg/l.

(D) Main stem Willamette River from Salem to the confluence of the Coast and Middle Forks, river mile 187: The DO concentration shall not be less than 90% of saturation.]

340-41-925(2)(a)

[(B) Goose Lake:DO concentrations shall not be less than 7 milligrams per liter.]

340-41-965(2)(a)

[(A) Main stem Klamath River from Klamath Lake to Keno Dam, (river miles 255 to 232.5): DO concentrations shall not be less than 5 mg/l.

(B) Main stem Klamath River from Keno dam to Oregon-California Border (river miles 232.5 to 208.5): DO concentrations shall not be less than 7 mg/l.]

New standards proposed above are also applicable to these water bodies.

REFERENCES

Chapman, G. 1986. Water Quality Criteria for Dissolved Oxygen. EPA 440/5-86-003

EPA. 1986. Quality Criteria for Water 1986. EPA 440/5-86-001

(COMPARISON OF EXISTING DISSOLVED OXYGEN STANDARDS, EPA CRITERIA AND ALTERNATE PROPOSALS FOR HEARING AUTHORIZATION REQUEST ON NOVEMBER 2, 1990)

BENEFICIAL USE: SALMONID PRODUCING WATERS -- SPAWNING, INCUBATION, HATCHING AND EARLY LIFE STAGE

Stream Basin	Application of Numerical Value	Existing Standard	09/21/90 Proposal	11/02/90 Alternate Proposal	EPA "National" Criteria(1)	EPA Criteria With Quality Effects(2)
Willamette 0 - 26.6 + Multnomah Channel	30-Day Average	This Beneficial Use Is Not Designated for This Segment	None Proposed For This Use	Standard for Salmonid Producing (Passage, Rearing & Later Life Stage) Appl.		
	7-Day Average					
	7-Day Mean Min.					
	1 Day					
Willamette >26.6 - RM 50	30-Day Average	This Beneficial Use Is Not Designated for This Segment	None Proposed For This Use	Standard for Salmonid Producing (Passage, Rearing & Later Life Stage) Appl.		
	7-Day Average					
	7-Day Mean Min.					
	1 Day					
Willamette >50 to RM 85	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 7.0	9.0	9.0	8.0	9.0
Willamette >85 to RM 187	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 90% Saturation	9.0	9.5	8.0	9.0
Willamette Tributaries, and North Coast, Mid Coast, Umpqua, SC, Rogue, Sandy, Hood, Deschutes, & Klamath River Basins, Except as Noted Below	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 95% Saturation(3)	9.0	9.0	8.0	9.0
Columbia River	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 90% of Saturation(4)	9.0	9.0	8.0	9.0
John Day, Umatilla, Walla Walla, Grande Ronde, Powder, Malheur, Owyee, Malheur Lake, Goose & Summer Lake	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 95% of Saturation(3)	9.0	9.0	8.0	9.0
Mainsteam Klamath Falls from Klamath Lake to Keno Dam	30-Day Average	This Beneficial Use Is Not Designated for This Segment	None Proposed For This Use	Standard for Non-Salmonid Waters (Early Life Stages) Applies		
	7-Day Average					
	7-Day Mean Min.					
	1 Day					
Mainsteam Klamath Falls from Keno Dam to OR/CA Border	30-Day Average					
	7-Day Average		11.0	11.0	9.5	11.0
	7-Day Mean Min.					
	1 Day	Not Less than 7.0	9.0	9.0	8.0	9.0

NOTE:

(1) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986, Table 8, National Criteria. Average DO concentration values are 0.5 mg/l above the slight production impairment values. Serve as estimate of threshold concentrations below which detrimental effects expected.

(2) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986. Summary of DO concentrations coinciding with EPA's judgments on qualitative levels of effect: 30-day average -- No Production Impairment; 7-day average -- Slight Production Impairment; 1-day minimum -- Moderate Production Impairment. Slight and Moderate are equivalent to 10 - 20 percent growth impairment, respectively.

(3) 95% Sat.: Is equivalent at 10°C to DO concentrations of 10.8 mg/l and 9.3 mg/l for elevations of 0 and 4,000 feet, respectively. Is equivalent at 15°C to DO concentrations of 9.6 mg/l and 8.3 mg/l for elevations of 0 and 4,000 feet, respectively.

(4) 90% Sat.: Is equivalent at 10°C to DO concentrations of 10.2 mg/l and 8.8 mg/l for elevations of 0 and 4,000 feet, respectively. Is equivalent at 15°C to DO concentrations of 9.1 mg/l and 7.9 mg/l for elevations of 0 and 4,000 feet, respectively.

Table 1B

(COMPARISON OF EXISTING DISSOLVED OXYGEN STANDARDS, EPA CRITERIA AND ALTERNATE PROPOSALS FOR HEARING AUTHORIZATION REQUEST ON NOVEMBER 2, 1990)

BENEFICIAL USE: SALMONID PRODUCING WATERS -- PASSAGE & REARING AND LATER LIFE STAGE

Stream Basin	Application of Numerical Value	Existing Standard	09/21/90 Proposal	11/02/90 Alternate Proposal	EPA "National" Criteria(1)	EPA Criteria With Quality Effects(2)
Willamette 0 - 26.6 + Multnomah Channel	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 5.0	5.0	6.0	4.5*	5.0
Willamette >26.6 - RM 50	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 6.0	5.0	6.0	4.5*	5.0
Willamette >50 to RM 85	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 7.0	5.0	6.0	4.5*	5.0
Willamette >85 to RM 187	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 90% Saturation(4)	5.0	6.0	4.5*	5.0
Willamette Tributaries, and North Coast, Mid Coast, Umpqua, SC, Rogue, Sandy, Hood, Deschutes, & Klamath River Basins, Except as Noted Below	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 90% Saturation, Except When More Sensitive Use Occurs(4)	5.0	6.0	4.5*	5.0
Columbia River	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 90% Saturation(4)	5.0	6.0	4.5*	5.0
John Day, Umatilla, Walla Walla, Grande Ronde, Powder, Malheur, Owyee, Malheur Lake, Goose & Summer Lake	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 75% Saturation, Except When More Sensitive Use Occurs(5)	5.0	6.0	4.5*	5.0
Mainsteam Klamath Falls from Klamath Lake to Keno Dam	30-Day Average	This Beneficial Use Is Not Designated for This Segment		Standard for Non-Salmonid Waters (Early Life Stages) Applies'		
	7-Day Average					
	7-Day Mean Min.					
	1 Day					
Mainsteam Klamath Falls from Keno Dam to OR/CA Border	30-Day Average		8.0	8.0	6.5	8.0
	7-Day Average					
	7-Day Mean Min.		6.0		5.0	6.0
	1 Day	Not Less than 7.0	5.0	6.0	4.5*	5.0

* 0.5 mg/l added to value of Table 8 as suggested by EPA to minimize risk where "manipulatable" discharges would allow repeated weekly cycles of minimum acutely acceptable DO values.

NOTE:

(1) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986, Table 8, National Criteria. Average DO concentration values are 0.5 mg/l above the slight production impairment values. Serve as estimate of threshold concentrations below which detrimental effects expected.

(2) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986. Summary of DO concentrations coinciding with EPA's judgments on qualitative levels of effect: 30-day average -- No Production Impairment; 7-day average -- Slight Production Impairment; 1-day minimum -- Moderate Production Impairment. Slight and Moderate are equivalent to 10 - 20 percent growth impairment, respectively.

(4) 90% Sat.: Is equivalent at 20°C to DO concentrations between 8.2 mg/l and 7.1 mg/l for elevations between 0 and 4,000 feet, respectively.

(5) 75% Sat.: Is equivalent at 20°C to DO concentrations of 6.5 mg/l and 5.9 mg/l for elevations of 1,000 and 4,000 feet, respectively. Is equivalent at 24°C to DO concentrations of 6.1 mg/l and 5.5 mg/l for elevations of 1,000 4,000 feet, respectively.

(COMPARISON OF EXISTING DISSOLVED OXYGEN STANDARDS, EPA CRITERIA AND ALTERNATE PROPOSALS FOR HEARING AUTHORIZATION REQUEST ON NOVEMBER 2, 1990)

BENEFICIAL USE: NON-SALMONID WATERS -- WARMWATER FISH CRITERIA (EARLY LIFE STAGES)

Stream Basin	Application of Numerical Value	Existing Standard	09/21/90 Proposal	11/02/90 Alternate Proposal	EPA "National" Criteria(1)	EPA Criteria With Quality Effects(2)
Willamette 0 - 26.6 + Multnomah Channel	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 5.0	N/A		5.0	5.5
Willamette >26.6 - RM 50	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 6.0	N/A		5.0	5.5
Willamette >50 to RM 85	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 7.0	N/A		5.0	5.5
Willamette >85 to RM 187	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 90% Saturation	N/A		5.0	5.5
Willamette Tributaries, and North Coast, Mid Coast, Umpqua, SC, Rogue, Sandy, Hood, Deschutes, & Klamath River Basins, Except as Noted Below	30-Day Average					
	7-Day Average		6.5	6.5	6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 6.0, Except Where More Sensitive Use Occurs	5.0	5.5	5.0	5.5
Columbia River	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 90% Saturation	N/A		5.0	5.5
John Day, Umatilla, Walla Walla, Grande Ronde, Powder, Malheur, Owyee, Malheur Lake, Goose & & Summer Lake	30-Day Average					
	7-Day Average		6.5	6.5	6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 75% Saturation, Except When More Sensitive Use Occurs(5)	4.0	5.5	5.0	5.5
Mainsteam Klamath Falls from Klamath Lake to Keno Dam	30-Day Average					
	7-Day Average		6.5	6.5	6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 5.0	5.0	5.5	5.0	5.5
Mainsteam Klamath Falls from Keno Dam to OR/CA Border	30-Day Average			Standard For More Sensitive Use Applies		
	7-Day Average		N/A		6.0	6.5
	7-Day Mean Min.					
	1 Day	Not Less than 7.0	N/A		5.0	5.5

NOTE:

(1) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986, Table 8, National Criteria. Average DO concentration values are 0.5 mg/l above the slight production impairment values. Serve as estimate of threshold concentrations below which detrimental effects expected.

(2) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986. Summary of DO concentrations coinciding with EPA's judgments on qualitative levels of effect: 30-day average -- No Production Impairment; 7-day average -- Slight Production Impairment; 1-day minimum -- Moderate Production Impairment. Slight and Moderate are equivalent to 10 - 20 percent growth impairment, respectively.

(5) 75% Sat.: Is equivalent at 15°C to DO concentrations of 7.3 mg/l and 6.6 mg/l for elevations of 1,000 and 4,000 feet.
Is equivalent at 20°C to DO concentrations of 6.6 mg/l and 5.9 mg/l for elevations of 1,000 and 4,000 feet.
Is equivalent at 24°C to DO concentrations of 6.1 mg/l and 5.5 mg/l for elevations of 1,000 and 4,000 feet.

(COMPARISON OF EXISTING DISSOLVED OXYGEN STANDARDS, EPA CRITERIA AND ALTERNATE PROPOSALS FOR HEARING AUTHORIZATION REQUEST ON NOVEMBER 2, 1990)

BENEFICIAL USE: NON-SALMONID WATERS -- WARMWATER FISH CRITERIA (LATER LIFE STAGES)

Stream Basin	Application of Numerical Value	Existing Standard	09/21/90 Proposal	11/02/90 Alternate Proposal	EPA "National" Criteria(1)	EPA Criteria With Quality Effects(2)
Willamette 0 - 26.6 + Multnomah Channel	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.0	6.0
	7-Day Average		N/A			
	7-Day Mean Min.				4.0	5.0
	1 Day	Not Less than 5.0	N/A		3.0	4.0
Willamette >26.6 - RM 50	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 6.0	N/A		3.0	4.0
Willamette >50 to RM 85	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 7.0	N/A		3.0	4.0
Willamette >85 to RM 187	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 90% Saturation	N/A		3.0	4.0
Willamette Tributaries, and North Coast, Mid Coast, Umpqua, SC, Rogue, Sandy, Hood, Deschutes, & Klamath River Basins, Except as Noted Below	30-Day Average		6.0	*	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		5.0			
	1 Day	Not Less than 6.0, Except Where More Sensitive Use Occurs	4.0		3.0	4.0
Columbia River	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 90% Saturation	N/A		3.0	4.0
John Day, Umatilla, Walla Walla, Grande Ronde, Powder, Malheur, Owyee, Malheur Lake, Goose & Summer Lake	30-Day Average		6.0	*	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		5.0		4.0	5.0
	1 Day	Not Less than 75% of Saturation	4.0		3.0	4.0
Mainsteam Klamath Falls from Klamath Lake to Keno Dam	30-Day Average		6.0	*	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		5.0		4.0	5.0
	1 Day	Not Less than 75% Saturation, Except When More Sensitive Use Occurs	4.0		3.0	4.0
Mainsteam Klamath Falls from Keno Dam to OR/CA Border	30-Day Average		N/A	Standard For More Sensitive Use Applies	5.5	6.0
	7-Day Average					
	7-Day Mean Min.		N/A		4.0	5.0
	1 Day	Not Less than 7.0	N/A		3.0	4.0

* For Warm-Water Fisheries, use criteria for Early Life Stages Only.

NOTE:

(1) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986, Table B, National Criteria. Average DO concentration values are 0.5 mg/l above the slight production impairment values. Serve as estimate of threshold concentrations below which detrimental effects expected.

(2) EPA, "Ambient Water Quality Criteria for Dissolved Oxygen", April 1986. Summary of DO concentrations coinciding with EPA's judgments on qualitative levels of effect: 30-day average -- No Production Impairment; 7-day average -- Slight Production Impairment; 1-day minimum -- Moderate Production Impairment. Slight and Moderate are equivalent to 10 - 20 percent growth impairment, respectively.

NEIL GOLDSCHMIDT
GOVERNOR

Department of Environmental Quality

811 SW SIXTH AVENUE, PORTLAND, OREGON 97204-1390 PHONE (503) 229-5696

TO: PERSONS INTERESTED IN WATER QUALITY STANDARDS
FROM: KRYSTYNA WOLNIAKOWSKI
DATE: OCTOBER 8, 1990

RE: **NOTICE OF PUBLIC MEETING: OCTOBER 19, 1990, 8:30 to 11:00 a.m., Portland State University, Smith Center, Room 290**

The Department is holding a public meeting to review the proposed rule language for water quality standards contained in Chapter 340-41 for each of the river basins. The purpose of the meeting is to receive comments from the public specifically related to clarifying the proposed rule language. Any comments related to policy and technical issues should be reserved for the public hearing process where they can be part of the formal hearing record. The Department is requesting authorization from the Environmental Quality Commission to conduct public hearings on the proposed rules at the November 2, 1990 meeting. If the hearing are authorized, they will be scheduled for mid-January, 1991.

The Department reviewed and evaluated public comments received on the fourteen issue papers related to the possible revisions of the water quality standards. These comments served as the basis for developing the proposed draft amendments to the rules. The Department decided to prepare proposed amendments to eight of the rules. These include: adding "Wetlands" to definition of Waters of the State; Antidegradation Policy; Dissolved Oxygen; Bacteria; Toxic Substances; Mixing Zones; Biological Criteria; and Particulate Matter and Turbidity. The Department has decided not to propose changes to the 2,3,7,8-TCDD standards adopted in 1987. Finally, the Department has decided that further work needs to be done to define the needed changes on rules for the remaining five issues related to sediment quality criteria and guidelines, temperature, total dissolved solids, and toxicity equivalency factors.

A request for authorization from the Environmental Quality Commission to conduct public hearings was made at the September 21, 1990 meeting on the proposed amendments to the rules. The Environmental Quality Commission deferred authorizing the public hearing until the November 2, 1990 meeting. This delay gives the Department an opportunity to consider any additional comments you may have regarding the clarity of the proposed rule amendments.

Please call Dena Burian at 229-5886 for copies of the proposed rules. Copies will also be available at the meeting.

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Mr. Strong^R
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Polk County Courthouse
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Mr. Harland^R
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Mr. Robart^R
^E
Gary Krahmer

receive comments from you specifically related to clarifying the proposed rule language. Any comments related to policy and disagreements, should, always, be reserved for the public hearing process where they can be part of the formal hearing record.

Sincerely,

Krystyna U. Wolniakowski
Water Quality Standards
Coordinator

KUW:crw
SW\WC7182
cc: William Hutchison, Chairman, EQC
Fred Hansen, Director, DEQ

NEIL GOLDSCHMIDT
GOVERNOR

Department of Environmental Quality

811 SW SIXTH AVENUE, PORTLAND, OREGON 97204-1390 PHONE (503) 229-5696

[THIS LETTER WAS SENT TO THOSE INDIVIDUALS (LIST ATTACHED) WHO RESPONDED WITH COMMENTS ON THE ISSUE PAPERS]

September 25, 1990

^F1^

Re: Water Quality Standards Review Meeting, October 5, 1990

Dear ^F2^:

Thank you for your comments related to the fourteen Water Quality Standards Issue Papers the Department developed as part of the Triennial Water Quality Standards Review. The Department reviewed and considered your comments in the development of proposed draft amendments to the rules contained in Chapter 340 Division 41.

The Department decided to prepare proposed amendments to eight of the rules. These include: adding "Wetlands" to definition of Waters of the State; Antidegradation Policy; Dissolved Oxygen; Bacteria; Toxic Substances; Mixing Zones; Biological Criteria; and Particulate Matter and Turbidity. The Department has not proposed changes to the 2,3,7,8-TCDD standards adopted in 1987. Finally, the Department has decided that further work needs to be done to define the needed changes on rules for the remaining five issues related to sediment quality criteria and guidelines, temperature, total dissolved solids, and toxicity equivalency factors.

A request for authorization from the Environmental Quality Commission to conduct public hearings was made at the September 21, 1990 meeting on the proposed amendments to the rules. The Environmental Quality Commission deferred authorizing the public hearing until the November 2, 1990 meeting. This delay gives the Department an opportunity to consider comments you may have regarding the clarity of the proposed rule amendments. Consequently, we are requesting that you review the staff report that was sent to you in early September and submit any comments you may have by October 5, 1990. The Department is also scheduling a meeting on October 5, 1990 from 9:00 am to 12:00 pm at DEQ in Conference Room 3A. The purpose of the meeting is to

NEIL GOLDSCHMIDT
GOVERNOR

Department of Environmental Quality

811 SW SIXTH AVENUE, PORTLAND, OREGON 97204-1390 PHONE (503) 229-5696

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WATER QUALITY STANDARDS
TRIENNIEL REVIEW

LAST REMINDER NOTICE

PUBLIC COMMENT DEADLINE: JUNE 29, 1990

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TO: PERSONS INTERESTED IN WATER QUALITY STANDARDS
FROM: KRYSTYNA WOLNIAKOWSKI, WQ STANDARDS COORDINATOR
DATE: JUNE 8, 1990
RE: ONE MORE PUBLIC WORKSHOP

Three public workshops to review the 14 Water Quality Issue Papers were held last week in Portland, Bend and Eugene. By request, one more will be added:

SALEM: JUNE 26, 1990 9:00 TO 11:30 AM
STATE CAPITOL
ROOM H-177

Many good questions and comments were received at the workshops. If you need any copies of the issue papers, please contact Dena Burian at 229-5886. If you have questions about the issue papers, please contact me at 229-6018.

Public comments on the issue papers and proposed rule concepts are due by June 29, 1990 at 5:00 pm. Comments received will be considered and incorporated into the development of proposed rule language revisions to be presented to the Environmental Quality Commission for authorization to conduct hearings at the August 10, 1990 meeting.

The following is a list of the issue papers:

#1. Definition of "Waters of the State" to include wetlands.
#2. Antidegradation Policy
#3. Dissolved Oxygen
#4. Temperature
#5. Bacteria
#6. Total Dissolved Solids
#7. Toxic Pollutants
#8. Toxic Equivalency Factors
#9. 2,3,7,8-TCDD (dioxin)
#10. Mixing Zones
#11. Sediment Quality Standards
#12. Interim Sediemnt Quality Guidelines
#13. Biological Criteria
#14. Particulate Matter and Turbidity

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PUBLIC WORKSHOPS
WATER QUALITY STANDARDS REVIEW

ISSUE PAPER DISCUSSIONS

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PLEASE ATTEND THE FOLLOWING PUBLIC WORKSHOPS TO DISCUSS THE WATER QUALITY ISSUE PAPERS. WATER QUALITY STAFF WILL BE AVAILABLE TO MAKE PRESENTATIONS AND EXPLAIN THE CURRENT WATER QUALITY STANDARDS AND PROPOSED REVISIONS.

THREE WORKSHOPS ARE SCHEDULED AS FOLLOWS:

BEND:	MAY 30, 1990 COURTHOUSE "ANNEX" 1128 NW HARRIMAN	1:00 TO 4:00 PM
EUGENE:	MAY 31, 1990 HARRISON HALL 125 E. 8TH STREET	1:00 TO 4:00 PM
PORTLAND:	JUNE 1, 1990 DEQ HEADQUARTERS 811 SW SIXTH AVENUE CONFERENCE ROOM 3A (THIRD FLOOR)	1:00 TO 4:00 PM

AFTER THE PUBLIC WORKSHOPS AND CLOSE OF THE PUBLIC COMMENT PERIOD, ON JUNE 29, 1990, 5:00 PM, WATER QUALITY STAFF WILL PREPARE REVISED RULE LANGUAGE AND REQUEST AUTHORIZATION TO CONDUCT PUBLIC HEARINGS AT THE ENVIRONMENTAL QUALITY COMMISSION MEETING SCHEDULED FOR AUGUST 11, 1990.

PUBLIC HEARINGS WILL BE HELD STATEWIDE IN SEPTEMBER, 1990.

QUESTIONS? CONTACT KRYSTYNA WOLNIAKOWSKI, 229-6018

Department of Environmental Quality

811 SW 6TH AVENUE PORTLAND, OREGON 97204-1390 PHONE (503) 229-5696

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WATER QUALITY STANDARDS
ISSUE PAPERS

EXTENSION OF PUBLIC COMMENT PERIOD TO JUNE 29, 1990

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TO: PERSONS INTERESTED IN WATER QUALITY STANDARDS

FROM: KRYSTYNA WOLNIAKOWSKI, WATER QUALITY STANDARDS COORDINATOR

DATE: MAY 17, 1990

The Department recently sent out a notice to you indicating that water quality standards issue papers were available and could be ordered by calling DEQ or sending in an order form. The Public Comment Period was from May 11 to June 8, 1990.

Due to an OVERWHELMING response for copies, and the disruption in copying services at the DEQ Copy Center in moving from one floor to another, we have not been able to make and send out the copies as quickly as we planned.

Therefore, we are extending the Public Comment Period to 5pm June 29, 1990. That will give you more time to review the papers after the public workshops which will be held as in Bend, Eugene and Portland. (See reverse side for schedule of workshops).

We also received requests for multiple copies of the papers. Because of the volume of requests, and the number of papers involved, we are only sending one copy of the requested papers. If you wish to receive additional copies, please enclose funds to reimburse DEQ for the costs of the additional copies at 10 cents per page.

Please let us know if you wish to be dropped from the mailing list, or have changed addresses. We have almost 2000 people on our water quality standards mailing list. If you are receiving these notices, and would like to be removed from the list, let us know. Otherwise, we assume you are interested and wish to continue receiving materials. If someone should be on this list that is currently not included, please send in additional names, or call me at 229-6018.

#10) Mixing Zones 340-41-(river basin)(4)

A mixing zone is a designated area of a receiving waterbody where wastewater and receiving waters mix. Water quality standards may be suspended in this zone to allow for mixing, but must be met at the edge of the zone. In addition, acute toxicity may not occur in the mixing zone, and chronic toxicity may not occur outside the mixing zone. This issue paper clarifies where acute toxicity would be measured in a mixing zone, proposes the use of a "zone of immediate dilution", proposes the use of toxicity equivalent units for measuring toxicity due to complex effluent mixtures, and proposes to define how much of a stream may be designated as a mixing zone.

#11) Sediment Quality Standards (new)

This issue paper discusses the use of numeric standards to protect sediment quality, what information is currently available on sediment standards, and a tiered testing approach that would assist with determining if contaminants are present in sediments. The paper does not, at this time, suggest specific numeric limits.

#12) Interim Sediment Quality Guidelines (new)

With the absence of numeric sediment standards, this paper discusses the use of guidelines to evaluate pollutant levels in sediment and for determining the potential for adverse effects on water quality. These proposed guidelines have been developed in a cooperative effort with state and federal agencies.

#13) Biological Criteria (new)

Although the water quality standards contain limits for toxic and conventional pollutants to protect beneficial uses such as fish and aquatic life, a chemical by chemical approach may not be protective enough particularly because of complex effluents, and nonpoint source pollution problems. The Water Quality Act of 1987 now requires BioMonitoring to be conducted to assure that biological integrity of biological communities is protected. The Department is proposing to develop an approach for conducting biomonitoring and bioassessments, to define biological terms, and to establish narrative and numeric criteria to protect biological communities.

#6) Total Dissolved Solids 340-41-(river basin)(2)(o)

Total Dissolved Solids are the dissolved salts, organic matter and other materials in water that pass through a fine pore filter. These dissolved substances affect the use of water for drinking, agriculture, industry, and recreation as well as its suitability for aquatic organisms. The Department is proposing specific changes to a few river basin TDS standards such as the Klamath, and the Hood River. The Department is also proposing to include sulfates chlorides in the basin standards, considering adopting the background levels as TDS standards in several basins and ruling that artificial increases in TDS should not exceed one third background levels.

#7) Toxic Pollutants 340-41-(river basin)(2)(p)

The control of toxic pollutants is critical for the protection of beneficial uses. The current water quality standards for control of toxic pollutants includes narrative and numeric limits. The numeric limits are presented in Table 20 of the water quality standards regulations. The Department is proposing to add the three new numeric limits for Aluminum, Chloride, and Ammonia, that EPA recently adopted as criteria. Because complex mixtures of toxic pollutants can occur that have different toxicity effects, than any one toxic pollutant itself, the Department is also proposing to use calculated "Toxicity Units" for determining whether a complex mixture will cause acute or chronic toxicity at specific concentrations.

#8) Toxic Equivalency Factors (new)

Dioxin is a term commonly used for the family of polychlorinated dibenzo-para-dioxins (PCDD). 2,3,7,8-tetrachloro dibenzo-p-dioxin is one of 75 different congeners of PCDD and is one of 22 different isomers of tetrachloro dibenzo-papr-dioxin. A group of compounds closely related to PCDD's are polychlorinated dibenzo furans (PCDF's) of which there are 135 different congeners. A water quality standards now exists for 2,3,7,8-TCDD, but not for any other PCDD's or PCDF's. The Department is proposing the use of toxicty equivalency factors to evaluate the risk to human health from exposure to the bioaccumulative dioxin and furan congeners. This issue paper discusses the use and calculation of toxicity equivalency factors.

#9) 2,3,7,8-Tetrachlorodibenzo-para-dioxin (TCDD) 340-41-(river basin)(2)(p)

This issue paper discusses the current water quality standard for 2,3,7,8-TCDD which is 0.013 parts per quadrillion, how that standard was calculated, the risk and cancer potency factors, and what concerns have been expressed about using the current standard to protect human health. The Department, however, is not proposing to change the standard at this time.

ISSUE PAPER SUMMARIES

#1) Definition of "Waters of the State" to include wetlands 340-41-006(14)

This paper discusses the definition of "waters of the state", specifically describing the current definition for marshes, and proposing a clearer definition for all types of marshes, including the federal definition of wetlands.

#2) Antidegradation Policy 340-41-026

The Antidegradation Policy is the policy that determines whether water quality may be degraded and when it must be maintained at existing levels. The issue paper discusses what criteria may be used to decide what level of degradation may be allowed, or what level of protection is needed. The paper also discusses establishing a new category of protection for "Outstanding Resource Waters", such as Wild and Scenic Rivers, or areas of special ecological significance.

#3) Dissolved Oxygen 340-41-(river basin)(2)(a)

Dissolved oxygen must be high enough in the water to support fisheries and aquatic life, both warmwater and coldwater species. This issue paper discusses what dissolved oxygen levels are needed to meet fisheries needs, and how to account for daily and seasonal variability.

#4) Temperature 340-41-(river basin)(2)(b)

Water temperature affects the physiological processes and ability of aquatic organisms to survive and reproduce effectively. Temperature also affects other water quality conditions such as degradation of organic material, oxygen saturation, and survival of bacteria and pathogens. This issue paper discusses the need to examine seasonal and daily fluctuations in temperature, maximum and minimum values for the protection of aquatic life, thermal plumes, and maximum changes allowed in water.

#5) Bacteria 340-41-(river basin)(2)(e)

Microbiological indicator organisms are used for monitoring water quality and pollution levels, and for evaluating the human health risks associated with contact recreation or shellfish collection. Fecal coliform bacteria has been used as an indicator organism to determine the human health risj from exposure to pathogens. However, enterococcus may provide a better indication of risk for water contact recreation than fecal coliform. This issue paper describes the two indicator organisms and proposes to use enteroccoci instead of fecal coliform.

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PUBLIC WORKSHOPS
WATER QUALITY STANDARDS REVIEW

ISSUE PAPER DISCUSSIONS

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PLEASE ATTEND THE FOLLOWING PUBLIC WORKSHOPS TO DISCUSS THE WATER QUALITY ISSUE PAPERS. WATER QUALITY STAFF WILL BE AVAILABLE TO MAKE PRESENTATIONS AND EXPLAIN THE CURRENT WATER QUALITY STANDARDS AND PROPOSED REVISIONS.

THREE WORKSHOPS ARE SCHEDULED AS FOLLOWS:

BEND:	MAY 30, 1990 COURTHOUSE "ANNEX" 1128 NW HARRIMAN	1:00 TO 4:00 PM
EUGENE:	MAY 31, 1990 HARRISON HALL 125 E. 8TH STREET	1:00 TO 4:00 PM
PORTLAND:	JUNE 1, 1990 DEQ HEADQUARTERS 811 SW SIXTH AVENUE CONFERENCE ROOM 3A (THIRD FLOOR)	1:00 TO 4:00 PM

AFTER THE PUBLIC WORKSHOPS AND CLOSE OF THE PUBLIC COMMENT PERIOD, WATER QUALITY STAFF WILL PREPARE REVISED RULE LANGUAGE AND REQUEST AUTHORIZATION TO CONDUCT PUBLIC HEARINGS AT THE ENVIRONMENTAL QUALITY COMMISSION MEETING SCHEDULED FOR JUNE 29, 1990.

PUBLIC HEARINGS WILL BE HELD STATEWIDE IN LATE JULY AND EARLY AUGUST, 1990.

QUESTIONS? CONTACT KRYSTYNA WOLNIAKOWSKI, 229-6018

NEIL GOLDSCHMIDT
GOVERNOR

Department of Environmental Quality

811 SW SIXTH AVENUE, PORTLAND, OREGON 97204-1390 PHONE (503) 229-5696

**********NOTICE OF AVAILABILITY**********

WATER QUALITY STANDARDS ISSUE PAPERS

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TO: Persons Interested in Water Quality Standards
FROM: Krystyna Wolniakowski, Water Quality Standards Coordinator (229-6018)
DATE: May 4, 1990

Every three years the Department reviews the water quality standards contained in Oregon Administrative Rule Chapter 340 Division 41 to revise them as necessary, based on updated information to assure that beneficial uses are protected. The Department requested public comments on possible water quality standards revisions in a public notice issued 12/11/89. Public comments were due 1/15/90. Based on the public comments received during that public comment period, the Department prepared a set of draft issue papers to discuss possible water quality standards revisions. The draft issue papers are now available for public comment. After comments are received, the Department will make needed revision and propose amendments to the standards for review at public hearings to be held in summer 1990. The issue paper titles are:

#1) Definition of "Waters of the State" to include wetlands.
#2) Antidegradation Policy
#3) Dissolved Oxygen
#4) Temperature
#5) Bacteria
#6) Total Dissolved Solids
#7) Toxic Pollutants
#8) Toxic Equivalency Factors
#9) 2,3,7,8-Tetrachlorodibenzo-para-dioxin (TCDD)
#10) Mixing Zones
#11) Sediment Quality Standards
#12) Interim Sediment Quality Guidelines
#13) Biological Criteria

If you would like to receive a copy of one or several issue papers, please return this letter with your name and address and the issue paper numbers circled, and they will be sent to you immediately, or call Vi Cinotto at 229-6962. The public comment period on the issue papers will be from May 11 to June 8,1990.

****

NAME: _____

ADDRESS: _____

DEQ-1

Department of Environmental Quality

811 SW SIXTH AVENUE, PORTLAND, OREGON 97204-1390 PHONE (503) 229-5696

TO: PERSONS INTERESTED IN TRIENNIEL REVIEW OF WATER QUALITY STANDARDS

FROM: KRYSTYNA WOLNIAKOWSKI

DATE: DECEMBER 18, 1989

RE: PUBLIC COMMENTS ON WATER QUALITY STANDARDS

Enclosed is a copy of the Oregon Administrative Rules that you requested. The Public Notice that was sent 12/11/89 described a list of rules the DEQ is currently reviewing to determine if changes are needed. The Public Notice requested the public to review that list and do the following:

1. Review the language for the rules on the list and provide an opinion if the rules are adequate as written, or propose modifications for DEQ to consider in reviewing the rules; and/or

2. Provide techincal or local information for DEQ to use in reviewing the rules on the DEQ list; and/or

3. Review other rules not on the DEQ proposed list and provide an opinion if other rules need to be considered for revision to clarify, modify or expand the language.

************PLEASE SUBMIT COMMENTS TO DEQ BY 1/15/90 5 PM************

DEQ will review the public comments that were received by 1/15/90 and develop issue papers in early February that review the rules and propose any needed modifications.

A public review of the issue papers, and more opportunity for public comments will follow.

The public is invited to provide comments on concerns related to the list of rules the Department is reviewing, provide information for the Department to consider related to those rules, or to suggest other rules that should be considered for revisions. The Department will be distributing issue papers in early February 1990 that describe the current rules referenced above, concerns with these rules, and suggestions for revision.

WHAT ARE THE STEPS:

1. Public comment on the list of possible rule revisions.
2. Department reviews rules and prepares issue papers describing concerns based on internal staff review and public comment.
3. Department distributes issue papers for public review.
4. Department assembles and evaluates comments received on the issue papers.
5. Department prepares amendments to rules to clarify the intent of current rules and to incorporate newest scientific information available and public comments received.
6. Department requests authorization from Environmental Quality Commission to conduct public hearings on proposed amendments.
7. Department conducts public information meetings and public hearings to accept public comment on proposed rule amendments.
8. Department prepares final rule amendments and submits to Environmental Quality Commission for adoption.

HOW TO COMMENT: Written comments should be sent to:

Gene Foster
Department of Environmental Quality
Water Quality Division
811 S.W. Sixth Avenue
Portland, OR 97204

THE COMMENT PERIOD FOR STEP 1 WILL END MONDAY JANUARY 15, 1990 AT 5:00 P.M.

For more information or copies of the administrative rules call Gene Foster at 229-6982 or Krystyna Wolniakowski at 229-6018, or toll free 1-800-452-4011.

PM\WC5875

Oregon Department of Environmental Quality

A CHANCE TO COMMENT ON...

TRIENNIAL REVIEW OF WATER QUALITY STANDARDS

Notice Issued: 12/11/89
Comments Due: 1/15/90

WHO IS AFFECTED: All businesses, residents, industries, and local government in the State of Oregon.

WHAT IS PROPOSED: Every three years the Department reviews the water quality standards contained in Oregon Administrative Rule Chapter 340 Division 41 to revise them as necessary, based on updated information to assure that beneficial uses are protected. At this time, the Department is considering revision of several rules and is soliciting public comment to identify any other rule revisions that the Department should consider.

WHAT ARE THE HIGHLIGHTS: The Department is considering revision to the following rules for each of the river basins.

- 340-41-026 - Antidegradation Policy
- 340-41-(2)(a) - Dissolved Oxygen
- 340-41-(2)(b) - Temperature
- 340-41-(2)(c) - Total Suspended Solids/Turbidity
- 340-41-(2)(e) - Bacteria
- 340-41-(2)(k) - Color
- 340-41-(2)(o) - Total Dissolved Solids
- 340-41-(2)(p) - Toxics (including dioxin)
- 340-41-(4) - Mixing Zones

In addition, the Department will explore developing standards that are biologically based, address sedimentation and sediment chemistry, and clarify the definition of wetlands as waters of the state.

811 S.W. 6th Avenue
Portland, OR 97204

FOR FURTHER INFORMATION:

Contact the person or division identified in the public notice by calling 229-5696 in the Portland area. To avoid long distance charges from other parts of the state, call 1-800-452-4011.

11/1/86

9/25/90	Notification letter sent to announce a Public Workshop for those groups (34) who responded to issue papers to discuss clarity of proposed rules
9-10/90	More public comments received on clarity.
10/5/90	Workshop held at DEQ
10/8/90	Notification letter to WQSML (1700) to announce a Public Workshop for anyone interested in discussing clarity of proposed rules.
10/19/90	Workshop held at Portland State University
10/22/90	Proposed rules clarified as needed

ATTACHMENT F

Chronology of Public Notices
for Triennial water Quality Standards Review

Date	Information Item
12/11/89	Public Notice "A Chance to Comment on Triennial Review of Water Quality Standards"
12/18/89	Notification letter to Water Quality Mailing List (1700) on "Chance to Comment" requesting comments on rules for review
1/15/90	Deadline for comments on issues and rules to review
1/15 - 5/4/90	Development of issue papers in response to public comment
5/4/90	Notification letter to WQSML (1700) of availability of issue papers, public workshops schedule and summaries of issue papers
5/17/90	Notification letter to WQSML (1700) extension of public comment period for issue papers
5-6/90	Public workshops held around state
6/90	Over 370 requests for issue papers
6/8/90	Reminder Notice on deadline for comments
6/29/90	Deadline for comment on issue papers. 34 commentors responded.
7-8/90	Development of proposed rule revisions based on public comments
9/21/90	EQC meeting: Hearing authorization deferred until 11/2/90

Garton, R.R., P.H. Davies, F.A. Elkind, R.H. Estabrook, W.A. Evans, T.P. Frost, J.P. Goettl Jr., G.F. Lee, B.A. Manny, R.L. Rulifson, S.H. Snell, G.R. Snyder, and D.L. Swanson. 1979. Solids (Suspended, Settleable) and Turbidity. Pages 266-271 In: A review of the EPA Red Book: Quality Criteria for Water. R.V. Thurston, R.C. Russo, C.M. Fetterolf, Jr., T.A. Edsall, and Y.M. Barber, Jr. (Eds.) Water Quality Section, American Fisheries Society, Bethesda, MD. 313p.

Harvey, G.W. 1989. Technical Review of Sediment Criteria. Idaho Department of Health & Welfare, Division of Environmental Quality, Water Quality Bureau, 450 W. State Street, Boise, ID 83720.

NAS (National Academy of Sciences, National Academy of Engineering). 1974. EPA Ecol. Res. Series EPA-R3-73-033, U.S. Environmental Protection Agency, Washington, D.C. 594 p.

Peterson, L.A., G.E. Nichols, N.B. Hemming, J.A. Glaspell. 1985. Alaska Particulates Criteria Review. L.A. Peterson & Associates, Inc., Fairbanks Alaska: Prepared for State of Alaska, Department of Environmental Conservation. November 1985.

Ruttner, F. 1953. Fundamentals of Limnology. Univ. of Toronto Press, Toronto, Canada. 295 p.

USEPA. 1986. Quality Criteria for Water 1986. EPA 440/5-86-001. May 1, 1986.

Basin	Rule
North Coast	340-41-205(2)(c)
Mid Coast	340-41-245(2)(c)
Umpqua	340-41-285(2)(c)
South Coast	340-41-325(2)(c)
Rogue	340-41-365(2)(c)
Willamette	340-41-445(2)(c)
Sandy	340-41-485(2)(c)
Hood	340-41-525(2)(c)
Deschutes	340-41-565(2)(c)
John Day	340-41-605(2)(c)
Umatilla	340-41-645(2)(c)
Walla Walla	340-41-685(2)(c)
Grande Ronde	340-41-725(2)(c)
Powder	340-41-765(2)(c)
Malheur	340-41-805(2)(c)
Owyhee	340-41-845(2)(c)
Malheur Lake	340-41-885(2)(c)
Goose and Summer Lakes	340-41-925(2)(c)
Klamath	340-41-965(2)(c)

LITERATURE CITED

APHA (American Public Health Association). 1985. Standard Methods for the Examination of Water and Wastewater. 16th Edition. American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

Bachman, R.W. 1958. The ecology of Four North Idaho Trout Streams with Reference to the Influence of Forest Road Construction. M.S. Thesis, University of Idaho. 97 p.

Chapman, D.W. & K.P. McLeod. 1987. Development of Criteria for Fine Sediment in the Northern Rockies Ecoregion. EPA Report No. EPA 910/9-87-162. 262 p.

DEQ. 1980. Assessment of Oregon's Water Quality and Water Pollution Control Program. Oregon Department of Environmental Quality, 811 SW 6th Avenue, Portland OR 97201. November 1980.

DEQ. 1990. Department of Environmental Quality Issue Paper, Dissolved Oxygen. Oregon Department of Environmental Quality, 811 SW 6th Avenue, Portland, OR 97201.

EIFAC (European Inland Fisheries Advisory Commission). 1965. Working Party on Water Quality Criteria for European Freshwater Fish, Report on Finely Divided Solids and Inland Fisheries. Air Water Pollution 9(3): 151-168.

VI. DEPARTMENT RESPONSE TO PUBLIC COMMENTS

The Department will not recommend adoption of water quality standards for suspended solids, settleable solids, and accumulated fines at this time.

The Department will only recommend changing the turbidity standard use of Jackson Turbidity Units to Nephelometric Turbidity Units.

The Department recommends that a scientific committee be established for review of scientific literature pertaining to turbidity, suspended solids, settleable solids, and accumulated fines. This committee would make recommendations on appropriate standards and criteria.

VII. PROPOSED RULE AMENDMENTS: PARTICULATE MATTER

(Turbidity, Total Suspended Solids, Settleable Solids, and % Embeddedness)

The following changes are recommended for the particulate matter standards. These recommendations are based on the recent changes in units of measurement. Proposed deletions are bracketed and new language underlined.

340-41-__(2)(c) Turbidity [(Jackson Turbidity Units, JTU)] <u>(Nephelometric Turbidity Units, NTU)</u>; No more than a 10 percent cumulative increase in natural stream turbidities shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity. However, limited duration activities necessary to address an emergency or to accommodate essential dredging, construction or other legitimate activities and which cause the standard to be exceeded may be authorized provided all practicable turbidity control techniques have been applied and one of the following has been granted:

(A) Emergency activities: Approval coordinated by DEQ with the Department of Fish and Wildlife under conditions they may prescribe to accommodate response to emergencies or to protect public health and welfare.

(B) Dredging, Construction or other Legitimate Activities: Permit or certification authorized under terms of Section 401 or 404 (Permits and Licenses, Federal Water Pollution Control Act) or OAR 141-85-100 et seq. (Removal and Fill Permits, Division of State Lands), with limitations and conditions governing the activity set forth in the permit or certificate.

2. Salmonid streams -- establishment of a turbidity level for a chronic five day maximum of 25 NTUs and an acute instantaneous maximum of 50 NTUs unless naturally occurring stream turbidity is higher, then the natural turbidity level shall be the standard.

3. Protection of primary productivity -- the combined effect of color and turbidity should not change the compensation point more than 10 percent from its seasonally established norm, nor should such a change place more than 10 percent of the biomass of photosynthetic organisms below the compensation point.

4. Suspended solids -- chronic five day values shall not exceed 25 mg/l and acute one day values shall not exceed 80 mg/l except where naturally occurring stream suspended solids are higher then the natural suspended solids values shall become the standard.

5. No statistically significant deviation from the naturally occurring percent embeddedness as defined by baseline information. Statistically significant is the mean value at the 95% precision level of the t statistic.

V. PUBLIC COMMENTS RECEIVED ON ISSUE PAPER

The Department received the following public comment on the subject of particulate matter:

Turbidity, suspended solids, settleable solids, and accumulated fines are separate issues and should be addressed in separate issue papers.

Naturally occurring fluctuations for turbidity and suspended solids in many streams would violate the proposed standards for those parameters. An approach needs to be developed which considers naturally occurring fluctuations within a waterbody.

There is a lack of scientific information in Oregon waterbodies which addresses accumulated fines effects. Where and when the measurement of accumulated fines should be performed is not addressed in the issue paper..

Compensation point can change daily depending on local conditions and can not be used for shallow waterbodies where light reaches the streambed/lakebed.

A scientific panel should be convened to discuss and make recommendations on these issues.

Interstitial filling of cobble and rubble habitat can be measured by percent embeddedness (Harvey, 1989). Percent embeddedness can be defined as the quantitative measurement of the sedimentation of the cobble and rubble substrate. Lower thresholds for the percent embeddedness which would affect juvenile carrying capacity for salmonid rearing streams have not been established (Harvey, 1989).

A workgroup has recommended to the state of Idaho a criteria that would be protective of any increase in the level of percent embeddedness (Harvey, 1989). This was based on the assumption that any increase in percent embeddedness would have an adverse effect on salmonid rearing habitat.

The recommendation was to define a process to protect all habitats associated with cobble and interstitial spaces (Harvey, 1989). The process would define a baseline percent embeddedness for geomorphological similar areas and permit no statistically significant increase above baseline (Harvey, 1989). Statistically significant was defined as the mean value at the 95% precision level of the t statistic.

Recreation

Adverse effects to recreational beneficial uses result mostly from turbidity. Recreation effects from turbidity include an increase in danger for swimming and diving (NAS, 1974 cited in USEPA, 1986) and interferences with aesthetic enjoyment of water (USEPA, 1986). Studies performed by ODF&W indicated that as turbidity levels exceeded 3.5 to 10 JTU anadromous salmonid angling decreased (DEQ, 1980).

Drinking Water

Generally, effective chlorination of drinking water is the primary concern for suspended solid concentrations in drinking water supply. Suspended solids provide areas for micro organisms to escape chlorine contact. Drinking water treatment facilities differ in the methods of removal of suspended solids but have a maximum limit of 1 turbidity unit for finished drinking water (USEPA, 1986). Raw water suspended solid limits are not practical due to the variation in treatment technologies.

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

The Department recommends the following:

1. Use of NTUs for turbidity units.

Low level Protection	400 mg/l
Very Low Level Protection	>400 mg/l

These numbers would be at a level of protection for aquatic communities when used with the NAS turbidity recommendations (Garton, 1979).

Settled Solids

Settleable solids can be defined as the material which settles out of suspension within a given period of time (APHA, 1985). Settleable solids can affect beneficial uses while suspended in the water column or when deposited on the substrate after settling.

Settleable solids can affect aquatic life following settling on the substrate and depriving fish eggs and benthic invertebrates of oxygen; by interference of emergence of alevins from redds; and filling of interstitial cobble and rubble habitat used by juvenile salmonids.

The information reviewed by Chapman & Mcleod (1987) suggest that salmonid spawning beds require a minimum intergravel dissolved oxygen level of 54% at 10^{o} C (Harvey, 1989). The State of Oregon in-stream water quality standard for dissolved oxygen are designed to protect salmonid spawning habitat (DEQ Issue Paper on Dissolved Oxygen, 1990). The standard is protective if settled solids do not interfere with permeability of dissolved oxygen to the interstitial waters of the spawning habitat.

Permeability criteria for protection of spawning habitat may not be practical at this time (Harvey, 1989). When spawning habitat dissolved oxygen levels are a concern due to deposition of settleable solids interstitial water dissolved oxygen levels should be measured directly (Harvey, 1989).

Settled solids can interfere with the emergence of alevins from spawning gravels (Harvey, 1989). Deposition of solids will interfere with escapement by reduction of the rate of emergence or entombment of alevins (Chapman & McLeod, 1987). A methodology is not available at this time to quantify escapement success (Harvey, 1989).

Settled solids can also fill interstitial cobble and rubble habitat used by juvenile salmonids. This habitat would be used primarily for overwintering of juvenile salmonids. This type of habitat is used by juvenile anadromous salmonids for a period of one to three years prior to smoltification (Harvey, 1989). Should this habitat be unavailable the juvenile salmonids would be displaced.

A seasonal norm for the compensation point would need to be established for the waterbody which would require frequent measurements of photosynthesis. The compensation point should be defined as the depth at which assimilation and dissimilation are balanced (Ruttner, 1953) or simply, the balance between algal photosynthesis and total plankton respiration (Garton, 1979). The reduction in compensation point would only apply to those waters where the photic zone does not extend to the bottom of the waterbody.

Turbidity of 25 - 70 NTUs would impair salmonid sight feeding and reduces growth. Fish exposed to 25 NTUs for 5 - 7 days exhibited effects on gill tissue. Levels of 50 NTUs caused displacement of salmonid juveniles (Appendix A) (Harvey, 1989).

Suspended Solids

Suspended solids can be defined as the portion of the total solids which are retained by a filter (APHA, 1985). Suspended solids are the fraction of total solids in the water column which would be influenced by particulate matter.

Suspended solids can cause adverse effects to aquatic life. Cutthroat trout cease feeding at suspended solids concentrations of 35 ppm (Bachmann, 1958 cited in Peterson, 1985). Rainbow trout exhibited effects at the following suspended solids concentrations (EIFAC, 1965 cited in Peterson, 1985):

o	50 ppm	-	Reduced growth
o	90 ppm	-	20% mortality in 2 to 6 months
o	100 to 270 ppm	-	Fin rot
o	200 ppm	-	50% mortality in 16 weeks
o	1000 to 2500 ppm	-	100% mortality in 20 days

Suspended solids should not have an adverse effect on fisheries when concentrations are less than 25 mg/l. Good to moderate fisheries should be possible to maintain (with somewhat lower yields as compared to the previous category) at suspended solids concentrations of 25 to 80 mg/l. Waters with suspended solids of 80 to 400 mg/l are unlikely to support good fisheries with poor fisheries likely to be found in waters with suspended solids greater than 400 mg/l (EIFAC, 1965 cited in Garton, 1979)

The NAS review of the data recommends that aquatic communities should be at a level of protection from adverse effects of suspended solids at the following concentrations (Garton 1979):

High Level Protection	25 mg/l
Moderate Protection	80 mg/l

Turbidity and Settleable Solids

- Reductions of invertebrate populations;
- Turbidity and settled solids can cause increases in invertebrate drift;

Settled Solids

- Reduced survival of fish eggs and juveniles;
- Reduced survival of fish eggs, early life stages of fish, and invertebrates;

Suspended Solids

- Stress reactions, fin and gill damage in adult fish;
- Invertebrate drift;
- Fish avoidance of otherwise usable habitat;
- Inhibit the ability of sight feeding fish to locate prey;
- Fin and gill damage in adult fish;
- Reduce the growth rate of fish;
- Reduce fish resistance to disease;
- Mortality in adult fish.

Turbidity

The National Academy of Sciences (NAS) considers turbidity and color in combination for the effects on primary productivity (Garton, 1979). The recommendation was " The combined effect of color and turbidity should not change the compensation point more than 10 percent from its seasonally established norm, nor should such a change place more than 10 percent of the biomass of photosynthetic organisms below the compensation point " (Garton, 1979).

Settleable solids can be defined as the material which settles out of suspension within a given period of time (APHA, 1985). Settleable solids can affect beneficial uses while suspended in the water column or when deposited on the substrate after settling.

Percent embeddedness can be defined as the quantitative measurement of the sedimentation of the cobble and rubble substrate. Percent embeddedness would be a measurement of the filling of the interstitial spaces of cobble and rubble substrates by finer sediments (Harvey, 1989).

Effects

Beneficial uses which can be adversely affected by particulate matter are (USEPA, 1986):

- Aquatic life;
- Recreation;
- Drinking water supply.

The literature indicates that aquatic life is the most sensitive beneficial use (USEPA 1986) with salmonids being the most sensitive cold water species (Harvey 1989). Appendix A has a summary of the adverse effects to the beneficial uses.

Aquatic Life

Particulate matter has been identified as having a variety of effects on different species at various concentrations. The following are effects on aquatic life (Appendix A) (Peterson, 1985; USEPA, 1986; DEQ, 1980):

Turbidity

- Reduction of photosynthesis within a waterbody by reducing the amount of light available for green plants;
- Inhibit in-stream movement of fish;
- Inhibit the ability of sight feeding fish to locate prey;

7. "formation of appreciable bottom sludges" is not quantified in the existing standard. A methodology needs to be established for quantification of this narrative standard. A protocol should be established for determining accumulation of fines or sedimentation of aquatic habitat.

8. Turbidity and color should be considered together for protection of primary productivity of a waterbody.

Discussion

Particulate matter can be described as suspended and settleable solids of organic and inorganic nature (USEPA, 1986). Particulate matter can cause adverse effects when suspended in the water column or when deposited on the substrate. Some of the common measurements of particulate matter are turbidity, suspended solids, settleable solids, and percent accumulated fines.

Turbidity can be described as the measurement of the optical property which causes light to be scattered and absorbed (APHA, 1985). Two methods commonly used for measurement of turbidity are the Jackson candle turbidimeter and nephelometer. Measurements with the Jackson candle turbidimeter are reported in Jackson Turbidity Units (JTU) and nephelometer measurements are reported in Nephelometric Turbidity Units (NTU). There is no direct relationship between the two methods. Because of this there is no direct method of converting JTU's to NTU's and vice versa (APHA, 1985).

A considerable data base has been collected for turbidity expressed in JTU's. However, the use of JTU's is limited in that reliable measurements can not be made below 25 JTU's. The nephelometric method is considered to have greater precision, sensitivity, and applicability over a wide turbidity range and is recommended for use over Jackson candle turbidimeter (APHA, 1985; Garton, 1979).

Suspended solids can be defined as the portion of the total solids which are retained by a filter (APHA, 1985). Total solids can be defined as the amount of residue left following evaporation and subsequent drying in an oven (APHA, 1985). Total solids are the combination of suspended solids and dissolved solids found in a water sample. Particulate matter would affect the concentration of suspended solids.

There is not a direct correlation between turbidity and suspended solids. Turbidity measures the light scattering capabilities of a sample while suspended solids is a measure of the solids content. Size, shape, and refractive characteristics effect the light scattering characteristics which can not be directly converted to a weight measurement (APHA, 1985).

(A) Emergency activities: Approval coordinated by DEQ with the Department of Fish and Wildlife under conditions they may prescribe to accommodate response to emergencies or to protect public health and welfare.

(B) Dredging, Construction or other Legitimate Activities: Permit or certification authorized under terms of Section 401 or 404 (Permits and Licenses, Federal Water Pollution Control Act) or OAR 141-85-100 et seq. (Removal and Fill Permits, Division of State Lands), with limitations and conditions governing the activity set forth in the permit or certificate.

(j) The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry shall not be allowed.

III. CONCERNS WITH THE CURRENT RULE

The Department has the following concerns with the existing water quality standards for particulate matter.

1. 10% above the stream turbidity as measured directly upstream of the activity does not take into account other upstream activities, either identified or unidentified.

2. Identification of natural turbidities for a waterbody requires data that the Department does not currently possess for many waterbodies.

3. There is difficulty in establishing upstream monitoring points for certain nonpoint source activities.

4. There is not a clear understanding of what constitutes a limited duration activity.

5. Turbidity should be measured in Nephelometric Turbidity Units rather than Jackson Turbidity Units for valid scientific reasons and for consistency with Standard Methods and the recommendations made by American Fisheries Society.

6. A turbidity standard does not protect aquatic life from suspended solids effects.

ISSUE PAPER # 14
PARTICULATE MATTER

(Turbidity, Total Suspended Solids, Settleable Solids, and % Embeddedness)
Revised as of 10/22/90

I. INTRODUCTION

Particulate matter in waters of the state are an important concern because of the potential adverse effects on the beneficial uses supported by water quality. Beneficial uses which can be adversely affected by particulate matter are aquatic life, recreational, and domestic water supply.

The adverse effects from elevated levels of particulate matter would include: reduction or loss of primary productivity; reduction or loss of fish production and or fish growth; increased respiratory stress of aquatic life; reduction in recreational use of waterbody; and reduced effectiveness of chlorination of domestic waste water. Aquatic life have been identified as the most sensitive beneficial use to particulate matter.

The parameters which can be used to measure particulates in the waters of the state are; turbidity, total suspended solids, settleable solids, and % accumulated fines. No one single particulate matter parameter adequately addresses protection of all designated beneficial uses potentially affected by particulates. A multi-parameter approach would be useful for the control of adverse effects of particulate matter.

II. CURRENT RULE

The current water quality standards for particulate matter in waters of the state are:

OAR 340-41-(River Basin)

(c) Turbidity (Jackson Turbidity Units, JTU); No more than a 10 percent cumulative increase in natural stream turbidities shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity. However, limited duration activities necessary to address an emergency or to accommodate essential dredging, construction or other legitimate activities and which cause the standard to be exceeded may be authorized provided all practicable turbidity control techniques have been applied and one of the following has been granted:

(45) "Appropriate reference site or region" means a site on the same stream, or within the same basin or ecoregion that has similar aquatic habitat and riparian conditions, and represents the water quality and biological community attainable without the effects of significant human perturbations.

REFERENCES

EPA. 1990. Biological Criteria - National Program Guidance for Surface Waters. EPA Criteria and Standards Division, Office of Water Regulations and Standards, Washington D.C.

Hughes, R.M. 1989. Ecoregional Biological Criteria. From Proceedings for Water Quality Standards for the 21st Century, EPA, Dallas, TX.

Karr, J.R & D.R. Dudley. 1981. Ecological Perspective on Water Quality Goals. Environmental Management, Vol. 5, No. 1, pp. 55-68.

Plafkin, J.L., M.T. Barbour, K.D. Porter, S.K. Gross & R.M. Hughes. 1989. Rapid Bioassessment Protocols for Use in Streams and Rivers: Benthic Macroinvertebrates and Fish. EPA, Assessment and Watershed Protection Division, Washington D.C.

(2) Other waters of the state, including waters outside designated mixing zones, shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

Add to the Definitions:

340-41-006

(37) "Aquatic life/species" means any plants or animals which live at least part of their life cycle in waters of the State.

(38) "As naturally occurs" means that the same species and numbers of organisms should be found in similar habitats that are free of human influence.

(39) "Biological criteria" means numerical values or narrative expressions that describe the biological integrity of aquatic communities inhabiting waters of a given designated aquatic life use.

(40) "Ecological integrity" means the condition of an aquatic community as measured by the structural and functional characteristics of an aquatic community of organisms living in the unimpaired waters of a specified ecological habitat.

(41) "Designated beneficial use" means the purpose or benefit to be derived from a water body, as designated by the Water Resources Department or the Commission.

(42) "Indigenous" means supported in a reach of water or known to have been supported according to historical records compiled by State and Federal agencies or published scientific literature.

(43) "Resident biological community" means aquatic life expected to exist in a particular habitat when water quality standards are met. This shall be established by accepted biomonitoring techniques.

(44) "Without detrimental changes in the resident biological community" means no significant loss of species or excessive dominance by any species or group of species, when compared to an appropriate reference site or region.

2 & 3) The rule language includes protection for all aquatic life. The specific types of aquatic communities monitored will depend on specific concerns or types of impacts. EPA has developed monitoring protocols that identify macroinvertebrates and fish as the most appropriate biological communities for assessing water quality.

4) Because standards already exist for the protection of aquatic life, there should be no significant change in implementation or enforcement with adoption of this new language. Cost of performing biological surveys will vary depending on the particular problem and monitoring needs. EPA's biological monitoring protocols describe five different methods with varying levels of effort for completing biological surveys. The time needed to complete the surveys varies from method to method and ranges from 1.5 to 17 hours per study site (EPA, 1989).

5) The new rule language covers all aquatic life, and therefore, separate issue papers for fish and macroinvertebrates should not be needed. Different monitoring guidelines and methods, however, will be needed for fish and macroinvertebrates. The protocols outlined in EPA's monitoring guidelines for bioassessments addresses this need.

6) "Reference site" refers to a site on the same stream, or within the same basin or ecoregion that has similar aquatic habitat and riparian conditions, and represents the water quality and biological community attainable without the affects of significant human perturbations. A definition will be added for clarification.

VII. PROPOSED RULE AMENDMENT: Biological Criteria

The proposed rule language is underlined. Since this is a new rule, no deletions to existing language is needed. The language is consistent with other references to aquatic life protection in the rules.

340-41-027 Biological Criteria:

(1) Waters of the State designated as "Outstanding Resource Waters" shall be maintained such that resident biological communities are to remain as they naturally occur and all indigenous aquatic species are protected and preserved.

A respondent endorsed the use of macroinvertebrates as one of the primary indicators of water quality and support the process recommended. However, the term aquatic community as defined includes other than macroinvertebrates so it is unclear as to whether fish sampling was included. If so then a separate issue paper is needed.

Another respondent states that Oregon should adopt EPA assessment standards and procedures for each type of water system. Reference standards should then be based on the results at undamaged test sites in Oregon, or EPA test results for similar sites in other states. Standards should be developed which include population counts of vertebrate and invertebrate species for each location or type of habitat.

Summary of Issues:

1) Biological criteria should only be used as criteria, not standards that trigger regulatory action without full and fair consideration of a number of other tests such as chemical analyses and bioassay testing.

2) At least two assemblages of aquatic organisms should be included in criteria (e.g., fish and invertebrates).

3) Fish eating birds and mammals should be included in development of biological criteria.

4) It is unclear how this standard will be implemented or enforced. Substantial costs may be incurred by cities and businesses as a result of this standard.

5) Separate issue papers should be presented for fish and macroinvertebrates.

6) Reference sites need to be defined since biological communities vary because of habitat as well as water quality.

VI. DEPARTMENT RESPONSE TO PUBLIC COMMENTS

1) Oregon Administrative Rules already include narrative standards for the protection of aquatic life. Therefore, the proposed rule does not add any requirements that cities and businesses do not already have to meet. Rather, the new language clarifies current standards to assure that water quality will adequately protect aquatic communities. Further, EPA has directed states to adopt narrative biological criteria as part of state standards in order to comply with the Clean Water Act.

Comments were made that strongly recommended that DEQ include criteria for a minimum of two assemblages for water bodies (macroinvertebrates and fish in most streams; algae and fish in most lakes). They also recommended using both basins and ecoregions in the design for selecting reference sites. Biological criteria should also be integrated into permit actions, standards actions, and nonpoint source actions. Establishing criteria is not enough, they must be sued regularly to be effective. The Department also needs to develop physical habitat and flow criteria as recommended in Plafkin et al. (1989); conduct triennial reviews of biological and physical habitat criteria, biological and physical habitat monitoring methods, and biological and physical habitat data analysis techniques.

One respondent supports, but urges caution in developing biological criteria. Biological criteria are useful because they may indicate the effect of multiple hard-to-measure condition. However, because they are an accumulation of complex conditions, cause-and-effect relationships are not well-understood. Therefore, biological criteria can be used as an indicator of the meed for more intensive investigation. They should not be standards in themselves. Modification was requested of the approach to biological criteria to reflect their limitations. Another respondent commended the Department for again recognizing that the aquatic life in rivers and lakes are important to showing the health of the water body. Much of the original work on water bodies in Oregon in the 1940's through the 1960's was based on aquatic communities. However, to make numerical biological criteria a regulatory tool may be pushing the system too much. Counting actual numbers of individual animals or species above and below an outfall may be dependent upon substrate as well as possible affects of the discharges. While water quality is a factor, it is only one factor in the biological world. Skilled biologists who could determine the biological criteria are not readily available, either to the agency, to industry, or to consultants. The proposed criteria may be limited by this scarcity of skilled biologists. A respondent stated that there will be substantial costs associated with the biological surveys. They estimate the surveys required may cost as much as $25,000 annually for their city. They also stated that it was unclear how the information collected will be used to set standards.

V. PUBLIC COMMENTS RECEIVED ON ISSUE PAPER

The following comments were made on the biological criteria issue paper:

Several respondents were impressed with DEQ's inclusion and new emphasis in biological standards for measuring water quality. ODFW supports this approach to create a link between water chemistry and effects on aquatic organisms.

Comments were made that the new biological criteria standard appears to have merit. However, it is unclear how the standard will be implemented. The standard lacks the details necessary to properly evaluate the impacts of this new standard on existing dischargers.

A few respondents asked clarification of the meaning for "When compared to an appropriate reference site or region". Does a "reference site or region" mean another site that has been similarly affected by humans? Or does it mean another site that has similar aquatic features, but which has <u>not</u> been similarly affected by humans?

A few respondents commented that the development of a viable biological criteria program in Oregon would be beneficial to evaluating water quality within the state. However, the biological criteria must not be used as a trigger for regulatory action without full and fair consideration of a number of other tests such as chemical analysis and bioassay testing... The DEQ is encouraged to include this concept of biological criteria in their water quality programs. However, these should be criteria, not standards, used in a weight of evidence manner to assist the agency in evaluating water quality in the state.

Comments were made that DEQ needs to make explicit that fish-eating birds and mammals (e.g., river otter, mink) are to be considered in the development of biological criteria. The rationale for biocriteria should include us of biocriteria for measuring whether regulatory controls (or proposed treatments) are in fact proving sufficient to reduce and eliminate adverse effects of contamination on organisms. Narrative criteria should be ambitious, not vague. The DEQ intention to let biological criteria be sufficient for the state to take action is a major step forward in environmental protection policy. The word "all" should be inserted before "life stages" in DEQ's example of a narrative criterion.

- Ohio has the most extensive biocriteria program. Criteria were developed for their rivers and streams using an ecoregional reference site approach. Within each of Ohio's five ecoregions, criteria for three biological indices (two for fish and one for macroinvertebrates) were derived. Ohio successfully uses biological criteria to demonstrate attainment of aquatic life uses and discover previously unknown or unidentified environmental degradation. Twice as many impaired waters were discovered using biological criteria and chemistry together, than by using chemistry alone.

IV. DEPARTMENT'S PROPOSAL FOR PUBLIC COMMENT

The Department makes the following proposals for the development and implementation of biocriteria into State Standards:

- Recommend the adoption of definitions as listed above under the **"Definitions"** section (340-41-006)

- Recommend the adoption of a more specific narrative criteria than currently used in OAR's. For example:

  "Ambient water quality shall be sufficient to support life stages of all indigenous aquatic species as naturally occurs in the water body."

- Recommend adoption of the following process which will lead to the development and implementation of numeric biocriteria in Oregon's water quality standards.

  1) Develop standard protocols for the assessment of biological communities in all water types (streams, rivers, lakes, wetlands, and estuaries) of the State.

  2) Identify and conduct biosurveys at unimpaired reference sites within ecoregions or specific basins.

  3) Establish numeric biological criteria based on results of reference site studies.

  4) Adopt numeric criteria as water quality standards for biological communities and evaluate impairment at impacted sites based on these standards.

Since measurements of resident biota are capable of detecting water quality problems that may not be detected by chemical or toxicity testing, violation of biological criteria should be sufficient for the state to take action. This means that corroborating chemical and toxicity testing data should not be required as supporting evidence in the criteria statement.

Other State Programs

Approximately 20 States currently use some form of standardized instream biological assessments to evaluate the status of aquatic communities within State waters. Programs vary from conducting bioassessment studies to fully developed biological criteria. Below is a summary of current State bioassessment programs:

- Colorado, Illinois, Iowa, Kentucky, Massachusetts, Tennessee, and Virginia conduct biomonitoring to evaluate biological conditions, but are not developing biological criteria.

- Fifteen States are presently developing biological assessment procedures that will allow development of biological criteria.

- Nebraska and Vermont use informal biological criteria to support existing aquatic life narratives in their water quality standards.

- New York is proposing to use biocriteria for site-specific evaluations of water quality impairment.

- Five States, Florida, Arkansas, North Carolina, Maine, and Ohio are now using biocriteria to define aquatic life use classifications and to enforce water quality standards. Of these, three, North Carolina, Maine, and Ohio, have made biocriteria an integral part of their water quality programs. For example:

- North Carolina developed narrative biocriteria in the State water quality standards to assess impairment to aquatic life uses.

- Maine has enacted a revised Water Quality Classification Law, specifically designed to facilitate the use of biological assessments. Each of four water quality classes contains descriptive aquatic life conditions necessary to attain that class.

Narrative Criteria

Oregon uses narrative criteria or goals as described in the summary of current OAR's. Refined use designations incorporating biological components can result in the development of improved narrative biological criteria. For example, Connecticut has incorporated the following narrative criteria:

> "Benthic invertebrates which inhabit lotic waters: A wide variety of macroinvertebrate taxa should normally be present and all functional groups should normally be well represented... Water quality shall be sufficient to sustain a diverse macroinvertebrate community of indigenous species. Taxa within the Orders Plecoptera (stoneflies), Ephemeroptera (mayflies), Coleoptera (beetles), Trichoptera (caddisflies) should be well represented."

Numerical Criteria

Numerical indices that serve as biological criteria should describe expected attainable conditions for different designated uses. To determine numerical criteria, some aspect of the aquatic community's structure and function is measured at reference sites and set as the attainable goal. Examples of relative measures include similarity indices, coefficients of community loss, and comparisons of lists of dominant taxa. Static measures of existing community structure such as species richness, presence or absence of indicator taxa, and distribution of trophic guild are useful for establishing the normal range to be expected in unperturbed systems.

No single index or measure has been universally recognized as free from bias and reliable as a decision-making tool. However, the weaknesses of one measure or index can often be compensated for by combining it with the strengths of other indices. Some indices rely on one measurement while others comprise several measurements. A multimetric approach that incorporates information on species richness and composition, trophic composition, abundance or biomass, and condition is recommended. The choice of numerical criteria, and the particular indices to be used, depends on the types of surface waters (streams, rivers, lakes, estuaries, wetlands, and nearshore marine) to which they must be applied. In general, community-level indices such as the IBI (Index of Biotic Integrity) for fish or RBP (Rapid Bioassessment Protocols) for invertebrates are more easily interpreted than fluctuating numbers such as population size.

1) Development and adoption of narrative biological criteria into State standards for all surface waters (streams, rivers, lakes, wetlands, estuaries). Definitions of terms and expressions in the narratives must be included in the standards.

2) Development of an implementation plan. This plan should include program objectives, study design, research protocols, criteria for selecting reference conditions and community components, quality assurance and control procedures, and training for State personnel. Plans for each surface water type should be developed.

3) Implementation and integration of biological criteria in water quality standards. This requires using biological surveys to derive biological criteria for classes of surface waters and designated uses. These criteria are then used to identify nonattainment of designated uses and make regulatory decisions.

Criteria may be based on either individual population measurements or combined data indices such as species richness, abundance, trophic composition, or biomass. Criteria based on several indices will provide a more robust measure of community structure and function (EPA 1990). Many improvements in biological monitoring and assessment tools have been made during the past decade. The release of EPA's Rapid Bioassessment Protocols for Streams and Rivers is a good example.

Two cautions must be applied to the biological criteria approach: 1) regional or habitat specific biological criteria are required because of inherent natural variability among ecosystems; thus national quantitative biological criteria will not be developed, and 2) final identification of the source of impairment may require the use of chemical and physical analyses in addition to biological information. Biological criteria should augment chemical and whole effluent criteria; they should not be considered as replacements (EPA 1990).

Application of Biocriteria

A major purpose for conducting biological assessments should be to produce biological criteria that represent the best possible goals for waters of a given designated use. Use classifications set the regulatory requirements (ie. "protection of aquatic life"), and the criteria will support this classification. Biological criteria can be numeric, narrative or both.

ECOLOGICAL INTEGRITY - The summation of chemical, physical and biological integrity capable of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region.

ECOREGION - A relatively homogeneous area defined by similarity of geography, hydrology and land use. Ecoregions help define the potential for designated use classifications of specific water bodies.

DESIGNATED USE - The purpose or benefit to be derived from a water body.

IMPACT - A water quality stressor caused by physical or chemical perturbations or contamination of a water body.

IMPAIRMENT - A detrimental effect to the biological integrity of a water body which results from an impact.

TARGET GROUP - The component of the community, such as a taxonomic category, trophic guild, or other designation, that is the focus of a bioassessment.

Rationale for Biocriteria

Biocriteria are based on the premise that the structure and function of an aquatic biological community reflects the quality of its habitat and surface waters (Plafkin, etal. 1989). In pristine environments we expect the existing biological community to provide a measure of the best possible goal for water quality. While pristine environments are virtually non-existent, minimally impacted waters exist. Assessment of aquatic communities in these waters help to establish a value for biological integrity and define water quality for other waters within similar habitats. Thereby, numerical and/or narrative descriptions of the kinds and numbers of organisms expected in unimpaired habitats become the criteria.

In impacted waters biological assessments provide an integrated picture of habitat and water quality problems over time, rather than a "snapshot" picture provided by chemical sampling. Bioassessments can also be more cost effective than chemical analyses especially where complex effluents occur.

EPA (1990) lists three phases to the implementation of biocriteria:

biological use designations and ecologically meaningful biological criteria were developed.

Effective narrative rules also require clear operational definitions of the terms used in the rules (EPA, 1990). Clear operational definitions for "fish or aquatic life" are not present in the current OAR's.

Definitions

Terms often used in biological criteria or standards are listed below:

AQUATIC COMMUNITY - A biological association composed of all the interacting populations of aquatic organisms inhabiting a water body in a given area or region.

BIOASSAY - A toxicity test using selected organisms to determine the acute or chronic effects of a chemical pollutant or whole effluent.

BIOASSESSMENT - A measurement of the biological condition of a water body using biosurveys and/or toxicity tests. Toxicity tests may be performed either in situ or in the laboratory on either whole-effluent or ambient samples.

BIOCRITERIA - Numerical values or narrative expressions that describe the biological integrity of aquatic communities inhabiting waters of a given designated aquatic life use. Refined aquatic life use classifications based on biological measures can function as narrative biological criteria.

BIOLOGICAL INTEGRITY - The condition of an aquatic community as measured by the structural and functional characteristics of an aquatic community of organisms living in the unimpaired waters of a specified ecological habitat.

BIOMONITORING - A continued program of biosurveys systematically undertaken to provide a series of biological measures over time, often used to ensure that standards are being met or to assess long-term trends. Bioassays are not considered to be biomonitoring within the biocriteria framework.

BIOLOGICAL STANDARD - A legally established State rule consisting of a designated biological use (goal) and biological criteria.

(i) **Materials in concentrations that will cause acute (96HLC50) toxicity to aquatic life.** Acute toxicity is measured as the lethal concentration that causes 50 percent mortality of organisms within a 96-hour test period.

(B) The water outside the boundary of the mixing zone shall:
(i) **Be free of materials in concentrations that will cause chronic (sublethal) toxicity.** Chronic toxicity is measured as the concentration that causes long-term sublethal effects, such as significantly impaired growth or reproduction in aquatic organisms, during a testing period based on test species life cycle. Procedures and end points will be specified by the Department in waste water discharge permits.

(c) (C) **Minimize adverse effects on the indigenous biological community** especially when species are present that warrant special protection for their economic importance, tribal significance, ecological uniqueness, or for other similar reasons as determined by the Department;

(E) Minimize adverse effects on other designated beneficial uses outside the mixing zone.

III. CONCERNS WITH THE CURRENT RULE

General Approach

Biological criteria should describe the aquatic communities inhabiting waters of a given designated aquatic life use (EPA 1990). These descriptions can be narrative expressions or numeric values. Thus, aquatic life uses are general statements of attained or attainable uses of State waters, while the biological criteria are quantifiable values used to determine if a use is impaired and if so the degree of impairment. Criteria must be written to protect the use (EPA 1990).

Current beneficial uses in Oregon waters include salmonid fish rearing, salmonid fish spawning, and resident fish & aquatic life. The statement "fish or other aquatic life," in the current OAR's does not specifically address the beneficial uses defined for waters of the state. Hughes (1989) concludes that management of aquatic ecosystems could be enhanced around the country if ecologically meaningful

II. CURRENT RULES

Current OAR's include general narrative statements for the protection of fish and aquatic life. All basins include the following:

340-41-(river basin)

(2) No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause violation of the following standards in the waters of the (river) Basin:

(g) The liberation of dissolved gases, such as carbon dioxide, hydrogen sulfide, or other gases, in sufficient quantities to cause objectionable odors or to be deleterious to fish or other aquatic life, navigation, recreation, or other reasonable uses made of such water shall not be allowed.

(h) The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or which are injurious to health, recreation, or industry shall not be allowed.

(i) The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.

(j) The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry shall not be allowed.

(k) Objectionable discoloration, scum, oily sleek or floating solids, or coating of aquatic life with oil films shall not be allowed.

(4) Mixing Zones:

(b) The Department may suspend all or part of the water quality standards, or set less restrictive standards, in the defined mixing zone, provided that the following conditions are met:

(A) The water within the mixing zone shall be free of:

ISSUE PAPER #13
BIOLOGICAL CRITERIA
Revised as of 10/22/90

I. INTRODUCTION

As State water pollution control programs improve water quality, it is becoming clear that chemical standards alone cannot adequately determine water quality problems and protect instream beneficial uses (EPA 1990). This is especially true where diffuse nonpoint sources of pollution occur (Plafkin, etal. 1989). The Clean Water Act (Federal Water Pollution Control Act of 1972, Clean Water Act of 1977, and Water Quality Act of 1987) recognizes this deficiency by mandating the development of criteria based on biological assessments of natural ecosystems. The objective of the Act [Sec. 101 (a)] is "to restore and maintain the chemical, physical and biological integrity of the Nation's waters." Section 303 of the Act requires States to adopt water quality standards that include both designated uses and protective criteria. Under Section 303(c)(2)(B) States are required to adopt criteria based on biological monitoring or assessment methods consistent with information published pursuant to Section 304(a)(8) when numerical criteria are not available.

In addition to direct applications to criteria development under the Clean Water Act, biological criteria support several other programs including: biennial reports on the extent to which waters support balanced biological communities, [Sec. 305(b)]; assessment of lake trophic status and trends, [Sec 314]; lists of waters that cannot attain designated uses without non-point source controls, [Sec. 319]; and prohibitions against dredge and fill disposal adversely affecting balanced wetland communities, [Sec. 404].

State statute (ORS 468710) also requires that aquatic life in waters of the State be protected.

Biological criteria will help identify water quality impairments, support regulatory controls that address water quality problems, and assess improvements in water quality due to regulatory efforts. Other federal and state agencies can use these criteria for determining the biological integrity of surface waters within their jurisdiction, and for assessments of the effects of specific practices on surface water quality.

Several commentors felt that the issue paper did not discuss where or when the guidelines apply, ie., upland disposal, in-water disposal, confined disposal.

Some respondents were concerned that the issue paper did not identify the test methods which should be used for analysis of parameters.

One commentor stated tha the equilibrium partitioning method should be re-evaluated as other methods are available for defining the residue trigger point for chemical parameters.

VI. DEPARTMENT RESPONSE TO PUBLIC COMMENTS

The guidelines are intended to be used for evaluating sediments for appropriateness of in-water disposal. Chemical trigger points should be evaluated on a regular basis. The Department will refer this to a scientific review panel for review.

No other actions are recommended at this time since more work will be needed to develop these guidelines further.

VII. REFERENCES

Turner R.A., Tiered Sediment Quality Evaluations for Dredging Projects. Proc. Coastal Zone '87 Symposium, May 1987.

USEPA. Interim Sediment Criteria Values for Nonpolar Hydrophobic Organic Contaminants. May 1988.

Where the natural quality of sediment for the waterbody exceed the guideline numerical limit for a metals parameter, the natural sediment quality shall be the guideline numerical limit. A natural sediment quality guideline for a waterbody will be applicable only for that specific waterbody.

Best professional judgement is required when evaluating chemistry data.

Toxicological

Bioassays can be used for further evaluation of sediment quality when chemistry values exceeds the guideline numerical values.

The types of bioassys that could be required for further assessment are as follows.

1. Acute Toxicity Bioassays

2. Chronic Toxicity Bioassays

3. Bioaccumulation Testing

Specific tests and endpoints are to be determined by the Department and appropriate regulatory and resource agencies. Best professional judgement is required for evaluation of sediment quality from toxicological data.

GUIDELINE RE-EVALUATION

DEQ will incorporate new information into the guidelines. A triennial review of the guidelines will be performed during water quality standards review.

TEST METHODS

Specific test methods required for physical, chemical, and toxicological analysis will be determined by the Department and appropriate regulatory and resource agencies.

III. PUBLIC COMMENTS RECEIVED ON ISSUE PAPER

The Department received the following comments on the Sediment Quality guidelines:

Chemical Parameters

The basic chemical parameters required for sediment quality assessment are as follows. Additional parameters may need to be evaluated depending on historical information and best professional judgement. Additional parameters could include priority pollutants or chemicals of concern not listed on the priority pollutant list.

Parameter	Concentration (ppm)
Total Organic Carbon	(Required for evaluation of organic parameters)
Arsenic	40
Cadmium	1
Chromium	20 - 300
Copper	50
Mercury	0.15
Lead	40
Zinc	250
Aldrin	(EQP)
Chlordane	(EQP)
DDT, DDD, DDE	0.2
Methoxychlor	(EQP)
2,4-D	(EQP)
Heptachlor	(EQP)
Lindane	(EQP)
Acenaphthene	(EQP)
Phenanthrene	(EQP)
Total PCB's	0.5

EQP = Numerical value should be calculated from the USEPA Interim Sediment Criteria for Nonpolar Hydrophobic Organic Contaminants

Chemical parameters exceeding the guideline chemical concentrations will be regarded as having the potential for adversely affecting water quality. Toxicological data could be used for further assessment of sediment quality and the potential effects on water quality.

3. Hazardous or solid waste releases or spills within the waterbody basin.

4. Naturally occurring soil and rock formations.

Through best professional judgement information which would indicate a cause for concern or a lack of information for the area would require physical and chemical data for further assessment.

Causes for concern could include, but are not limited to:

* Point or nonpoint sources discharging toxic pollutants to the waterbody or a tributary to the waterbody;

* Sediment data exceeding the physical or chemical guideline values;

* Recent hazardous waste spills;

* Soil and rock formations known to leache heavy metals, and;

* Land uses such as farming (pesticide concerns) and mining (heavy metal concerns).

Physical Parameters

The basic physical parameters and the numerical limits required for sediment quality assessment are as follows.

Parameter	Concentration
Grain Size	20 % Silt
Organic Content	5 % Volatile Solids
Oil & Grease	1,000 ppm

Exceedence of one of the numerical values requires additional chemical data for further assessment.

indicates no cause for concern. Information indicating a cause for concern or a lack of information for the area would require physical and chemical data for further assessment. Best professional judgement is required for evaluation of the historical information (Section III).

2. Physical characteristics are evaluated for potential adverse effects by comparison of the data to the guideline numerical value (Section III). Should one of the physical parameters exceed the guideline numerical value then chemistry data would be required for further assessment.

3. Chemical characteristics are evaluated for potential adverse effects by comparison of the data to the guideline numerical value (Section III). Chemical parameters exceeding the guideline chemical concentrations will be regarded as having the potential for adversely affecting water quality. Toxicological data could be used for further assessment of sediment quality and the potential effects on water quality. Best professional judgement is required when evaluating chemical parameters.

4. Toxicological data will be used on a case-by-case basis for evaluating sediment quality when the chemical parameters exceed the guideline numerical values. Best professional judgement is required for evaluation of sediment quality from toxicological data.

EVALUATION GUIDELINES

Historical

The following items should be considered when evaluating historical information.

1. Identification of point or nonpoint sources which could discharge toxic pollutants to the waterbody. The potential pollutants discharged by the sources and concentrations should be identified. This information would be used for determining the loading of potential pollutants to the waterbody.

2. Review of existing sediment information from the waterbody. Physical, chemical, and toxicological sediment data should be reviewed. When sediment data is unavailable for the past five years physical data would need to be collected for initial evaluation.

Issue Paper #12
INTERIM SEDIMENT QUALITY GUIDELINES
Revised as of 10/22/90

I. INTRODUCTION

The Department of Environmental Quality has the responsibility of assuring water quality standards and protecting its beneficial uses. Water quality is affected by many factors, one of which is the quality of the waterbody sediments. Managing activities to maintain sediment quality is an important aspect of assuring water quality is protective of the beneficial uses.

Sediment quality characteristics are important in determining present and past water quality conditions. The physical, chemical, and toxicological characteristics of sediment are important when determining effects from dredge disposal activities and point/nonpoint source discharges.

These guidelines are intended to provide a framework for evaluation of sediment quality information when determining the effects on water quality.

II. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

STRATEGY

The sediment quality guidelines will be used for evaluating pollutant levels in sediment and for determining the potential for adverse effects on water quality.

The tiered evaluation frame work was adapted from the Corps of Engineers Portland District Office (Turner, 1987) for use in evaluating sediment quality. The tiered approach was first developed for evaluating suitability of sediments for in-water disposal of dredged sediments. USEPA interim sediment criteria values have been reviewed for use in these guidelines.

The guidelines utilize historical, physical, chemical, and toxicological data in evaluating sediment quality. Information is evaluated in the following manner:

1. Historical information is evaluated to determine possible causes for concern. Physical data is required for further assessment when historical information

USEPA. 1989. Briefing Report to the EPA Science Advisory Board on the Equilibrium Partitioning Approach to Generating Sediment Quality Criteria. EPA 440/5-89-002. April 1989.

USEPA. 1990. Draft Ecological Evaluation of Proposed Discharge of Dredged Material into Ocean Waters. EPA-503-8-90/002. January 1990.

V. PUBLIC COMMENTS RECEIVED ON ISSUE PAPER

The Department received the following comment on sediment quality standards.

A respondent stated that the Department needs to determine whether it has statutory authority to regulate sediment quality.

a respondent stated that the Department needs to be careful when determining sources of pollutants in sediments, and that the cost of sediment monitoring needs to be considered.

Another respondent commented that the Department should use site specific information in the absence of sediment standards. In addition, the use of equilibrium partitioning method should be re-evaluated as other methods are available for defining the residue trigger point for chemical parameters.

VI. DEPARTMENT RESPONSE TO ISSUE PAPER COMMENTS

The Department does not recommend sediment standards to be adopted into Oregon Administrative Rules at this time. The Department recommends that an advisory committee be formed to review the development of these standrads.

Literature Cited

Albright, R. 1990. pers. comm.

Battelle. 1987. Regulatory Applications of Sediment Criteria. Battelle Ocean Sciences, 397 Washington Street, Duxbury, MA 02332. June 23, 1987.

DEQ. 1989. DEQ Interim Sediment Quality Guidelines.

Long, E.R. and L.G. Morgan. 1990. The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program. NOAA Technical Memorandum NOS OMA 52. March 1990.

Tetra Tech. 1986. Development of Sediment Quality Values for Puget Sound. September 1986.

USEPA. 1988. Interim Sediment Quality Criteria Values for 20 Nonpolar Hydrophobic Organic Chemicals. May 1988.

Sediment quality values for Puget Sound were developed through the Puget Sound Estuary Program and the Puget Sound Dredged Disposal Analysis (USEPA, 1987). The method used was the AET following evaluation of several methods. The AET methodology is being developed for freshwater systems in the Great Lakes area (Albright, 1990 pers. comm.).

The state of Washington has begun adoption of sediment quality values for marine waters.

Sediment quality methods using an equilibrium partitioning approach could be used in any waterbody providing the base information is provided, ie. total organic carbon. The other methodologies such as AET, SLC, and field bioassays require that site specific information be collected prior to use. Species and sediment characteristic information would be useful prior to implementation of these methodologies.

The Oregon Dredged Sediment Conference was attended by state and federal resource and regulatory agencies and the regulated community. The meeting resulted in several recommendations on development of sediment quality values for dredged sediment disposal and testing requirements. These recommendations in general were:

- Establishment of a tiered approach for evaluating sediment;
- Numbers used for evaluation should be above background levels but below chronic values;
- Numbers used for evaluation should be reviewed and updated periodically;
- Guidance should be provided by the agencies to the regulated community on number of samples collected and frequency, holding time, compositing samples, appropriate analytical methodology, detection limits, and quality control.

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

1. The Department should continue with the use of the tiered approach for evaluating sediment data.
2. The equilibrium partitioning approach should be used as guideline numbers for sediment data evaluation.
3. Encourage the development of sediment data bases.

Advantages of this method are the use of site specific data is based on objective method design and the method is not limited to a single type of chemical contaminant. The limitations of this method are the assumptions of the presence or absence of benthic organisms are the result of toxic effects and not environmental variables and an assumption that single contaminant effects can be distinguished from a combination of pollutants.

Apparent Effects Threshold (AET) Method

The AET method uses empirically derived paired field data for sediment chemistry and a range of biological effects indicators. The sediment concentrations are compared to statistically significant biological effects.

Advantages of this method are the use of empirical data to establish sediment values, the ability to derive contaminant specific sediment values, and the ability to establish sediment levels that could allow some adverse effect, if appropriate. The limitations of this method are extensive field data is needed, the possibility of interactive effects, and the effects of an unmeasured chemical.

Spiked Bioassay Method

The spiked bioassay method uses known amounts of a chemical or chemical mixtures to develop dose response curves for exposed test organisms.

The advantages of this approach are the establishment of cause and effect relationships and identification and quantification of interactive effects. The limitations of this method are the number of chemicals which need to be tested, the number of different types of sediments, the different organisms to be tested, and the ability to match laboratory conditions to field conditions.

SEDIMENT GUIDELINES, CRITERIA, STANDARDS IN USE

Sediment guidelines have been developed for several waterbodies including the Great Lakes and Puget Sound. Interim criteria have been developed for several nonpolar hydrophobic chemicals by the USEPA which uses the equilibrium partitioning approach (USEPA, 1988). The USEPA has recently evaluated the equilibrium partitioning method for use for metals (USEPA, 1989).

The advantages of this method are the utilization of the water quality criteria data base and does not require the collection of additional biological data. The limitations of this method are the same for the method using the water quality criteria. Additional limitations include the assumption of equilibrium in all aquatic environments and the variability in partition coefficient values due to variations in scientific literature, effects of dissolved organic matter, and the ratio of sediment to water.

Equilibrium Partitioning (sediment-biota) Method

The equilibrium partitioning (sediment-biota) method uses sediment contaminant concentrations which would correspond to body burdens in benthic organisms under thermodynamic equilibrium. Acceptable body burdens are based on existing regulatory limits established by USFDA action levels, the USEPA reference dose levels, or the water quality criteria when established limits are not set. The sediment concentrations are established as the sediment quality values.

The advantages of this method are that sediment quality values can be established with USFDA or USEPA established limits and partition coefficients from the literature. The limitations of this method are that sufficient data does not exist to validate the method or to generate definitive sediment quality values which would require extensive field and laboratory work.

Field Bioassay Method

The field bioassay method uses field collected sediments to expose test organisms for determining the relationship between the biological response and the measured chemical concentration in the sediments.

This method has an advantage of providing a high degree of statistical confidence in determining differences between a test site and a control site. The method can not set contaminant specific values as the total effect of all toxic agents present are measured.

Screening Level Concentration Method

The screening level concentration method uses empirically derived paired field data for sediment chemistry and species specific benthic infaunal abundances. This information is used to estimate the minimum sediment concentration for a compound that was not exceeded in 90 percent of the samples which contained a specific species.

Reference Value Method

The reference value method uses sediment quality values which are based on chemical concentrations in a pristine area or an area with acceptably low levels of toxic pollutants (USEPA, 1987). The main advantage of this method is that there is a minimal amount of data that needs to be collected. Quantitative toxicological data is not required for this method. The main limitation of this method is the difficulty of scientific and legal defense. This is due to subjectivity in background site selection which could either over protect or under protect the beneficial uses.

A modified reference approach has been developed in Region X which utilizes bioassay data. This method has been primarily developed for assessing dredged sediments prior to disposal at designated disposal areas in Puget Sound. This method was used because of the immediate need for establishing disposal criteria, a lack of biological data at the disposal site, and a lack of toxicological data on the dredged sediments (Tetra Tech, 1986).

Water Quality Criteria Method

The water quality criteria method compares USEPA water quality criteria or the appropriate state standard to toxic pollutant concentrations in the interstitial water.

The primary advantage of this method is that it utilizes the existing water quality criteria toxicological data base. Disadvantages of this technique are the limitation to the parameters which have been addressed by the water quality criteria documentation. Collection and analysis of interstitial water has not been standardized and procedures validated between laboratories.

Equilibrium Partitioning (sediment-water) Method

Interstitial water concentrations of metals and non-ionic organic chemicals correlate to biological effects (USEPA, 1989). The equilibrium partitioning (sediment-water) method attempts to predict the concentration of a chemical in the interstitial water.

The method uses a theoretical model to describe the equilibrium partitioning of a chemical between sedimentary organic material and interstitial water. A sediment quality value for a non-ionic organic chemical is the organic carbon normalized concentration that would correspond to an interstitial water concentration which is compared to the appropriate water quality criteria or standard. A sediment quality value for a metal would be derived through a similar method except that the partition coefficient would be predicted from a multi phase sorption model (USEPA, 1989).

Superfund Amendment and Reauthorization Act, and

Comprehensive Environmental and Liability Act

SEDIMENT STANDARD METHODOLOGY

The bioavailability of chemicals associated with the sediment is important for determining adverse effects to the beneficial uses. Different biological effects can occur from similar chemical concentrations found in different sediment types.

Biological effects variability for similar concentrations of a chemical would be influenced by many factors, some of which are:

1. The biological availability of the chemical found in the sediment;

2. The types of biological communities exposed to the sediment.

Biological availability of similar concentrations of a non-ionic organic chemical can be influenced by octanol-water partition coefficient for a given chemical and the sediment organic carbon content (USEPA, 1989). The concentration of chemical in the interstitial water is correlated with biological effects (USEPA, 1989).

Application of a standard across sediment types requires that the factors affecting bioavailability be understood. Several methodologies for the development of sediment standards address this issue (Tetra Tech, 1986; Long, 1990; USEPA, 1987).

Some of the more common approaches are:

- the reference value;
- water quality criteria;
- equilibrium partitioning (sediment-water);
- equilibrium partitioning (sediment-biota);
- field bioassay;
- screening level concentration;
- apparent effects threshold (AET);
- spiked bioassay (Tetra Tech, 1986).

3. Determining adverse effects to water quality &/or compliance with water quality standards for nonpoint sources;

4. Assessing monitoring data and determining beneficial use effects;

5. Site characterization and clean-up for superfund and RCRA facilities.

Sediment standards can be used in 401 certification programs for assessing the potential for adverse effects to aquatic life and human health due to in-water disposal of dredged sediments. Sediments with concentrations of a pollutant exceeding the sediment standard would be eligible for confined or upland disposal. Potential adverse effects to aquatic life would be from acute or chronic toxicity due to toxic chemicals. Potential adverse effects to human health would result from the bioaccumulation of resuspended toxic pollutants to levels which pose a threat to human health when ingested. Another potential use is assessing the potential for adverse effects to aquatic life and human health of runoff from upland disposed sediments which contained toxic pollutants.

Sediment standards can be used in point source industrial and municipal waste discharge programs and nonpoint source programs. Specific application of sediment standards could be for monitoring discharge of pollutants, siting new discharge points, and compliance monitoring of dischargers.

RCRA, CERCLA, and SARA programs would be able to use sediment standards for assisting in assessing the risk at a site, the evaluation of site data in characterizing a site, and for the establishment of cleanup goals at a site. These standards could be used in coordination with the established protocols of the program.

Waterbody monitoring programs can use sediment standards for identification of " hot spots ", prioritizing areas to be studied, and listing waterbodies as water quality limited.

Federal laws where sediment standards could be applied are:

Clean Water Act of 1977

Clean Water Act of 1987

Marine Protection, Research, and Sanctuaries Act of 1972

Resource Conservation and Recovery Act

Toxic Substances Control Act

2. What type of methodology would be appropriate for the state of Oregon?

3. Does enough information exist to adopt numerical sediment standards for the state of Oregon?

4. Should a process be established for development of numerical sediment standards?

SEDIMENT STANDARDS APPLICABILITY

The quality of sediment in waters of the state are important for consideration because contaminants in the aquatic environment often accumulate to higher concentrations in sediments that the water column (USEPA, 1987). These sediments can act as a source of pollutants which would adversely affect beneficial uses supported by water quality. Contaminated sediments can act as a source of toxic pollutants available for bioaccumulation into aquatic life which would pose a threat to human health depending on tissue concentration and consumption patterns. Contaminated sediments can also act as a threat to the health of aquatic life through acute and chronic toxicity.

Sources of chemicals in sediments can result from natural and man-made activities. Leaching of heavy metals from certain types of geologic formations and soil erosion can cause higher than expected concentrations in the sediments of waterbodies. Human activities such as the improper use of pesticides, urban runoff, and point source discharges can cause an increase in pesticides, heavy metals, and organics found in sediments.

There are technical and program limitations in application of sediment standards derived from one methodology. Application of a standard designed to predict in-water aquatic life effects would not be appropriately applied for determining effects of dried sediments at upland disposal sites. Use of a "no effect" concentration for in-water disposal of dredged sediments may be appropriate but the same "no effect" concentration may not be appropriate for use in Superfund site cleanups.

Sediment standards can be used for:

1. Determining suitability of dredged sediments for in-water disposal for projects requiring 404 &/or Oregon Fill and Removal permits;

2. Determining adverse effects to water quality &/or compliance with water quality standards for industrial and municipal point source discharges;

II. CURRENT RULE

No numerical sediment standards have been adopted by the state of Oregon. The Environmental Quality Commission (EQC) have adopted narrative standards and numeric water quality standards for toxic pollutants. The Oregon Administrative Rules (OAR) narrative toxic standard adopted by the EQC states that:

" Toxic substances shall not be introduced above natural background levels in the waters of the state in amounts, concentrations, or combinations which may be harmful, may chemically change to harmful forms in the environment, or may bioaccumulate to levels that adversely affect public health, safety, or welfare; aquatic life; or other designated beneficial uses ".

III. CONCERNS WITH THE CURRENT RULE

One interpretation of the narrative OAR for toxic substances would be that there exists a narrative sediment standard for toxics which would be " no toxics in toxic amounts ". Sediment standards can be used for assessing waterbody conditions for determining whether toxic substances are accumulating in sediments to levels that adversely affect human health or aquatic life through bioaccumulation, acute toxicity, or chronic toxicity.

At present the Department uses a tiered approach for evaluating sediment data in implementing the narrative standard for in-water disposal of dredged sediments requiring 401 certification. This approach uses a combination of historical information, physical, chemical, and biological parameters for sediment quality evaluation. There are a total of 20 parameters with guideline values. Seven of the parameters are metals, seven are pesticides, three are organic chemical pollutants with the remainder being physical parameters (DEQ, 1989). These numbers are used as a guideline in combination with best professional judgement to assess the potential affect from in-water disposal of dredged material. This approach is being proposed for evaluating sediments for ocean disposal by the U.S. Army Corps of Engineers (USEPA, 1990).

Questions concerning sediment standards are:

1. How should sediment guidelines, criteria, or standards be used?

ISSUE PAPER # 11
SEDIMENT QUALITY STANDARDS
Revised as of 10/22/90

I. INTRODUCTION

The quality of sediment in waters of the state are important for consideration because contaminants in the aquatic environment often accumulate to higher concentrations in sediments than the water column (USEPA, 1987). These sediments can act as a source of pollutants which would adversely affect beneficial uses supported by water quality. Therefore, control of sediment quality is important for assuring the protection of water quality. Authority for control of sediment quality can be found in state regulations and federal law (OAR 340-41-(River Basin; USEPA, 1987).

Application of sediment standards would be dependent on the specific program goals and objectives. The goals and objectives could be influenced by environmental, technological, and financial considerations.

The bioavailability of chemicals associated with the sediment is important for determining adverse effects to the beneficial uses. Different biological effects can occur from similar chemical concentrations found in different sediment types.

Application of a standard across sediment types requires that the factors affecting bioavailability be understood. Several methodologies for the development of sediment standards address this issue.

There are several different approaches for development of sediment standards and the control of sediment quality. Some of the more common approaches are; the reference value, water quality criteria, equilibrium partitioning (sediment-water), equilibrium partitioning (sediment-biota), field bioassay, screening level concentration, apparent effects threshold (AET), and spiked bioassay (Tetra Tech, 1986). Details on these methods can be found in the Discussion section.

(A) Type of operation to be conducted;
(B) Characteristics of effluent flow rates and composition;
(C) Characteristics of low flows of receiving waters;
(D) Description of potential environmental effects;
(E) Proposed design for outfall structures.

(e) The Department may, as necessary, require mixing zone monitoring studies and/or bioassays to be conducted to evaluate water quality or biological status within and outside the mixing zone boundary.

(f) The Department may change mixing zone limits or require the relocation of an outfall if it determines that the water quality within the mixing zone adversely affects any existing beneficial uses in the receiving waters.

Basin	Rule
North Coast	340-41-205(4)
Mid Coast	340-41-245(4)
Umpqua	340-41-285(4)
South Coast	340-41-325(4)
Rogue	340-41-365(4)
Willamette	340-41-445(4)
Sandy	340-41-485(4)
Hood	340-41-525(4)
Deschutes	340-41-565(4)
John Day	340-41-605(4)
Umatilla	340-41-645(4)
Walla Walla	340-41-685(4)
Grande Ronde	340-41-725(4)
Powder	340-41-765(4)
Malheur	340-41-805(4)
Owyhee	340-41-845(4)
Malheur Lake	340-41-885(4)
Goose and Summer Lakes	340-41-925(4)
Klamath	340-41-965(4)

Literature Cited

USEPA. 1985. Technical Support Document for Water Quality-based Toxics Control. EPA-440/4-85-032. September 1985.

toxicity within a designated portion of the established mixing zone. This designated portion shall be defined as a zone of immediate dilution (ZID). The size of the zone of immediate dilution will be determined by the Department on a case-by-case basis. The Department may use appropriate guidance documents, such as Technical Support Document for Water Quality-based Toxics Control, USEPA April 1990, for establishment of the zone of immediate dilution.
(ii) Materials that will settle to form objectionable deposits.
(iii) Floating debris, oil, scum, or other materials that cause nuisance conditions.
(iv) Substances in concentrations that produce deleterious amounts of fungal or bacterial growths.

(B) The water outside the boundary of the mixing zone shall:

(i) Be free of materials in concentrations that will cause chronic (sublethal) toxicity. Chronic toxicity is measured as the concentration that causes long-term sublethal effects, such as significantly impaired growth or reproduction in aquatic organisms, during a testing period based on test species life cycles. Procedures and end points will be specified by the Department in waste water discharge permits.
(ii) Meet all other water quality standards under normal annual low flow conditions.
(c) The limits of the mixing zone shall be described in the waste water discharge permit. In determining the location, surface area, and volume of a mixing zone area, the Department may use appropriate mixing zone guidelines to assess the biological, physical, and chemical character of receiving waters, and effluent, and the most appropriate placement of the outfall, to protect instream water quality, public health, and other beneficial uses. Based on receiving water and effluent characterisitics, the Department shall define a mixing zone in the immediate area of a waste water discharge to:

(A) Be as small as feasible;
(B) Avoid overlap with any other mixing zones to the extent possible and be less than the total stream width as necessary to allow passage of fish and other aquatic organisms;
(C) Minimize adverse effects on the indigenous biological community especially when species are present that warrant special protection for their economic importance, tribal significance, ecological uniqueness, or for other similar reasons as determined by the Department;
(D) Not threaten public health;
(E) Minimize advers effects on other designated beneficial uses outside the mixing zone.
(d) The Department may request the applicant of a permitted discharge for which a mixing zone is required, to submit all information necessary to define a mixing zone, such as:

VI. DEPARTMENT RESPONSE TO PUBLIC COMMENTS

Acute toxicity should be determined with 100% effluent. Effluents exhibiting acute toxicity should be managed in a manner to reduce the likelihood of adverse affects to aquatic life. Management of the discharge would be through establishment of a zone of immediate dilution. The Zone of Immediate dilution would be calculated on the basis of the April 1990 USEPA Technical Support Document.

Toxicity is a function of the physical and chemical characteristics of the chemical and the physical, chemical, and biological characteristics of the receiving water. The Department feels that the use of mixing zones for toxic pollutants are appropriate at this time.

The Department Mixing Zone guidelines have yet to be developed. Until the Department develops these mixing zone guidelines the Department will rely on the technical support documents provided by USEPA. In development of the Department's mixing zone guidelines the policy of "as small as feasible" will be addressed.

VII. PROPOSED RULE AMENDMENTS: MIXING ZONES

The following changes are recommended for the mixing zone standards. These recommendations are based on recent EPA guidance. Proposed deletions are bracketed and new language underlined.

340-41-__(4) Mixing zones:

(a) The Department may allow a designated portion of a receiving water to serve as <u>an area</u> [a zone of initial dilution] for waste waters and receiving waters to mix thoroughly and this zone will be defined as a mixing zone.
(b) The Department may suspend all or part of the water quality standards, or set less restrictive standards, in the defined mixing zone, provided the following conditions are met:

(A) The water within the mixing zone shall be free of:

(i) Materials in concentrations that will cause acute [(96HrLC 50)] toxicity to aquatic life. Acute toxicity is measured as the lethal concentration <u>of one hundred percent (100%) effluent</u> that causes 50 percent mortality of organisms within a [96-hour] test period. <u>Acute toxicity test methods will be established by the Department on a case-by-case basis and will be consistent with established methods and procedures. The Department may allow exceptions to the acute toxicity criteria on a case-by-case basis by allowing acute</u>

2. Acute toxicity shall be defined as those values which exceed 0.3 TU_a.

3. Chronic toxicity shall be defined as those values which exceed 1.0 TU_c.

4. Adopt the use of a zone of immediate dilution for those chemicals and outfalls meeting the criteria established by the USEPA in the technical Support document.

5. The width of the stream used for mixing zone designation should be designated on a case-by-case basis.

V. PUBLIC COMMENTS RECEIVED ON ISSUE PAPER

The Department has received the following comments on mixing zones:

Several respondents stated that the issue paper was prepared without benefit of the most recent USEPA technical support document for mixing zones. The information in this document should be utilized. Others stated that the Department should define the terminology "as small as feasible" and the economic affects and methodology used for this policy.

A respondent stated that sufficient information has not been provided by the USEPA for adoption and use of Toxicity Units in point source control, that the methodology for design of the zone of immediate dilution needs to be addressed and that acute toxicity should be defined in terms of diluted effluent instead of 100% effluent.

Another respondent believed that mixing zones should not be used for toxic pollutants, especially for pollutants which bioaccumulate. Water quality standards for these chemicals should be met at the end of pipe. Zones of immediate dilution should only be used where physical conditions allow.

A respondent stated that calculating the size of the mixing zone should be based on biological affects and that the "appropriate mixing zone guidelines" referred to in (4)(c) should be identified.

The most restrictive of the following are to be met:

3. Acute water quality standards are to be met within 10 percent of the distance from the edge of the outfall structure to the edge of the regulatory mixing zone in any spatial direction.

4. Acute water quality standards are to be met within a distance of 50 times the discharge length scale in any spatial direction.

5. Acute water quality standards are to be met within a distance of five times the local water depth in any horizontal direction from any discharge outlet.

The discharge length scale is defined as the square-root of the cross-sectional area of any discharge outlet. In the case of a multiport diffuser, this requirement must be met for each port.

Stream Width

Another portion of the mixing zone rule that needs further definement is the percentage of stream a mixing zone is allowed to affect. The mixing zone rule states that:

" Based on receiving water and effluent characteristics, the Department shall define a mixing zone in the immediate area of a waste water discharge to:

(A) Be as small as feasible;
(B) Avoid overlap with any other mixing zones to the extent possible and be less than the total stream width as necessary to allow passage of fish and other aquatic organisms; "

There is no indication as to the percentage of stream allowed to be used for a mixing zone other than less than the total amount of the stream to allow fish passage. The mixing zone should assure that the waterbody has a continuous zone of passage that meets water quality criteria for free-swimming and drifting organisms.

Some states have restrictions on the width of a mixing zone. For example the state of Washington requirements are that a mixing zone should not be greater than 15 percent of the width of the waterbody.

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

The Department recommends the following.

1. Adopting the Toxicity Unit calculation to determine the toxicity from exposure to complex effluents or mixtures of contaminants.

Toxicity could then be defined as not exceeding a certain TU. TU can be expressed in terms of acute units (TU_a) and chronic units (TU_c). This allows quantification of the narrative standard of " no toxics in toxic amounts "

This method would allow setting a number to be used, which if exceeded, would trigger the need for a toxicity reduction evaluation (TRE). TRE is a method used to identify the cause of toxicity in an effluent. The Department has the authority to require a discharger to perform a TRE. The narrative toxic rule states that:

> " If toxicity occurs, the Department shall evaluate and implement measures necessary to reduce toxicity on a case-by-case basis. "

Acute Toxicity

Another area of concern is at what point is no acute toxicity allowed within the mixing zone. The present rule appears to prohibit any acute toxicity within the mixing zone. This would equate to no acute toxicity at the end of pipe. At present many POTW's can not achieve " no acute toxicity at end of pipe " for ammonia and chlorine toxicity.

The USEPA " Technical Support Document for Water Quality-based Toxics Control " states that acute toxicity can be controlled by the states by one of two methods. The two methods are (1) prohibiting acute toxicity in the pipe itself or (2) use a high rate diffuser and to ensure that acute toxicity is dissipated a short distance from the outfall (USEPA, 1985).

A zone of immediate dilution (ZID) could be used for achieving the second alternative. The ZID is a small area around the discharge which is within and smaller than the mixing zone where acute toxicity is allowed. The acute toxicity would be allowable for nonpersistent chemicals only. The toxicity would be quickly dissipated by the receiving stream. This area would be avoidable by fish and would not be expected to adversely effect beneficial uses.

Criteria recommended in the technical support document for designing the ZID are:

1. A high rate diffuser is to be used.

2. The outfall discharge must exceed 10 feet per second.

The mixing zone rule states that:

"(A) The water within the mixing zone shall be free of:

(i) Materials in concentrations that will cause acute (96HrLC 50) toxicity to aquatic life. Acute toxicity is measured as the lethal concentration that causes 50 percent mortality of organism within a 96-hour test period. "

and

"(B) The water outside the boundary of the mixing zone shall:

(i) Be free of materials in concentrations that will cause chronic (sublethal) toxicity. Chronic toxicity is measured as the concentration that causes long-term sublethal effects, such as significantly impaired growth or reproduction in aquatic organisms, during a testing period based on test species life cycles. Procedures and end points will be specified by the Department in waste water discharge permits. "

Effluent Concentration

There is not an effluent concentration associated with determining acute or chronic toxicity. The lack of an effluent concentration allows an extreme amount of variability in interpretation. An effluent could be determined toxic if 1 percent of the effluent causes 50 per cent mortality or not toxic until 100 percent of the effluent causes 50 percent mortality.

The LC50 number is the percentage of effluent which causes 50 percent mortality in the test organisms. There exists an inverse relationship between LC50 data and toxicity, that is, the lower the LC50 the higher the toxicity. That is less effluent causes a toxic response. A method of translation of LC50 data to alleviate the problem of the inverse relationship is to convert the LC50 data into Toxic Units (TU) (USEPA, 1985). A TU is 100 divided by the toxicity measured:

$$TU = \frac{100}{\text{LC50 or NOEL}}$$

The higher the number the more toxic the effluent with this calculation. An example is if an effluent with an LC50 of 20 percent would be calculated to have 5 TU.

(d) The Department may request the applicant of a permitted discharge for which a mixing zone is required, to submit all information necessary to define a mixing zone, such as:

(A) Type of operation to be conducted;
(B) Characteristics of effluent flow rates and composition;
(C) Characteristics of low flows of receiving waters;
(D) Description of potential environmental effects;
(E) Proposed design for outfall structures.

(e) The Department may, as necessary, require mixing zone monitoring studies and/or bioassays to be conducted to evaluate water quality or biological status within and outside the mixing zone boundary.

(f) The Department may change mixing zone limits or require the relocation of an outfall if it determines that the water quality within the mixing zone adversely affects any existing beneficial uses in the receiving waters.

III. CONCERNS WITH THE CURRENT RULE

Numeric standards and narrative standards are used for defining toxicity in waterbodies. Numeric standards have been adopted on chemical specific basis for protection of acute and chronic toxicity.

Acute numeric standards are to protect beneficial uses for short term exposures to the chemical. The duration of exposure should not exceed one hour. Chronic numeric standards are to protect beneficial uses for long term exposures to the chemical. The duration of exposure should not exceed four days. The acute standards are to be met when there is to be no acute toxicity. Chronic standards are to be met when there is to be no chronic toxicity.

One method for interpreting the narrative standard is through whole effluent toxicity testing (USEPA, 1985). Whole effluent acute and chronic toxicity would be measured with bioassays. Terminology for acute and chronic toxicity is not specific in the narrative water quality standard. Toxicity should be defined on the basis of the percentage of effluent causing toxicity or the use of toxicity units and a " not to exceed " level.

(iii) Floating debris, oil, scum, or other materials that cause nuisance conditions.

(iv) Substances in concentrations that produce deleterious amounts of fungal or bacterial growths.

(B) The water outside the boundary of the mixing zone shall:

(i) Be free of materials in concentrations that will cause chronic (sublethal) toxicity. Chronic toxicity is measured as the concentration that causes long-term sublethal effects, such as significantly impaired growth or reproduction in aquatic organisms, during a testing period based on test species life cycles. Procedures and end points will be specified by the Department in waste water discharge permits.

(ii) Meet all other water quality standards under normal annual low flow conditions.

(c) The limits of the mixing zone shall be described in the waste water discharge permit. In determining the location, surface area, and volume of a mixing zone area, the Department may use appropriate mixing zone guidelines to assess the biological, physical, and chemical character of receiving waters, and effluent, and the most appropriate placement of the outfall, to protect instream water quality, public health, and other beneficial uses. Based on receiving water and effluent characteristics, the Department shall define a mixing zone in the immediate area of a waste water discharge to:

(A) Be as small as feasible;
(B) Avoid overlap with any other mixing zones to the extent possible and be less than the total stream width as necessary to allow passage of fish and other aquatic organisms;
(C) Minimize adverse effects on the indigenous biological community especially when species are present that warrant special protection for their economic importance, tribal significance, ecological uniqueness, or for other similar reasons as determined by the Department;
(D) Not threaten public health;
(E) Minimize adverse effects on other designated beneficial uses outside the mixing zone.

ISSUE PAPER # 10
MIXING ZONES
Revised as of 10/22/90

I. INTRODUCTION

A mixing zone is a designated area of a receiving water where waste water and receiving waters mix. Water quality standards and criteria can be suspended all or in part, or less restrictive standards can be established. Mixing zones are designated to reduce excessive waste water treatment and to limit areas of water quality degradation (USEPA, 1985).

The Environmental Quality Commission adopted mixing zone language into the Oregon Administrative Rules in 1987. Since adoption the Department has recognized several areas that need additional definement. These areas are defining acute and chronic toxicity, the point where no acute toxicity is allowed, and defining the size of the mixing zone.

II. CURRENT RULE

The language for a mixing zone is stated in each basin standard and are the same for all basins.

340-41-(River Basin)

(4) Mixing zones:

(a) The Department may allow a designated portion of a receiving water to serve as a zone of initial dilution for waste waters and receiving waters to mix thoroughly and this zone will be defined as a mixing zone.
(b) The Department may suspend all or part of the water quality standards, or set less restrictive standards, in the defined mixing zone, provided the following conditions are met:

(A) The water within the mixing zone shall be free of:

(i) Materials in concentrations that will cause acute (96HrLC 50) toxicity to aquatic life. Acute toxicity is measured as the lethal concentration that causes 50 percent mortality of organism within a 96-hour test period.

(ii) Materials that will settle to form objectionable deposits.

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Fish consumption rates reported in the Northwest Pulp and Paper study on dioxins in the Columbia River system should be used in calculating the water quality criteria.

USEPA's use of surface area for extrapolation of rat data to humans is inappropriate for 2,3,7,8-TCDD and the body weight method should be used instead.

Uptake of 2,3,7,8-TCDD does not appear to make a significant contribution to bioaccumulation with sediments and food having more effect on bioaccumulation. Based on this information no bioaccumulation is occurring.

Fish could comprise 50% of the Native American diet along the Columbia River. Many different species are consumed by Native Americans. Native Americans would consume fillets, skin, head, eggs, bones, heart, and tail.

The standard is not protective of children, pregnant women, wildlife, and people that weigh less than 70 Kg.

A greater safety factor than 10 should be applied to the LOAEL for use as an acute criteria for protection of aquatic life.

VI. THE DEPARTMENT RESPONSE TO PUBLIC COMMENTS

The risk level of $1X10^{-6}$ is a policy decision that the Environmental Quality Commission has adopted for use in water quality standards.

The review of information on the factors used in calculating the water quality criteria indicates that although the cancer potency used by USEPA is high and should be lower the bioconcentration factor and fish consumption rates used are low and should be higher. The use of reasonable estimates by the Department for these factors indicate that the water quality criteria is within these estimates.

Cooking methods and cooking loss have not been well established for all methods of fish preparation.

Protection of human health from carcinogenic response to 2,3,7,8-TCDD appears to be the most sensitive beneficial use from the available literature. Based on this information the Department will not propose any changes to the current standard for dioxin. However, the Department is proposing to adopt a chronic water quality standard for protection of aquatic life. The rule language is part of the Toxics Substances Standards (Issue Paper #7).

Human Weight

Human weight of 70 kg was used as an estimate of a average adult male (Snyder, et al., 1975 cited in USEPA, 1984 memo).

Risk

The USEPA recommended risk levels for carcinogens for water quality standards were 1×10^{-5}, 1×10^{-6}, or 1×10^{-7}. These risk levels correspond risks of one in a hundred thousand, one in a million, and one in ten million. The Oregon Environmental Quality Commission adopted a risk level of 1×10^{-6} for water quality standards (OAR 340-41 Table 20).

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

The Department recommends the following:

1. Continue to use the one in a million risk level for water quality standards.

2. Retain the current water quality standards for 2,3,7,8-TCDD.

3. Adopt a chronic water quality standard for the protection of aquatic life of 3.8 picograms per liter (ppq). This would be based on the LOEL times a safety factor of 10.

4. Continue literature reviews of the subject.

5. Pursue piscivorous birds or other species as a more sensitive species than humans.

V. PUBLIC COMMENTS RECEIVED ON ISSUE PAPER

The Department received the following public comment on 2,3,7,8-TCDD.

An independent team of pathologist's review of the liver slides from the study used by USEPA for determining the cancer potency factor used in the water quality criteria development reported fewer incidence of malignant tumors.

Cooking loss should be considered when calculating the standard.

Alternative risk levels of $1X10^{-4}$ and $1X10^{-5}$ should be used instead of $1X10^{-6}$.

Bioaccumulation Factors

Bioaccumulation is the uptake and retention of substances by an organism from the surrounding medium and food (USEPA, 1984). Bioconcentration is the uptake of substances from the surrounding medium through gill membranes or other external body surfaces (USEPA, 1984).

Aquatic organisms have been reported to accumulate TCDD (USEPA, 1984, 1988). Fish have been reported to accumulate TCDD when exposed to contaminated sediments, flyash, and dissolved TCDD (Rappe et al., 1986; Kuehl et al., 1987a, 1987b; Mehrle, 1989). Bioconcentration factors reported from laboratory studies for various fish species were; 66,000 for carp, 97,000 and 159,000 for fathead minnow, and 39,000 for rainbow trout (Cook, 1987; Mehrle, 1989).

Bioconcentration factors (BCF) established in the laboratory may not adequately represent biological uptake in natural environments. Bioaccumulation would better estimate the routes of exposure and actual uptake rates in natural systems.

The bioaccumulation rate would estimate the uptake of TCDD from the significant routes (USEPA, 1988). These routes would include food chain, water ingestions, sediment ingestion, and bioconcentration. Fish tissue concentration would be variable depending on species and trophic level, lipid content, weight, ratio of surface area to weight, organic carbon content of sediment, food intake rate, density of suspended solids, and TCDD concentration in sediment (USEPA, 1988). These estimates would be specific to a given waterbody and would be dependent on physical transport, chemical transformation, and biological degradation (USEPA, 1988).

When site specific information is unavailable for calculating a bioaccumulation factor use of the laboratory bioconcentration factor would be appropriate for use. A bioconcentration factor of 5000 was used in deriving the criteria for TCDD (USEPA, 1985). Based on the recent laboratory data on bioconcentration factors the 5000 BCF is probably low.

Fish Consumption Rate

The fish consumption rate used in the water quality criteria was 6.5 grams per day.

Water Consumption Rate

Water consumption rate was estimated at 2 liters per day. Water consumption is not viewed to be a significant exposure route when compared to fish ingestion due to the bioconcentration factor.

The LMS was used by USEPA for calculating the cancer potency factor for TCDD (USEPA, 1985). Tumor incidence versus dose information from Kociba, 1978 was used for fitting the LMS (USEPA, 1985). Information from mice and epidemiological studies were used as supporting evidence (USEPA, 1985). The cancer potency calculated by the LMS was 156,000 mg/kg/day (USEPA, 1985). The reference dose (RfD) is calculated from the cancer potency factor and the level of risk.

$$RfD = \frac{\text{Level of Risk}}{\text{Cancer Potency Factor}}$$

The USEPA RfD at a 1×10^{-6} risk level (one chance in a million) is 0.006 pg/kg/day. A RfD is an estimate of the daily exposure to human populations that is unlikely to produce an appreciable risk (USEPA, 1989). RfDs are conceptually the same as Acceptable Daily Intake (ADI).

The FDA calculated a TCDD cancer potency factor of 17,500 mg/kg/day (USEPA, 1984 memo). The FDA cancer potency factor was developed from the linear interpolation model using dose-response data from Kociba, 1978 (Chemerisk, 1989). This model prediction is based on a non-threshold carcinogenic response to TCDD exposure. The FDA RfD at a 1×10^{-6} is .057 pg/kg/day (USEPA, 1984).

Several countries including Canada calculate TCDD cancer potency on the basis of a threshold carcinogenic response (Chemerisk, 1989; NRCC, 1981). The threshold calculation is based on studies that indicates exposure to TCDD below a certain concentration does not cause a carcinogenic response (USEPA, 1989 memo). This concentration is then used for calculating an Acceptable Daily Intake for TCDD. The maximum ADI calculated by MNO is 10 pg/kg/day (NRCC, 1981).

The Science Advisory Board (SAB) reviewed information on causation of cancer by TCDD (SAB, 1989). The SAB concluded " at the present time the important new scientific evidence about 2,3,7,8-TCDD does not compel a change in the current assessment of the carcinogenic risk of 2,3,7,8-TCDD to humans. ".

A review of the Squire Report is being performed by a group of pathologists at the request of the Maine Department of Health. The Squire Report examined slides of tissues from the Kociba rat study for determining the incidence of cancer in different organs. The information from the Squire Report was used in the USPA linear multi-staged model for deriving the cancer potecy factor. A change in the classification of the tumors could change the cancer potency factor. The results of the study have just been released. It is unknown at this time to what extent this analysis will affect the cancer potency factor.

Water Quality Criteria Development

Development of the water quality criteria for TCDD was documented in Ambient Water Quality Criteria for 2,3,7,8-Tetrachlorodibenzo-p-dioxin (USEPA, 1985). The TCDD water quality criteria was calculated by the following method.

$$\text{WATER []} = \frac{\text{RISK x WT}}{[\text{WCR} + (\text{BCF x FCR}) \text{ x CPF}}$$

Where:

WATER [] = Ambient water concentration

RISK = 1×10^{-6} lifetime cancer risk

WT = Assumed body weight of human adult of 70 kilograms

WCR = Water consumption rate of 2 liters per day

BCF = Bioconcentration factor for fish of 5000 (no units)

FCR = Fish consumption rate of 6.5 grams per day

CPF = Cancer potency factor of 156,000 mg/kg/day
(70 year lifetime exposure)

Cancer Potency Factor

Many substances cause a carcinogenic response in animals. Some substances cause a stronger carcinogenic response than others. The cancer potency factor is a measure of the potential of a substance to cause cancer (USEPA, 1989). Cancer potency factors for TCDD have been calculated by several agencies including USEPA, Food and Drug Administration (FDA), and Ministry of Ontario (MNO) (Chemerisk, 1989).

The USEPA uses the linearized multistage model (LMS) for derivation of cancer potency factors when there is no convincing biological evidence for use of another model (USEPA, 1989). The LMS derives the upper 95% confidence limit of the slope of a straight line which has been fitted to laboratory data. The LMS assumes that carcinogenic response is non-threshold, that is, some increase of cancer incidence occurs at any exposure (USEPA, 1989). The LMS is used to predict low dose cancer risk. The LMS dose-response data are usually derived from rat and mice lifetime cancer bioassays.

* 180 g/d to represent a "reasonable worst case" based on the assumption that some individuals would consume fish at a rate equal to the combined consumption of red meat, poultry, fish, and shellfish in the U.S. (USEPA, 1989a).

Water Quality Standard

The TCDD water quality standard is 0.013 pg/l (parts per quadrillion) in waters with the designated beneficial uses of drinking water and fish consumption (OAR 340-41 Table 20).

Table 5

TCDD Water Quality Standard OAR 340-41 Table 20

Compound	Water and Fish Ingestion	Fish Consumption Only
Dioxin (2,3,7,8-TCDD)	0.013 pg/l	0.014 pg/l

Water and Fish Ingestion = Values represent the maximum ambient water concentration for consumption of both contaminated water and fish or other aquatic life.

Fish Ingestion Only = Values represent the maximum ambient water concentration for consumption of fish or other aquatic organisms.

The Oregon water quality standard for TCDD was adopted in 1987 by the Environmental Quality Commission. The standard adopted was for the protection of human health at a risk of $1X10^{-6}$. The standard was adopted from the USEPA water quality criteria for TCDD (USEPA, 1985).

The TCDD water quality standard is a human health based in-stream water quality standard. TCDD has been listed by the USEPA as a probable human carcinogen. This listing is based on animal studies (USEPA, 1985; Kociba, 1979). Protection of human health was identified as the most sensitive beneficial use.

A water quality standard was not adopted for the protection of aquatic life. Criteria values for the protection of aquatic life were based on the LOAEL. These concentrations were several orders of magnitude above the water quality criteria for the protection of human health. Achieving the in-stream water quality standard for the protection of human health would be protective of aquatic life concerns based on the information from the criteria document. Additional information is needed on the protection of piscivorous birds.

The state of Wisconsin surveyed a portion of the sport fishing population for fish consumption habits (Wisconsin, 1987). The average number of fish meals consumed by sportfisherman was 41 with 18 fish meals being sport caught. An average fish meal would equal 114 grams (USEPA, 1989a). The number of grams per day of fish consumed by Wisconsin sportfisherman was 12.8. The consumption of sport caught fish would equal 5.6 g/d.

Race and religion influence fish consumption (USEPA, 1988a). The Market Facts Survey found that in the United States jewish and negro people consumed approximately twice the amount of fish than caucasian people (USEPA, 1988a). A similar study by the Tuna Research Institute found only a 13 percent increase in fish among blacks. Information from this study indicated that oriental populations consumed 47 percent more fish than caucasians. Native American populations residing along waterways have traditionally utilized fish in their diet.

A survey was performed in 1989 on potential fish consumption rates of salmon, steelhead, and sturgeon from the Columbia River by sportfisherman, Native Americans, and the general population (Beak, 1989). The survey was based on sport landings data, commercial harvest, estimates of fish retained in the area, and portions of fish used. Sportfisherman estimated consumption for the species surveyed ranged from 0.6 g/d to 23.4 g/d for 1988. Native American estimated consumption for the species surveyed was 16.4 g/d for 1988. General population estimate of consumption of the species surveyed was 1.05 g/d. The survey did not include ethnic consumption estimates or the consumption of resident species.

Many factors will influence the amount of fish consumed. Factors influencing fish consumption are age, race, religion, sport fishery availability, and economics. The most reliable method for estimating fish consumption patterns for an area is through direct survey similar to the Wisconsin study of fish consumption by sport fisherman. When reliable site specific data is unavailable the USEPA recommends using one of the following approaches (USEPA, 1989a).

* 6.5 g/d to represent an estimate of average consumption of fish and shellfish from estuarine and fresh waters by U.S. population (USEPA, 1980).

* 20 g/d to represent an estimate of average consumption of fish and shell fish from marine, estuarine, and freshwaters by the U.S. population (USDA, 1984).

* 165 g/d to represent an estimate average consumption of fish and shellfish from marine, estuarine, and freshwaters by the 99.9th percentile of the U.S. population (Finch, 1973).

TCDD residues have been identified in freshwater and saltwater fish and shellfish (USEPA, 1989a; Mah, 1989). The fish collected from waters of Oregon through the National Bioaccumulation Study were collected downstream of potential sources of TCDD. These sources were bleached kraft pulp mills, municipal sewage treatment plants, and superfund sites. Fish collected in the Canadian study were collected from areas predominantly affected by bleached kraft pulp mills. Human exposure and the associated risk would be dependent on the amount of contaminated fish consumed (USEPA, 1985, 1988a, 1989a).

The USPEA used a national average daily consumption rate of freshwater and estuarine fish and shellfish of 6.5 grams per day per capita for calculation of the TCDD water quality criteria (USEPA, 1985). This average was derived from a survey of freshwater and estuarine fish and shellfish consumption in the United States (USEPA, 1988a).

Recent surveys have been conducted by USDA and NMFS on the consumption of fish and shellfish (USEPA, 1988a). The USDA study was conducted in 1977 - 1978. Nationwide intake of fish and shellfish on a per capita basis was 12 g/d (USEPA, 1988a). Geographic differences ranged from 9 to 14 g/d. The NMFS study published in 1985 reported a total per capita fish and shellfish consumption rate of 16.9 g/d (U.S. Department of Commerce, 1985, cited in USEPA, 1988a).

A survey conducted by the USDA on food consumption for 1966 - 1987 included information estimated on fish and shellfish consumption for the United States (Putnam, 1989). Overall consumption of fishery products have steadily increased during the past two decades with fishery product consumption for 1987 increases of 45 percent and 21 percent for the years 1967 and 1977, respectively (Putnam, 1989). Analysis of the data indicated that fresh and frozen fish and shellfish consumption for 1987 was 12.4 g/d on a per capita basis. This estimate is based on disappearance from the store and calculated for raw edible portion. The estimate would not include consumption of sport caught fish.

Some estimates have been made of fish consumption by groups consuming greater than the national averages. These groups would include sport fisherman, ethnic groups, and native americans.

Consumption rates of fisherman from the Los Angeles area were calculated through an interview process (Puffer et al., 1983 cited in USEPA, 1988). The majority of fisherman consumed the fish they caught. The median value for consumption of fish was 37 g/d with a 90th percentile of 225 g/d.

0.03	mice / B6C3F1 F	No increase in tumors (NTP, 1982)
0.007	mice / B6C3F1 M	No increase in tumors (NTP, 1982)

Exposure Assessment

Potential routes for human exposure to TCDD include ingestion of contaminated soil, ingestion of contaminated fish and other food products, and inhalation of contaminated dust particles (USEPA, 1988a). The major route of exposure for the general population would be ingestion of contaminated fish (USEPA, 1985).

Estimates of dietary intake account for 82% to 98% of human body burden (USEPA, 1988a; Chemrisk, 1989). Food stuffs which would predominantly contribute to dietary intake of TCDD include fish, beef, dairy products, and vegetables (USEPA, 1988; Chemrisk, 1989).

The studies reviewed on plant uptake of TCDD were not in agreement, but studies with other halogenated hydrocarbons indicate a low potential for absorption by plants (USEPA, 1988a). The usual practice of washing crops consumed by humans further reduces the potential of TCDD exposure from contaminated attached soil particles.

Human exposure through beef and dairy products is another potential route (Chemrisk, 1989). Studies have been performed on the dietary intake of contaminated soil during feeding and the resulting contaminant levels in body fat and milk fat (Schaum, 1984 and Fries, 1985, 1986 cited in USEPA, 1988). Factors which would influence exposure were extent of soil or feed contamination, whether the cattle were fed to maturity outside of contaminated area prior to slaughter, type of activity within the industry, and slaughter categories and rates relative to national figures (USEPA, 1988a). Depending on these variables market dilution would vary considerably. The populations that would receive highest exposure would be beef producers and dairy farmers raising cattle on contaminated feed, and the direct consumers of their products (USEPA, 1988a). A source of soil or feed contamination would include uncontrolled hazardous waste sites with TCDD contamination that were located nearby (USEPA, 1988a).

The most significant exposure route for the general public was identified as ingestion of contaminated fish (USEPA, 1985). Fish ingestion was identified as a significant route of exposure due to fish exposure pathways, bioaccumulation potential of TCDD, and human consumption of contaminated fish.

Reproductive Responses Mammalian

Reduced reproductive success has been reported in mice, rats, and rhesus monkeys exposed to TCDD during pregnancy (USEPA, 1985). A Lowest Observed Adverse Effect Level (LOAEL) was re-evaluated by Nisbet and Paxton (1979) using information reported by Murray, 1979 (USEPA, 1985). The LOAEL was concluded to be 0.001 ug/kg/day (USEPA, 1985). There was an increase in aborted fetuses when pregnant rhesus monkeys were fed a diet of 50 parts per trillion TCDD (Schantz et al., 1979). The LOAEL for rhesus monkeys was 0.0015 ug/kg/day (USEPA, 1985).

Table 4

Animal Studies on Carcinogenicity (Kociba, 1983)

TCDD Daily Dose (ug/kg/day)	Species / Strain	Response / Reference
0.1	rat / SD	Hepatocellular carcinoma, squamous carcinoma of oropharynx and lung (Kociba et al., 1978)
0.07	rat / OM	Hepatocellular carcinoma, thyroid tumors (NTP, 1982)
0.01	rat / SD	Hepatocellular nodules (Kociba et al., 1978)
0.007	rat / OM	Questionable increase in thyroid tumors (NTP, 1982)
0.014	rat / OM	No increase in tumors (NTP, 1982)
0.001	rat / SD	No increase in tumors (Kociba et al., 1978)
0.3	mice / B6C3F1 F	Hepatocellular tumors, thyroid tumors (NTP, 1982)
0.1	mice / Swiss	Hepatocellular tumors (Toth et al., 1979)
0.07	mice / B6C3F1 M	Hepatocellular tumors (NTP, 1982)

Carcinogenic Responses Mammalian

Laboratory studies with animals has identified cancer to be the most sensitive response (the response occurring at the lowest dose) to TCDD exposure (USEPA, 1985). Carcinogenic responses from TCDD exposure have been observed in rats, mice, and hamsters (USEPA, 1985; Sambasiva, 1988). The dosage causing cancer in animals varies depending on the species (Table 4).

USEPA reviewed several epidemiological studies prior to 1985 and concluded that the studies were suggestive of human carcinogenicity (USEPA, 1985). The review of the epidemiological studies was supportive of the carcinogenic laboratory animal studies (USEPA, 1985).

A subsequent review of epidemiological studies by USEPA, reported in a review draft report (USEPA, 1988a; 1988b), concluded that an association may exist between increased incidence of cancer and chemicals contaminated with TCDD. However, the data was determined to be inconclusive to support an association between an increased incidence of cancer and exposure only to TCDD (USEPA, 1988a).

The USEPA Science Advisory Board Ad Hoc Dioxin Advisory Panel (SAB) reviewed two USEPA documents. The documents reviewed were " A Cancer Risk-Specific Dose Estimate for 2,3,7,8-TCDD " and " Estimating Exposure to 2,3,7,8-TCDD ". The SAB concluded that there was insufficient evidence from epidemiological studies to support an association of human carcinogenicity to TCDD exposure (USEPA, 1989a). The SAB noted that some of the epidemiological studies reviewed were inconclusive due to study design limitations.

Teratogenic Responses Mammalian

Teratogenic responses have been documented in laboratory studies using mice and rats (USEPA, 1985). Teratogenic responses from TCDD exposure in pregnant mice included cleft palate and kidney anomalies at doses of 0.5, 1.0, and 3.0 ug/kg/day (Courtney, 1971). Teratogenic responses by pregnant rats upon exposure to TCDD included kidney malformations and dilated renal pelvis at doses of 0.5 ug/kg/day and 0.001 ug/kg/day, respectively (Courtney, 1971; Murray et al., 1979). Cystic kidney, cleft palate, and spinal column deformities have been reported responses in fetuses of rats upon exposure to TCDD (Eisler, 1986).

4) Establish standards to maintain natural diurnal and seasonal temperature cycles. Limitations on acceptable temperature changes from artificial sources should allow natural diurnal and seasonal temperature regimes to continue with little change in cyclical frequency or amplitude.

5) Reword marine and estuarine standards to read: No temperature changes in ambient water temperatures beyond permitted mixing zones.

Specifics for Other Basins

		ambient temperature (°F)	allowable increase (°F)
Mid Coast			
(A)	Freshwaters	≥64	0
		≤63.5	.5
		≤62	2
(B)	Marine and estuarine waters: same as (C) above.		
Umpqua		≥58	0
		≤57.5	.5
		≤56	2
South Coast		≥64	0
		≤63.5	.5
		≤62	2
Willamette			
(A)	Multnomah channel and mainstem Willamette River to Newberg	≥70	0
		≤69.5	0.5
		≤68	2
(B)	Willamette River of coast and middle forks (R.M. 187)	≥64	0
		≤63.5	.5
		≤62	2
(C)	All other Willamette basin streams	≥58	0
		≤57.5	.5
		≤56	2
	(i) Salmonid fish producing water	≥58	0
		≤57.5	.5
		≤56	2
	(ii) Non-salmonid fish producing waters	≥64	0
		≤63.5	.5
		≤62	2
(D)	Columbia River	≥68	0
		≤67.5	.5
		≤66	2

Sandy			
(A)	Mainstem Columbia River (R.M. 120 to 147)	≥68 ≤67.5 ≤66	0 .5 2
(B)	All other Basin waters Same as 340-41-205(2)(b)(B)	≥58 ≤57.5 ≤56	0 .5 2
Hood			
(A)	Columbia River (R.M. 147 to 203)	≥68 ≤67.5 ≤66	0 .5 2
(B)	Other Hood River Basins	≥58 ≤57.5 ≤56	0 .5 2
Deschutes			
(A)	Columbia River (R.M. 203 to 218)	≥68 ≤67.5 ≤66	0 .5 2
(B)	Other Basin Streams	≥58 ≤57.5 ≤56	0 .5 2
John Day			
(b)	Temperature	≥68 ≤67.5 ≤66	0 .5 2
Umatilla			
(b)	Temperature	≥68 ≤67.5 ≤66	0 .5 2
Walla Walla			
(b)	Temperature	≥68 ≤67.5 ≤66	0 .5 2

Grande Ronde

(b)	Temperature	≥68	0
		≤67.5	.5
		≤66	2

Powder

(A)	Snake River	≥68	0
		≤67.5	.5
		≤66	2
(B)	All other basin waters	≥64	0
		≤63.5	.5
		≤62	2

Malheur

≥68		0
≤67.5		.5
≤66		2

Owyhee

≥68		0
≤67.5		.5
≤66		2

Malheur Lake Basin

≥68		0
≤67.5		.5
≤66		2

Goose and Summer Lakes

(A) Goose Lake: Daily average temperatures shall not exceed 70°F in the daily mean ambient air temperature, whichever is greater.

(B)	All other basin waters	≥68	0
		≤67.5	.5
		≤66	2

Klamath Basin

(A)	Salmonid fish (trout) producing waters	≥58	0
		≤57.5	.5
		≤56	2
(B)	Non-salmonid fish producing waters	≥72	0
		≤71.5	.5
		≤70	2

V. PUBLIC COMMENTS RECEIVED ON ISSUE PAPER

The Department received numerous comments on the temperature issue paper. These comments are summarized below. Several commentors asked if there was a problem with the existing standard. They also asked how baseline conditions would be established and if there was a need for diurnal and seasonal standards. One commentor asked whether discontinuance of a discharge could be construed as a standards violation?

Other comments were directed toward the Department basis for concluding that anadromous fish in eastern Oregon basins can tolerate significantly higher water temperatures than anadromous fish in the Hood River and Deschutes River Basins. A definition of salmonid producing waterbodies was requested as well. It was stated that the proposed marine/estuarine standard ignores whether temperature increases beyond the prescribed mixing zone will have an adverse effect on aquatic life and that the limit on cold water discharges is too strict. Soem commenters felt that impounded rivers should be exempted from the proposal to maintain natural diurnal and seasonal temperature fluctuations and that the proposed standards did not reflect nonpoint source pollution issues.

Standards should be applicable to fish-bearing streams only.

Small streams do offer thermal refuges.

VI. DEPARTMENT RESPONSE TO PUBLIC COMMENTS

Based on the complexity of the issue, the Department believes that further discussions with fisheries professionals and resource managers are necessary before any rule changes are recommended.

REFERENCES

Brungs, W.A. and B.R. Jones. Temperature Criteria for Freshwater Fish: Protocol and Procedures. EPA-600/3-77-061. 1977.

EPA. Quality Criteria for Water, 1986. EPA 450/5-86-001.

ISSUE PAPER #5
BACTERIOLOGICAL STANDARDS REVIEW

Revised as of 10/22/90

I. INTRODUCTION

Microbiological indicator organisms are used for monitoring water quality and for evaluating the human health risks associated with contact recreation or shellfish collection in ambient waters. The 1986 Quality Criteria for Water specifies that a water quality criterion should provide a "quantifiable relationship between the density of an indicator in the water and the potential human health risks involved in the water's recreational use".

For assessments of sanitary conditions, indicator organisms should behave similarly to pathogens; they should originate in the feces of warm-blooded animals, have similar die-off rates in the environment, and have similar resistance to disinfection agents such as chlorine. It is also desirable that indicator organism densities in feces far exceed the number of pathogenic microorganisms, and that infectious dose levels of a pathogen disappear before the indicator becomes unmeasurable.

II. CURRENT RULES

DEQ has adopted fecal coliform standards for the protection of the contact recreation and shellfish harvesting beneficial uses. Standards for the North Coast-Lower Columbia River are cited here as examples, but are also applicable to all other basins in the state.

Oregon Administrative Rule 340-41-205(1) -- "Notwithstanding the water quality standards contained below, the highest and best practicable treatment and/or control of wastes, activities, and flows shall in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperature, coliform bacteria concentrations... at the lowest possible levels."

340-41-205(2) -- "No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause violation of the following standards in the waters of the North Coast - Lower Columbia River Basin:"

> "(e) Organisms of the coliform group where associated with fecal sources (MPN or equivalent MF using a representative number of samples):"
>
> > "(A) ...A log mean of 200 fecal coliform per 100 milliliters based on a minimum of 5 samples in a 30-day period with no more than 10 percent of the samples in the 30-day period exceeding 400 per 100 ml.

"(B) Marine waters and estuarine shellfish growing waters: A fecal coliform median concentration of 14 organisms per 100 milliliters, with not more than 10 percent of the samples exceeding 43 organisms per 100 ml.

"(C) Estuarine waters other than shellfish growing waters: A log mean of 200 fecal coliform per 100 milliliters based on a minimum of 5 samples in a 30-day period with no more than 10 percent of the samples in the 30-day period exceeding 400 per ml.

"(f) Bacterial pollution or other conditions deleterious to waters used for domestic purposes, livestock watering, irrigation, bathing, or shellfish propagation, or otherwise injurious to public health shall not be allowed."

340-41-205(3) -- "Where the natural quality parameters of water of the North Coast - Lower Columbia River Basin are outside the numerical limits of the above assigned water quality standards, the natural water quality shall be the standard."

Department Interpretation

In freshwater, marine and estuarine bathing waters, the fecal coliform densities shall not exceed a **geometric mean** of 200 fecal coliforms per 100 ml sample with no more than 10 percent of the samples exceeding 400 per 100 ml. This geometric mean shall be calculated with no fewer than five samples collected within a 30 day period.

In marine and estuarine shellfish growing waters, the fecal coliform density shall have a median density of 14 or less per 100 ml sample with no more than 10 percent of the samples exceeding 43 fecal coliform per 100 ml using a five tube, three dilution method. Shellfish growing waters include all commercial as well as recreational harvesting areas.

U.S. EPA Bacteria Criteria

Freshwater Bathing

Based on a statistically sufficient number of samples (generally not less than 5 samples equally spaced over a 30-day period), the geometric mean of the indicated bacterial densities should not exceed one of the following:

E. coli	126 per 100 ml; or
enterococci	33 per 100 ml

No sample should exceed a one-sided confidence limit (C.L.) calculated using the following as guidance:

designated bathing beach	75% C.L.
moderate use for bathing	82% C.L.

light use for bathing	90% C.L.
infrequent use for bathing	95% C.L.

based on a site-specific log standard deviation, or if site data are insufficient to establish a log standard deviation, then using 0.4 as the log standard deviation for both indicators.

Marine Water Bathing

Based on statistically sufficient number of samples (five samples over 30 days), the geometric mean of the enterococci densities should not exceed 35 per 100 ml; no sample should exceed a one-sided confidence limit using the following as guidance:

designated bathing beach	75% C.L.
moderate use for bathing	82% C.L.
light use for bathing	90% C.L.
infrequent use for bathing	95% C.L.

based on a site-specific log standard deviation, or if site data are insufficient to establish a log standard deviation, then using 0.7 as the log standard deviation for both indicators.

Based on the observed log standard deviations during EPA studies (0.4 for freshwater E. coli and enterococci; and 0.7 for marine water enterococci), the following single sample maximum allowable densities were determined:

	Designated Beach Area 75% C.L.	Moderate Bathing 82% C.L.	Light Use Bathing 90% C.L.	Infrequent Bathing 95% C.L.
Freshwater				
enterococci	61	89	108	151
E. coli	235	298	409	576
Marine Water				
enterococci	104	124	276	500

Confidence limits are calculated with the standard deviation of the data and a "t" value, which is a function of the sample size and the desired confidence level.

The acceptable swimming associated gastroenteritis rates for swimmers for the above table were 8 occurrences per 1000 swimmers in freshwater and 19 occurrences per 1000 swimmers in marine waters. The acceptable illness rates associated with the former criterion of 200 fecal coliform were also 8 per 1000 swimmers in freshwater, and 19 illnesses per 1000 swimmers in

marine waters. The EPA suggests that each jurisdiction establish its own standard deviations for single sample limits.

Shellfish Harvesting Waters

The median fecal coliform bacterial concentration should not exceed 14 MPN per 100 ml with not more than 10 percent of samples exceeding 43 MPN per 100 ml for the taking of shellfish.

III. CONCERNS WITH CURRENT RULES

Evaluation of Oregon Standards and U.S. EPA Criteria

Contact Recreation

The Oregon fecal coliform standard is the same as the criterion recommended for primary contact recreation waters in the Federal Water Pollution Control Administration's 1968 Water Quality Criteria document (Green Book) and the 1976 USEPA Quality Criteria for Water (Red Book). The Department of the Interior's National Technical Advisory Committee (NTAC) used epidemiological data collected by the US Public Health Service (USPHS) from 1948 to 1950 to develop criteria for recreational bathing waters. These epidemiological studies were intended to investigate the relationship between swimming related illnesses (skin irritations, respiratory and gastrointestinal complaints) and total coliforms. A total coliform index was suggested and was the preferred standard until 1968. In that year, the NTAC determined that fecal coliform densities were approximately 18% of the total coliform population and, in order to adequately protect public health, proposed that fecal coliform densities should not exceed 200 counts per 100 ml. This was one-half the fecal coliform density at which a significant health risk occurred in a study conducted on the Ohio River in the mid 1960's. Despite a paucity of epidemiological data, the 200 fecal coliform per 100 ml criterion was included in the 1972 Water Quality Criteria. An emphasis was placed on the relationship between the high fecal coliform values and the presence of Salmonella rather than on epidemiological information.

The fecal coliforms are a subgroup of the total coliform bacteria which have been proven to be of more sanitary significance than total coliform because they are associated with the intestinal tract of warm-blooded animals. In the feces of these animals, the fecal coliform subgroup constitutes greater than 90% of the total coliforms, and as mentioned above, studies have also shown a correlation between high fecal coliform and the occurrence of Salmonella serotypes (Geldreich, 1978).

The NTAC criterion, which later became the EPA water quality criterion was criticized because of the absence of supporting epidemiological data and design flaws in the original USPHS studies. Another criticism of the fecal coliform criterion is that some non-fecal species of Klebsiella respond positively in the fecal coliform analysis. In 1972, the EPA began a series of epidemiological studies at marine and freshwater bathing sites. Several

water quality indicators were included in these studies to identify the most appropriate based on statistical relationships between the indicator and swimming associated health effects, specifically acute gastroenteritis.

The results of the EPA studies revealed that in marine waters, enterococcus were best correlated (r=0.712) to swimming related gastroenteritis. Other indicators such as E. coli, total and fecal coliforms were significantly less well correlated.

Enterococci had a good correlation (r=0.744) with highly credible gastro-intestinal illness for swimmers in freshwater, but that of E. coli was a slightly better (r=0.804). No correlation (r=-0.081) was observed between fecal coliform and swimming related illness at freshwater bathing beaches. The regression lines for E. coli and enterococci were very similar with respect to slope, standard error of the estimate and correlation coefficients. Thus, two criteria are offered and EPA recommends that factors unrelated to the statistics of the regression be used to select a freshwater standard.

E. coli is the most fecal specific of the coliform indicators. However, restriction of measurements to just E. coli as an indication of fecal contamination would ignore the 5 to 7 percent of the population (human and animal) whose intestinal flora are temporarily devoid of E. coli but contain other fecal coliform bacteria and possibly pathogenic microorganisms.

Enterococci have long been recognized as indicators of recent fecal contamination, and because their survival in the environment is similar, they are probably better indicators of the presence of viral pathogens believed to cause gastroenteritis. Streptococcus facaelis and S. faecium are the two principal species included in the enterococci analysis. These species are thought to be primarily of human origin although they have been isolated from other warm-blooded animals.

Shellfish Growing Areas

Oregon standards and USEPA criteria for shellfish growing areas are the same. This standard is applicable to recreational and commercial shellfish growing and harvesting areas. The US Food and Drug Administration has a slightly different standard for shellfish harvested for interstate shipment. This standard requires that the geometric mean of fecal coliform concentrations in the growing areas be less than 14 organisms per 100 ml with less than 10% of the samples exceeding 43 organisms per 100 ml. The USFDA has recommended that, based on a minimum of 15 samples in the past three years, commercial shellfish growing areas be classified in the following manner:

Supported:	FC median:	<14;	90%:	<49
Partially Supported:	FC median:	15-88;	90%:	50-300
Not Supported:	FC median:	> 88;	90%:	>300

Research is underway to identify the best indicator organism for shellfish growing areas and a change in the EPA criterion is likely. E. coli has been suggested as an alternative to fecal coliform for monitoring purposes; however, the FDA and EPA have yet to adopt such a recommendation and fecal

coliform concentrations must continue to be used for the evaluation of commercial and recreational shellfish growing areas.

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

Adopt enterococci standards for contact recreational areas in freshwater and marine waters, and continue to use the present fecal coliform standard for shellfish growing areas.

Freshwater Bathing

Based on a statistically sufficient number of samples (generally not less than 5 samples equally spaced over a 30-day period), the geometric mean of the indicated bacterial densities should not exceed one of the following:

enterococci 33 per 100 ml

no sample should exceed a one-sided confidence limit (C.L.) calculated using the following as guidance:

designated bathing beach	75% C.L.
moderate use for bathing	82% C.L.
light use for bathing	90% C.L.
infrequent use for bathing	95% C.L.

based on a site-specific log standard deviation, or if site data are insufficient to establish a log standard deviation, then using 0.4 as the log standard deviation for both indicators.

Marine Water Bathing

Based on statistically sufficient number of samples (five samples over 30 days), the geometric mean of the enterococci densities should not exceed 35 per 100 ml; no sample should exceed a one-sided confidence limit using the following as guidance:

designated bathing beach	75% C.L.
moderate use for bathing	82% C.L.
light use for bathing	90% C.L.
infrequent use for bathing	95% C.L.

based on a site-specific log standard deviation, or if site data are insufficient to establish a log standard deviation, then using 0.7 as the log standard deviation for both indicators.

Based on the observed log standard deviations during EPA studies (0.4 for freshwater E. coli and enterococci; and 0.7 for marine water enterococci), the following single sample maximum allowable densities were determined:

	Designated Beach Area 75% C.L.	Moderate Bathing 82% C.L.	Light Use Bathing 90% C.L.	Infrequent Bathing 95% C.L.
Freshwater enterococci	61	89	108	151
Marine Water enterococci	104	124	276	500

V. PUBLIC COMMENTS RECEIVED ON ISSUE PAPER

Comments were received supporting the proposal for a new indicator organism as well as the statistical considerations discussed in the issue paper. One comment received did not apply specifically to the proposed change from fecal coliform to enterococci but questioned enforcement of the standard. Several respondents were concerned that more chlorine would be required for disinfection of municipal wastewaters, and the costs of potential declorination facilities. In addition, several respondents were concerned about the new testing procedures that may be required.

VI. DEPARTMENT RESPONSE TO PUBLIC COMMENTS

No changes in compliance monitoring or enforcement policy are stated or implied. The literature suggests that enterococci are better indicator organisms than fecal coliform as for disinfection. Enterococci are thought to be more like actual pathogens in their resistance to disinfection and survival in the environment, nevertheless, DEQ data for 402 samples show that most treatment plants that met the fecal coliform effluent limit also met the proposed enterococci standards. Some plants may need to have a declorination system to remove the additional chlorine that may be needed, in some cases, to disinfect for enterococcus.

VII. PROPOSED RULE AMENDMENTS: Bacteria

The following changes are recommended for the bacteria water quality standard. These recommendations are based upon recent EPA guidance which indicates that selection of a new indicator organism is necessary for the protection of human health from swimming-associated illnesses. Rules for each basin are affected by these recommendations and are identified following the proposed new language. Proposed new language is underlined and language to be deleted is bracketed.

340-41-___(2)(e) -- [~~Organisms~~] Bacteria of the coliform group [~~where~~] associated with fecal sources and bacteria of the enterococci group (MPN or equivalent [MF] membrane filtration using a representative number of samples)[~~:~~]-shall not exceed the criteria values described in A-C. However, the Department may designate site-specific bacteria criteria on a case by case basis to protect beneficial uses. Site specific values shall be described in and included as part of a water quality management plan.

(A) ...~~[A log mean of 200 fecal coliform]~~ Freshwaters: A geometric mean of 33 enterococci per 100 milliliters based on ~~[a minimum of 5 samples in a 30-day period with no more than 10 percent of the samples in the 30-day period exceeding 400 per 100 ml]~~ no fewer than five equally spaced samples collected over a period of at least 30 days. No single sample should exceed 61 enterococci per 100 ml.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(e)(A)	340-41-205(2)(e)(A)
Mid Coast		340-41-245(2)(e)(A)
Umpqua	340-41-285(2)(e)(C),(D)	340-41-285(2)(e)(A)
South Coast		340-41-325(2)(e)(A)
Roque	340-41-365(2)(e)(C),(D)	340-41-365(2)(e)(A)
Willamette	340-41-445(2)(e)(A), (B),(C)(i),(C)(ii)	340-41-445(2)(e)(A)
Sandy	340-41-485(2)(e)	340-41-485(2)(e)(A)
Hood	340-41-525(2)(e)	340-41-525(2)(e)(A)
Deschutes	340-41-565(2)(e)(A),(B)	340-41-565(2)(e)(A)
John Day	340-41-605(2)(e)	340-41-605(2)(e)(A)
Umatilla	340-41-645(2)(e)	340-41-645(2)(e)(A)
Walla	340-41-685(2)(d)	340-41-685(2)(d)(A)
Grande Ronde	340-41-725(2)(e)	340-41-725(2)(e)(A)
Powder	340-41-765(2)(e)	340-41-765(2)(e)(A)
Malheur	340-41-805(2)(e)	340-41-805(2)(e)(A)
Owyhee	340-41-845(2)(e)	340-41-845(2)(e)(A)
Malheur Lake		340-41-885(2)(e)(A)
Goose and Summer Lakes	340-41-925(2)(e)	340-41-925(2)(e)(A)
Klamath	340-41-965(2)(e)	340-41-965(2)(e)(A)

340-41-___(2)(e)

(B) Marine waters and estuarine shellfish growing waters: A fecal coliform median concentration of 14 organisms per 100 milliliters, with not more than 10 percent of the samples exceeding 43 organisms per 100 ml.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(e)(B)	340-41-205(2)(e)(B)
Mid Coast	340-41-245(2)(e)(A)	340-41-245(2)(e)(B)
Umpqua	340-41-285(2)(e)(B)	340-41-285(2)(e)(B)
South Coast	340-41-325(2)(e)(A)	340-41-325(2)(e)(B)
Roque	340-41-365(2)(e)(B)	340-41-365(2)(e)(B)

340-41-___(2)(e)

(C) Estuarine waters other than shellfish growing waters: ~~[A log mean of 200 fecal coliform]~~ A geometric mean of 35 enterococci per 100 milliliters based on ~~[a minimum of 5 samples in a 30-day period with no more than 10 percent of the samples in the 30-day period exceeding 400 per 100 ml]~~ no fewer than five equally spaced samples collected over a period of at least 30 days. No single sample should exceed 61 enterococci per 100 ml.

RULE REFERENCES BY BASIN

Basin	Old Rule	New Rule
North Coast	340-41-205(2)(e)(C)	340-41-205(2)(e)(C)
Mid Coast	340-41-245(2)(e)(B)	340-41-245(2)(e)(C)
Umpqua	340-41-285(2)(e)(A)	340-41-285(2)(e)(C)
South Coast	340-41-325(2)(e)(B)	340-41-325(2)(e)(C)
Roque	340-41-365(2)(e)(B)	340-41-365(2)(e)(C)

References:

Dufour, A.P. 1984. Health Effects Criteria for Fresh Recreational Waters. USEPA 600/1-84-004
EPA Gold Book, 1986
EPA Red Book, 1980
FWPCA Green Book, 1976
Geldrich, E.E. 1978. Bacterial Populations and Indicator Concepts in Feces, Sewage, Stormwater and Solid Wastes. In: Indicators of Viruses in Water and Food.

ISSUE PAPER # 6
TOTAL DISSOLVED SOLIDS STANDARDS REVIEW
Revised as of 10/22/90

I. INTRODUCTION

Total dissolved solids (TDS) are the dissolved salts, organic matter and other materials in water that will pass through a fine-pore filter. These dissolved constituents affect the use of water for drinking, agriculture, industry and recreation as well as its suitability for aquatic organisms. Natural or background TDS concentrations are determined by numerous factors including bedrock geology, groundwater drainage and precipitation. TDS values are generally greatest in basins that receive little precipitation and surface runoff. Human activities such as agricultural, industrial and municipal uses of the water increase the concentration of dissolved substances in the water.

II. CURRENT RULE

Narrative statements for all basins include the following:

340-41-___

(1) Notwithstanding the water quality standards contained below, the highest and best practicable treatment and/or control of wastes, activities, and flows shall in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures... dissolved chemical substances... at the lowest levels.

(2) No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause violation of the following standards in the waters of the _____ Basin:

(i) The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.

(l) Aesthetic conditions offensive to the human senses of sight, taste, smell, or touch shall not be allowed.

(o) Total Dissolved Solids: Guide concentrations listed below shall not be exceeded unless otherwise specifically authorized by DEQ upon such conditions as it may deem necessary to carry out the general intent of this plan and to protect the beneficial uses set forth in rule 340-41-(river basin):

NC-Lower Columbia		
(A)	Columbia River	500 mg/l
(B)	All other fresh water streams and tributaries	100 mg/l
Mid Coast		100 mg/l
Umpqua		500 mg/l
S. Coast		100 mg/l
Rogue		500 mg/l
Willamette		
(A)	Columbia	500 mg/l
(B)	Willamette River and tributaries	100 mg/l
Sandy		
(A)	Columbia (R.M. 120-147)	200 mg/l
(B)	All other Basin waters	100 mg/l
Hood		500 mg/l
Deschutes		500 mg/l
John Day		
(A)	Columbia	200 mg/l
(B)	John Day and tributaries	500 mg/l
Umatilla		
Columbia River		200 mg/l
Walla Walla		200 mg/l
Grande Ronde		
(A)	Main Stem Grande Ronde River	200 mg/l
(B)	Main Stem Snake River	750 mg/l
Powder		
Main Stem Snake River		750 mg/l
Malheur		
Main Stem Snake River		750 mg/l
Owyhee		
Main Stem Snake River		750 mg/l
Malheur Lake		None
Goose & Summer Lakes		None
Klamath		
Main Stem Klamath		400 micromho at 77°F

(3) Where the natural quality parameters of waters of the River Basin are outside the numerical limits of the above assigned water quality standards, the natural water quality shall be the standard.

III. CONCERNS WITH THE CURRENT RULE

Total dissolved solids affect the use of water for domestic consumption, irrigation and livestock watering, industrial uses, aquatic life, and to a lesser extent, recreation. Water quality can be improved for drinking and industrial uses by removal of TDS, however this can be quite expensive.

As mentioned above, TDS includes many dissolved salts and inorganic constituents. These individual constituents may affect water quality more than the TDS value alone might indicate. For example, drinking water with sulfate concentrations of 200 mg/l can have a laxative effect on some individuals, and high chloride concentrations can affect the taste of water. The EPA criterion of 250 mg/l for chlorides and sulfates protects the potability of domestic water supplies.

The quality of irrigation water may also be affected by high TDS concentrations. In a California study, water with an electrical conductivity of 1000 micromhos/cm resulted in a 10% reduction in strawberry yield. This is roughly equivalent to a TDS concentration of 640 mg/l. The Quality Criteria for Water (1986) suggests that TDS concentrations of 500 mg/l will usually not have a detrimental effect on crops, but that sensitive crops will be affected at 500 to 1000 mg/l. Reduced crop yield may be attributed to osmotic stress in plants, decreased soil permeability and greater toxicity because of sodium accumulation.

Livestock and animal watering problems are reported in waters with TDS concentrations of 4000 mg/l. This concentration resulted in mild diarrhea and changes in water consumption. Sulfate concentrations of 1250 and 2500 mg/l in drinking water resulted in increased methemoglobin and sulfhemoglobin levels in cattle.

Industrial raw water requirements vary greatly depending on the type of use. Textile mills are identified as requiring higher quality water (TDS $\leq$ 150 mg/l) than most other processes. Generally, water quality that meets other beneficial use requirements can be improved to meet industrial needs.

Aquatic life requirements for TDS are poorly defined at this time. It is understood that fish and invertebrates can tolerate a range of TDS concentrations, but thresholds for reproductive effects are unknown. It does appear that adverse biological effects are generally caused by increased osmotic pressure rather than toxicity or other processes.

Elevated TDS levels can also increase biological productivity as greater concentrations of essential macro and micronutrients become more available for plant uptake. Higher TDS concentrations will also increase the hardness of water which decreases the bioavailability and toxicity of some toxicants.

Below is a summary of TDS concentrations which resulted in some measurable adverse effect.

	Beneficial Use			
	irrigation	livestock	domestic (taste)	aquatic life
slight impairment	500 to 1000 mg/l	2500 mg/l	900 mg/l	NA

Oregon TDS standards are generally adequate to protect all identified beneficial uses. Exceptions are noted in several basins which have standards of 500 mg/l or more. In these basins, standards may not fully protect drinking water supplies or irrigation water for very sensitive crops. These standards could be expanded to include other streams in the basin, and sulfate and chloride concentrations for domestic water supplies.

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

1. Change the Klamath River Basin so it is consistent with all other basins. A specific conductance of 400 umhos/cm^2 is approximately 250 mg/l TDS.

2. Consider standards which are the arithmetic mean or 90th percentile values. Some states use this approach, although this does require greater monitoring to identify standard violations, which is unlikely on many smaller tributaries.

3. Include the EPA criteria of 250 mg/l for sulfates and chlorides into any basin standard that has a TDS standard greater than 250 mg/l.

4. Adopt background levels as the TDS standard for all tributaries in the following basins: Umpqua, Rogue, Hood, Deschutes, Grande Ronde, Owyhee, Malheur, Goose and Summer Lakes. These basins have mainstem river standards of 500 mg/l or more, or no standard at all.

5. Artificial increases in TDS concentrations shall not exceed one-third of background levels, or the basin standard.

V. PUBLIC COMMENTS RECEIVED ON ISSUE PAPER RECOMMENDATIONS

A few respondents commented on the total dissolved solids (TDS) issue paper. These comments are summarized below:

A respondent stated that drinking water standards would be protective of all beneficial uses, so a more restrictive standard is not needed.

A respondent inquired whether discharges which increase TDS concentrations are prohibited when background TDS levels exceed the standard?

A respondent requested clarification on background levels of TDS and how these levels are determined.

A respondent stated that the proposed standards do not address Nonpoint Source Pollution issues.

VI. DEPARTMENT RESPONSE TO PUBLIC COMMENTS

As described in the issue paper, drinking water may not be the beneficial use most sensitive to total dissolved solids. Some crops are very sensitive and require very low levels of TDS.

Generally, when background levels are set as standards, no additional increase in human-caused pollutant loads are permitted if standards violations are likely to occur. Option 5 would permit increases in TDS to 133% above background provided the numerical basin standard (e.g., 500 mg/l) is not exceeded.

Background levels are the natural levels of total dissolved solids in a waterbody. These levels are usually measured upstream of discharges or watershed (nonpoint source) activities likely to affect water quality.

VII. PROPOSED RULE AMENDMENTS

The Department has decided to review this issue further by referring it to an advisory committee. No changes are proposed at this time to dissolved solids standard.

REFERENCES

1. Quality Criteria for Water. 1986.
2. Water Quality Standards Criteria Summaries: A compilation of State/federal Criteria. Dissolved Solids.
3. Water Quality Criteria. 1972.

ISSUE PAPER # 7
TOXIC POLLUTANTS
Revised as of 10/22/90

I. INTRODUCTION

The control of toxic pollutants is critical for the protection of beneficial uses. The Environmental Quality Commission (EQC) has adopted narrative and numeric water quality standards for the control of toxic pollutants. Point sources, nonpoint sources, and natural sources can contribute toxic pollutants to waters of the state.

This paper discusses the narrative and numerical water quality standards for toxic pollutants.

II. CURRENT RULE

The narrative toxic standard was adopted as follows:

" (p) Toxic Substances:

(A) Toxic substances shall not be introduced above natural background levels in waters of the state in amounts, concentrations, or combinations which may be harmful, may chemically change to harmful forms in the environment, or may bioaccumulate to levels that adversely affect public health, safety, or welfare; aquatic life; or other designated beneficial uses.

(B) Levels of toxic substances shall not exceed the most recent criteria values for organic and inorganic pollutants established by EPA and published in **Quality Criteria for Water**(1986). A list of the criteria is presented in Table 20.

(C) The criteria in paragraph (B) of this subsection shall apply unless data from scientifically valid studies demonstrate that the most sensitive designated beneficial uses will not be adversely affected by exceeding a criterion or that a more restrictive criterion is warranted to protect beneficial uses, as accepted by the Department on a site specific basis. Where no published EPA criteria exists for a toxic substance, public health advisories and other published scientific literature may be considered and used, if appropriate, to set guidance values.

(D) Bio-assessment studies such as laboratory bioassays or in-stream measurements of indigenous biological communities, shall be conducted, as the Department deems necessary, to monitor the toxicity of complex effluents, other suspected discharges or chemical substances without numeric criteria, to aquatic life. These studies, properly conducted in accordance with standard testing procedures, may be considered as scientifically valid data for the purposes if paragraph (C) of this subsection. If toxicity occurs, the Department shall evaluate and implement measures necessary to reduce toxicity on a case-by-case basis. "

Toxicity was also addressed in the OAR mixing zone rule.

" (4) Mixing zones:

(A) The water within the mixing zone shall be free of:

(i) Materials in concentrations that will cause acute (96HLC50) toxicity to aquatic life. Acute toxicity is measured as the lethal concentration that causes 50 percent mortality of organisms within a 96-hour test period. "

(B) The water outside the boundary of the mixing zone shall:

(i) Be free of materials in concentrations that will cause chronic (sublethal) toxicity. Chronic toxicity is measured as the concentration that causes long-term sublethal effects such as significantly impaired growth or reproduction in aquatic organisms, during a testing period based on test species life cycle. Procedures and end points will be specified by the Department in waste water discharge permits. "

Numeric water quality standards for toxic pollutants are in Table 20 of OAR 340-41 (Table).

III. CONCERNS WITH THE CURRENT RULE

The EQC adopted in 1987 water quality standards for toxics. The standards adopted were both narrative and numeric. The adopted standards were approved by the USEPA as fulfilling requirements of the Clean Water Act. These requirements were that states were to adopt water quality standards for the control of toxic pollutants.

Since adoption of the standards the Department has identified two general areas that require clarification for implementation and/or interpretation. These areas are interpretation and implementation of " no toxics in toxic amounts " and quantifying acute and chronic toxicity.

The narrative standard has been adopted to satisfy requirements in the Clean Water Act to assure waterbodies achieve " no toxics in toxic amounts ". The narrative standard addresses " no toxics in toxic amounts " in stating that:

" Toxic substances shall not be introduced above natural background levels in waters of the state in amounts, concentrations, or combinations which may be harmful, may chemically change to harmful forms in the environment, or may bioaccumulate to levels that adversely affect public health, safety, or welfare; aquatic life; or other designated beneficial uses. "

Based on the narrative water quality standard toxicity in waters of the state are not permitted due to:

1. Anthropogenic sources;

2. Single and complex mixtures of chemicals;

3. Chemicals which when entering the environment are changed to toxic forms;

4. Chemicals which may bioaccumulate in sediments, aquatic life, or wildlife;

5. And human health, aquatic life, and other beneficial uses are to be protected from toxicity.

The combination of narrative and numeric standards used by the Department for determining toxicity is a useful approach. However some limitations exist.

The numeric water quality standards for toxics (Table 20) can be used when evaluating single chemicals in the water column. The Department must use " Best Professional Judgement " when assessing in-stream data for chemicals not in Table 20, toxicity of complex mixtures of chemicals, and data in media other than the water column (fish tissue, sediment). There are no Department guidelines or criteria for making these decisions.

Acute and chronic bioassays can be used for addressing effluent discharges for toxicity. This approach addresses whole effluent toxicity of complex mixtures of chemicals to aquatic life. This method does not address the potential effect to human from the bioaccumulation of toxic chemicals or the toxicity of a chemical past the length of the test period.

The mixing zone rule includes language which addresses acute and chronic toxicity. The rule state acute and chronic toxicity are to be measured but does not state when a measurement indicates acute toxicity or chronic toxicity.

The mixing zone rule states that acute toxicity shall be measured as " the lethal concentration that causes 50 percent mortality of organisms within a 96-hour test period. " There is no indication of the concentration of effluent used to elicit a 50 percent mortality response. This is determined with an acute 96HR LC50 bioassay test.

The lack of an effluent concentration allows an extreme amount of variability in interpretation. An effluent could be determined toxic if 1 percent of the effluent causes 50 per cent mortality or not toxic until 100 percent of the effluent causes 50 percent mortality.

The LC50 number is the percentage of effluent which causes 50 percent mortality in the test organisms. There exists an inverse relationship between LC50 data and toxicity, that is, the lower the LC50 the higher the toxicity. That is less effluent causes a toxic response. A method of translation of LC50 data to alleviate the problem of the inverse relationship is to convert the LC50 data into Toxic Units (TU) (USEPA, 1985). A TU is 100 divided by the toxicity measured:

$$TU = \frac{100}{\text{LC50 or NOEL}}$$

The higher the number the more toxic the effluent with this calculation. An example is if an effluent with an LC50 of 20 percent would be calculated to have 5 TU.

Toxicity could then be defined as not exceeding a certain TU. TU can be expressed in terms of acute units (TU_a) and chronic units (TU_c). This allows quantification of the narrative standard of " no toxics in toxic amounts "

This method would allow setting a number to be used which if exceeded would trigger the need for a toxicity reduction evaluation (TRE). TRE is a method used to identify the cause of toxicity in an effluent. The Department has the authority to require a discharger to perform a TRE. The narrative toxic rule states that:

" If toxicity occurs, the Department shall evaluate and implement measures necessary to reduce toxicity on a case-by-case basis. "

Another area of concern for quantifying the narrative standard is the limitations in only using water column data for chemicals in Table 20 for assessing water quality standards violations for toxic chemicals in waterbodies.

Toxic pollutants by definition are chemicals which at very low concentrations or doses cause adverse effects to biological systems. Detection of toxic pollutants in the water column are difficult due to a number of factors. These factors are:

low concentrations in the water;

release of toxic pollutants particularly from nonpoint sources are associated with natural events such as rainfall;

many toxic pollutants are hydrophobic and are quickly absorbed to particulate matter which are incorporated in the sediment;

undetectable concentrations in the water column can accumulate to unacceptable levels in sediments and fish tissue;

concentrations in water column below detection level can cause adverse effects;

and, source reductions are hampered by only having numeric standards for water column data.

A more effective strategy may be to have numeric standards for fish tissue.

The USEPA water quality criteria were used as the scientific basis for the state of Oregon water quality standards. The water quality criteria were developed to protect aquatic life, human health, or the most sensitive beneficial use supported by water quality.

Water quality criteria for the protection of aquatic life were based on acute and chronic toxicity values from laboratory studies. These studies resulted in the establishment of a No Observable Effect Level (NOEL) or a Lowest Observed Adverse Effect Level (LOAEL).

Water quality criteria developed for the protection of human health were based on calculations with exposure through drinking water and/or fish consumption. Concentrations of a toxic chemical in fish tissue were used in the calculation of many of the water quality criteria (Table 1).

The USEPA has established Reference Doses (RfD) for concentrations of a toxic chemical in fish tissue for calculating water quality criteria. The RfD is the concentration of a toxic chemical in fish tissue above which would cause an unacceptable risk to human health or the most sensitive beneficial use identified (USEPA, 1989). Manipulation of the RfD number in a water quality criteria would cause the water quality criteria concentration to move accordingly.

Some state and federal agencies have adopted standards, criteria, or guidelines for evaluating fish tissue information for determining toxicity or have established standards for fish tissue concentrations which would indicate a violation of water quality standard (Appendix A). The state of Michigan and Maine have adopted or in the process of adopting protocols for evaluating fish tissue or adoption of standards for fish tissue.

Benefits of using fish tissue concentrations as another tool for determining deleterious effects to water quality include a method which enables direct measurement of potential beneficial use effects and measurement in a media where these chemicals can be detected.

The adverse effects of using fish tissue concentrations is the movement of fish from one area to another. Wild fish collected in an area may not have accumulated the chemical in that area. Wild fish collected from an area may not be representative of the conditions of water quality in that area, depending on species type and time of year collected.

Caged fish or flow through systems containing fish may be utilized for determining point source affects to waterbodies. Wild fish maybe used as a method of determining overall water quality.

The narrative toxic standard states that:

" Levels of toxic substances shall not exceed the most recent criteria values for organic and inorganic pollutants established by EPA and published in **Quality Criteria for Water**(1986). A list of the criteria is presented in Table 20. "

Since adoption of the rule in 1987 water quality criteria values have been published by the USEPA for three new parameters. These parameters are ammonia, chloride, and aluminum. The new criteria for freshwater are:

Parameter	Acute Criteria	Chronic Criteria
Aluminum	750 ug/l	87 ug/l
Chloride	860 mg/l	230 mg/l
Ammonia	0.233 mg/l	0.035 mg/l

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

Based on the toxics information available from EPA, the Department recommends the following:

1. Adopting the criteria values for Aluminum, Chloride, and Ammonia as water quality standards and adopting criteria for 2,3,7,8-TCDD (Dioxin) to protect aquatic life.

2. Adopting the Toxicity Unit calculation to determine the toxicity from exposure to complex effluents or mixtures of contaminants.

3. Acute toxicity shall be defined as those values which exceed 0.3 TU_a.

4. Chronic toxicity shall be defined as those values which exceed 1.0 TU_c.

5. Residue levels in fish tissue in Table 21 should be used as an additional tool for determining water quality standard compliance. The residue levels used should be for those chemicals in which the Department has adopted water quality criteria as standards which use fish tissue residue levels for water quality criteria derivation.

Table 21

Adopted standards with RfD used for derivation of criteria

	mg/kg
Antimony	4.31
Arsenic	0.0062
Beryllium	0.0022
Cadmium	10.77
Chromium III	10769
Chromium IV	54928
Copper	ND
Lead	ND
Mercury	1.0 (FDA)
Nickel	215.4
Selenium	5.4
Silver	2.48
Thallium	5.71
Zinc	ND
Cyanide	215
2,3,7,8-TCDD	0.00000007
Acrolein	ND
Acrylonitrile	0.02
Benzene	0.37
Bromoform	1.77
Carbon Tetrachloride	0.083
Chlorobenzene	155.1
Chlorodibromomethane	1.77
Chloroethane	ND
2-Chloroethylvinyl Ether	0.0098
Chloroform	1.77
Dichlorobromomethane	1.77
1,1-Dichloroethane	ND
1,2-Dichloroethane	0.118
1,1-Dichloroethylene	0.018
1,2-Dichloropropane	ND
1,3-Dichloropropylene (cis)	3.23
1,3-Dichloropropylene (trans)	3.23
Ethylbenzene	1077
Methyl Bromide	1.77
Methyl Chloride	1.77
Methylene Chloride	1.44
1,1,2,2-Tetrachloroethane	0.054
Tetrachloroethylene	0.27
Toluene	3231
1,2-trans-Dichloroethylene	215.4
1,1,1-Trichloroethane	969.2
1,1,2-Trichloroethane	0.189

Trichloroethylene	0.855
Vinyl Chloride	0.614
2-Chlorophenol	53.8
2,4-Dichlorophenol	32.3
2,4-Dimethylphenol	ND
2-methyl-4,6-Dinitrophenol	4.2
2,4-Dinitrophenol	21.4
2-Nitrophenol	ND
4-Nitrophenol	ND
3-methyl-4-Chlorophenol	ND
Pentachlorophenol	323
Phenol	6462
2,4,6-Trichlorophenol	0.54
Acenaphthene	ND
Acenaphthylene	0.000933
Anthracene	0.000933
Benzidine	0.0000468
Benzo(a)anthracene	0.000933
Benzo(a)pyrene	0.000933
3,4-Benzofluoranthene	0.000933
Benzo(ghi)perylene	0.000933
Benzo(k)fluoranthene	0.000933
Bis(2-chloroethoxy)methane	ND
Bis(2-choroethyl)ether	0.0098
Bis(2-chloroisopropyl)ether	431
Bis(2-ethylhexyl)phthalate	2154
2-Chloronaphthalene	ND
4-Chloropenyl phenyl ether	ND
Chrysene	0.00093
Dibenz(a,h)anthracene	0.00093
1,2-Dichlorobenzene	969
1,3-Dichlorobenzene	145
1,4-Dichlorobenzene	145
3,3'-Dichlorobenzidine	0.00624
Diethyl Phthalate	8615
Dimethyl Phthalate	104400
Di-n-butyl phthalate	1077
2,4-Dinitrotoluene	0.0146
2,6-Dinitrotoluene	ND
Di-n-octyl phthalate	ND
1,2-Diphenylhydrazine	0.013
Fluoranthene	62.1
Fluorene	0.000933
Hexachlorobenzene	0.00643
Hexachlorobutadiene	0.138
Hexachlorocyclopentadiene	75.4
Hexachloroethane	0.77
Indeno(1,2,3-cd)pyrene	0.000933

Isophorone	2154
Naphthalene	ND
Nitrobenzene	5.38
n-Nirosodimethylamine	0.000211
n-Nitrosodi-n-ptopylamine	0.00154
n-Nitrosodiphenylamine	2.2
Phenanthrene	0.000933
Pyrene	0.000933
1,2,4-Trichlorobenzene	ND
Aldrin	0.00635
a-BHC	0.0017
b-BHC	0.006
g-BHC	0.0081
d-BHC	ND
Chlordane	0.0083
4,4'-DDT	0.0316
4,4'-DDE	0.0316
4,4'-DDD	0.0449
Dieldrin	0.00067
a-Endosulfan	0.54
b-Endosulfan	0.54
Endosulfan sulfate	ND
Endrin	0.0024
Endrin aldehyde	0.0012
Heptachlor	0.0014
PCB-1242	0.0014
PCB-1254	0.0014
PCB-1221	0.0014
PCB-1232	0.0014
PCB-1248	0.0014
PCB-1260	0.0014
PCB-1016	0.0014
Toxaphene	0.0098
Bis(chloromethyl) ether	0.000049
Dichlorodifluoromethane	1.77
Pentachlorophenol	180.6
1,2,4,5-Tetrachlorobenzene	54
Trichlorofluoromethane	1.77

V. PUBLIC COMMENTS RECEIVED ON ISSUE PAPER

The Department received comment on the use of fish tissue residue data for water quality compliance as follows:

A respondent stated that the Department should determine if the statutory authority exists for use of fish flesh to regulate water quality.

They asked about the costs to the regulated community and regulatory agencies for collection and testing fish.

Respondents stated that the Department should consider using Acceptable Daily Intake instead of using USEPA Reference Doses when using fish tissue residue data.

Another respondent stated that due to species and site specific characteristics which could influence biological accumulation of toxic pollutants fish tissue residue can not be used reliably to reflect water quality concentrations of toxic pollutants. The Department should describe how fish tissue residues will be used for determining water quality standards violations, and that fish tissue residue should be based on the most sensitive beneficial use.

Respondent stated that site specific characteristics should be considered when applying toxic pollutant water quality standards, the Department should address the concerns of toxicity from complex mixtures of toxic pollutants, and that the types of species and toxicity tests to be used in bioassays should be clarified.

Another respondent pointed out that the value for ammonia should be stated as un-ionized ammonia.

VI. DEPARTMENT RESPONSE TO PUBLIC COMMENTS

The Department feels that the use of fish tissue residue as an indicator of water quality standards is within the statutory authority of the Department.

The Department's experiences with laboratory availability and cost indicate that fish tissue residue analysis is more expensive than water quality analysis for the same parameters but is worth the additional expense for the information supplied from analysis.

The Department recognizes that different species as well as environmental factors and physiological factors affect uptake of chemicals into aquatic organisms. However, the water quality standards are based on average biological accumulation rates from laboratory studies. Should site specific information show that the biological accumulation rates should be different from the rates used in calculating the water quality criteria the Department would investigate the use of the site specific rates.

The water quality standards are based on criteria developed by USEPA which used the reference dose concept in deriving the criteria. The Department feels it is appropriate to be consistent with development of the criteria.

The Department will propose guidelines to be used for evaluating fish tissue residues as indicators of in-stream water quality standards.

The Department will be reviewing the standards to assure that the most sensitive beneficial use is protected from toxic pollutants.

VII. PROPOSED RULE AMENDMENTS: TOXIC SUBSTANCES

The following changes are recommended for the toxic substances standards. These recommendations are based on recent EPA guidance. Proposed deletions are bracketed and new language is underlined.

340-41-__(2) (p) Toxic Substances:

(A) Toxic substances shall not be introduced above natural background levels in waters of the state in amounts, concentrations, or combinations which may be harmful, may chemically change to harmful forms in the environment, or may <u>accumulate in sediments or</u> bioaccumulate <u>in aquatic life or wildlife</u> to levels that adversely affect public health, safety, or welfare; aquatic life; <u>wildlife;</u> or other designated beneficial uses.

(B) Levels of toxic substances shall not exceed the [most recent] criteria values for organic and inorganic pollutants established by EPA and published in **Quality Criteria for Water** (1986). A list of the criteria is presented in Table 20. <u>The fish tissue residue concentrations used in calculating criteria values in Table 20 may be used as indicators for determining exceedances of the water quality criteria value. A list of the fish tissue residue concentrations used in calculating criteria values in Table 20 can be found in Table 21. The Department may use appropriate guidelines for the use of fish tissue residue as</u>

indicators for determining exceedances of the water quality criteria.

(C) The criteria in paragraph (B) of this subsection shall apply unless data from scientifically valid studies demonstrate that the most sensitive designated beneficial uses will not be adversely affected by exceeding a criterion or that a more restrictive criterion is warranted to protect beneficial uses, as accepted by the Department on a site specific basis. Where no published EPA criteria exists for a toxic substance, public health advisories and other published scientific literature may be considered and used, if appropriate, to set guidance values.

(D) Bio-assessment studies such as laboratory bioassays or in-stream measurements of indigenous biological communities, shall be conducted, as the Department deems necessary, to monitor the toxicity of complex effluents, other suspected discharges or chemical substances without numeric criteria, to aquatic life. These studies, properly conducted in accordance with standard testing procedures, may be considered as scientifically valid data for the purposes if paragraph (C) of this subsection. If toxicity occurs, the Department shall evaluate and implement measures necessary to reduce toxicity on a case-by-case basis.

Table 21

Fish Tissue Residue Concentrations used in Water Quality Criteria Development

Parameter	mg/kg
Antimony	4.31
Arsenic	0.0062
Beryllium	0.0022
Cadmium	10.77
Chromium III	10769
Chromium IV	54928
Mercury	1.0 (FDA)
Nickel	215.4
Selenium	5.4
Silver	2.48
Thallium	5.71
Cyanide	215.4
2,3,7,8-TCDD	0.00000007
Acrylonitrile	0.02
Benzene	0.37
Bromoform	1.77
Carbon Tetrachloride	0.083
Chlorobenzene	155.1

Chlorodibromomethane	1.77
2-Chloroethylvinyl Ether	0.0098
Chloroform	1.77
Dichlorobromomethane	1.77
1,2-Dichloroethane	0.118
1,1-Dichloroethylene	0.018
1,3-Dichloropropylene (cis)	3.23
1,3-Dichloropropylene (trans)	3.23
Ethylbenzene	1077
Methyl Bromide	1.77
Methyl Chloride	1.77
Methylene Chloride	1.44
1,1,2,2-Tetrachloroethane	0.054
Tetrachloroethylene	0.27
Toluene	3231
1,2-trans-Dichloroethylene	215.4
1,1,1-Trichloroethane	969.2
1,1,2-Trichloroethane	0.189
Trichloroethylene	0.855
Vinyl Chloride	0.614

2-Chlorophenol	53.8
2,4-Dichlorophenol	32.3
2-methyl-4,6-Dinitrophenol	4.2
2,4-Dinitrophenol	21.4
Pentachlorophenol	323
Phenol	6462
2,4,6-Trichlorophenol	0.54

Acenaphthylene	0.000933
Anthracene	0.000933
Benzidine	0.0000468
Benzo(a)anthracene	0.000933
Benzo(a)pyrene	0.000933
3,4-Benzofluoranthene	0.000933
Benzo(ghi)perylene	0.000933
Benzo(k)fluoranthene	0.000933
Bis(2-choroethyl)ether	0.0098
Bis(2-chloroisopropyl)ether	431
Bis(2-ethylhexyl)phthalate	0.77
Butylbenzyl phthalate	2154
Chrysene	0.00093
Dibenz(a,h)anthracene	0.00093
1,2-Dichlorobenzene	969
1,3-Dichlorobenzene	145
1,4-Dichlorobenzene	145
3,3'-Dichlorobenzidine	0.00624
Diethyl phthalate	8615
Dimethyl phthalate	104400
Di-n-butyl phthalate	1077
2,4-Dinitrotoluene	0.0346
1,2-Diphenylhydrazine	0.013
Fluoranthene	62.1

Fluorene	0.000933
Hexachlorobenzene	0.00643
Hexachlorobutadiene	0.138
Hexachlorocyclopentadiene	75.4
Hexachloroethane	0.77
Indeno(1,2,3-cd)pyrene	0.000933
Isophorone	2154
Nitrobenzene	5.38
n-Nirosodimethylamine	0.000211
n-Nitrosodi-n-ptopylamine	0.00154
n-Nitrosodiphenylamine	2.2
Phenanthrene	0.000933
Pyrene	0.000933
Aldrin	0.00635
a-BHC	0.0017
b-BHC	0.006
g-BHC	0.0081
Chlordane	0.0083
4,4'-DDT	0.0316
4,4'-DDE	0.0316
4,4'-DDD	0.0449
Dieldrin	0.00067
a-Endosulfan	0.54
b-Endosulfan	0.54
Endrin	3.23
Heptachlor	0.0024
Heptachlor Epoxide	0.0012
PCB-1242	0.0014
PCB-1254	0.0014
PCB-1221	0.0014
PCB-1232	0.0014
PCB-1248	0.0014
PCB-1260	0.0014
PCB-1016	0.0014
Toxaphene	0.0098
Bis(chloromethyl) ether	0.000049
1,2,4,5-Tetrachlorobenzene	54

Basin	Rule
North Coast	340-41-205(2)(p)
Mid Coast	340-41-245(2)(p)
Umpqua	340-41-285(2)(p)
South Coast	340-41-325(2)(p)
Rogue	340-41-365(2)(p)
Willamette	340-41-445(2)(p)
Sandy	340-41-485(2)(p)
Hood	340-41-525(2)(p)
Deschutes	340-41-565(2)(p)
John Day	340-41-605(2)(p)
Umatilla	340-41-645(2)(p)
Walla Walla	340-41-685(2)(p)
Grande Ronde	340-41-725(2)(p)
Powder	340-41-765(2)(p)
Malheur	340-41-805(2)(p)
Owyhee	340-41-845(2)(p)
Malheur Lake	340-41-885(2)(p)
Goose and Summer Lakes	340-41-925(2)(p)
Klamath	340-41-965(2)(p)

Amend Table 20 to include the following compounds:

Table 20
Water Quality Criteria Summary

Compound Name	Fresh Acute Criteria	Fresh Chronic Criteria
Aluminum	750	87
Chloride	860 mg/l	230 mg/l
(1) Dioxin (2,3,7,8-TCDD)	3.8 pg/l	0.38 pg/l

Compound Name	Marine Acute Criteria	Marine Chronic Criteria
Ammonia	CRITERIA ARE pH AND TEMPERATURE DEPENDENT - SEE DOCUMENT USEPA APRIL 1989	

Basin	Rule
North Coast	340-41-205(2)(p)
Mid Coast	340-41-245(2)(p)
Umpqua	340-41-285(2)(p)
South Coast	340-41-325(2)(p)
Rogue	340-41-365(2)(p)
Willamette	340-41-445(2)(p)
Sandy	340-41-485(2)(p)
Hood	340-41-525(2)(p)
Deschutes	340-41-565(2)(p)
John Day	340-41-605(2)(p)
Umatilla	340-41-645(2)(p)
Walla Walla	340-41-685(2)(p)
Grande Ronde	340-41-725(2)(p)
Powder	340-41-765(2)(p)
Malheur	340-41-805(2)(p)
Owyhee	340-41-845(2)(p)
Malheur Lake	340-41-885(2)(p)
Goose and Summer Lakes	340-41-925(2)(p)
Klamath	340-41-965(2)(p)

Literature Cited

USEPA. 1985. Technical Support Document for Water Quality-based Toxics Control. EPA-440/4-85-032. September 1985.

USEPA. 1989. Assessing Human Health Risks from Chemically Contaminated Fish and Shellfish: A Guidance Manual. EPA-503/8-89-002. September 1989.

ISSUE PAPER # 8
TOXICITY EQUIVALENCY FACTORS
Revised as of 10/22/90

I. INTRODUCTION

Dioxin is a term commonly used for the family of polychlorinated dibenzo-para-dioxins (PCDD's). 2,3,7,8-tetrachloro dibenzo-para-dioxin is one of seventy-five (75) different congeners of PCDD and is one of twenty-two (22) different isomers of tetrachloro dibenzo-para-dioxin. A group of compounds closely related to PCDD's are polychlorinated dibenzofurans (PCDF's) of which there are 135 different congeners.

The state of Oregon has a water quality standard for 2,3,7,8-TCDD of 0.013 picograms per liter (pg/l) and a narrative toxics standard (OAR 340-41 Table 20). The numeric standard was adopted from the USEPA water quality criteria for 2,3,7,8-TCDD and does not address the other PCDD's and PCDF's (USEPA, 1984; 1989a).

The USEPA has recommended the use of Toxicity Equivalency Factors (TEFs) as interim science policy. TEFs were developed to evaluate the risk to human health from exposure to the bioaccumulative dioxin and furan congeners (USEPA, 1989a).

This procedure has been proposed with the knowledge that the method may lack some scientific validity due to uncertainties inherent in the 2,3,7,8-TCDD quantitative risk assessment, the assumption that the other PCDD's and PCDF's will demonstrate the same chronic effects, and that the toxic effects are additive (USEPA, 1989a; NATO/CCMS, 1988). The TEF process has been proposed with the expectation that the methodology will be reviewed and updated periodically as new scientific information becomes available (USEPA, 1989a).

II. CURRENT RULE

The 2,3,7,8-TCDD numeric water quality standard is 0.013 pg/l for waters with designated beneficial uses for fish consumption and water ingestion.

Compound	Fish Ingestion Only	Water & Fish Consumption
2,3,7,8-TCDD	0.014 pg/l	0.013 pg/l

The EQC has adopted a narrative standard for the control of toxic pollutants which states that:

" Toxic substances shall not be introduced above natural background levels in waters of the state in amounts, concentrations, or combinations which may be harmful, may chemically change to harmful forms in the environment, or may bioaccumulate to levels that adversely affect public health, safety, or welfare; aquatic life; or other designated beneficial uses ".

III. CONCERNS WITH THE CURRENT RULE

Should other dioxins and furans be addressed in assessing risk?

If adopted how should this be applied, as standards, criteria, or guidelines?

Should the standard be for each congener or adopted for the entire class of compounds?

Dioxin is a term commonly used for the family of polychlorinated dibenzo-para-dioxins (PCDD's). 2,3,7,8-tetrachloro dibenzo-para-dioxin is one of seventy-five (75) different congeners of PCDD and is one of twenty-two (22) different isomers of tetrachloro dibenzo-para-dioxin. A group of compounds closely related to PCDD's are polychlorinated dibenzofurans (PCDF's) of which there are 135 different congeners.

PCDD's and PCDF's are composed of carbon, hydrogen, oxygen, and chlorine. The chemical structure for PCDD's is two benzene rings connected by two oxygen atoms. The chemical structure for PCDF's are similar to PCDD's except PCDF's have one less oxygen (USEPA, 1987). Congeners of PCDD's and PCDF's can have one (1) to eight (8) chlorine atoms attached to the benzene rings. The number and position of the chlorine atoms distinguish the congeners.

Human, aquatic life, and wildlife would be exposed to complex mixtures of PCDD's and PCDF's on the basis of their occurrence in the environment and the biologic availability of the congener (USEPA, 1989a; Kuehl, 1987). Risk to the health of the exposed organism would also be dependent on the toxicity of the congeners.

PCDD's and PCDF's can occur as complex mixtures in the environment (USEPA, 1989a). Complex mixtures of PCDD's and PCDF's can be found in discharges from a variety of industries which would include hazardous and municipal waste incinerators (USEPA, 1989a). Complex mixtures of PCDD's and PCDF's have been detected in fish tissue collected from waters near bleached-kraft pulp mills, municipal sewage treatment plants, refineries, steel mills, agricultural areas, and urban areas (USEPA, 1990). 2,3,7,8-TCDD and 2,3,7,8-TCDF have been detected in the effluent of bleached-kraft pulp mills (USEPA, 1989b; Bodien, 1989).

PCDD's and PCDF's have been shown to bioaccumulate in fish which were exposed to sediments contaminated with PCDD's and PCDF's. Preferential uptake of dioxins and furans with chlorine atoms attached to the two, three, seven, and eight positions was observed (Kuehl, 1987).

Toxicity of PCDD and PCDF congeners have been most studied for the 2,3,7,8-TCDD congener (USEPA, 1989). These studies reported 2,3,7,8-TCDD exposure produced increased incidence of carcinogenicity, teratogenicity, immunosuppresion, and reproductive toxicity (USEPA, 1985; 1989a; Pollock et, al., 1989).

Long-term carcinogenic animal studies with rodents have been performed with PCDD congeners 2,3,7,8-TCDD, and a mixture of 1,2,3,7,8,9-HxCDD and 1,2,3,6,7,8-HxCDD (USEPA, 1989a). These studies reported an increased incidence of carcinogenesis. These three congeners have been the most potent carcinogens studied by the USEPA (USEPA, 1989a). Long-term carcinogenic animal assays have not been performed for the other PCDD or PCDF congeners (NATO/CCMS, 1988).

Other types of toxic responses have been identified for the other PCDD and PCDF congeners with chlorine atoms attached at the two, three, seven, and eight positions. These toxic responses include teratogenic and reproductive effects. Whole animal experimental data and in vitro tests of structure/activity correlated with in vivo toxic effects have been used for determining toxic responses (USEPA, 1989a). These studies covered a wide variety of endpoints. These endpoints included receptor binding, enzyme induction (AHH and EROD), cell keratin, flat (XB) cell assay, and immunotoxicity in vitro (Table 1) (USEPA, 1989a). The relative toxicity of the 2,3,7,8 substituted PCDDs and PCDFs compared to the toxicity of 2,3,7,8-TCDD is consistent among several different end points.

There are seventeen PCDD and PCDF congeners which are believed to be available for uptake into biological systems and may pose a risk to human health (NATO/CCMS, 1988). These congeners are:

Dioxins	Furans
2,3,7,8-TCDD	2,3,7,8-TCDF
1,2,3,7,8-PeCDD	1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF
1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD	1,2,3,4,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF
1,2,3,4,6,7,8-HpCDD	1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF
OCDD	OCDF

There are at least three different approaches for estimating hazard from exposure to single and complex mixtures of dioxins and furans. These methods are long-term whole animal testing, short-term biological assays, and toxicity equivalency factors.

The ideal approach for determining the hazard of a chemical is through the long-term whole animal toxicity assays. These tests could be used to assess the toxicity of a single chemical or complex mixtures of chemicals. Although this approach is preferred these assessments are time consuming and costly which lead to delays in addressing potential health risks (USEPA, 1989a).

Short-term biological assays can be used as an alternative to the long-term assays (USEPA, 1989a; NATO/CCMS, 1988). Short-term assays provide an indirect measure of toxicity for a single chemical or complex mixture of chemicals. These assays could be performed in vitro or in vivo and would include the use of several different end points. These end points would include receptor binding, enzyme induction, and immunotoxicity in vitro. These end points are thought to be important in the mechanism or correlate with toxicity for PCDD and PCDF congeners. Short-term assays provide information on toxicity and require less time and resources to perform.

2,3,7,8-TCDD toxicity equivalency factors can be used for estimating risks associated with exposure to single and complex mixtures of PCDD and PCDF congeners (USEPA, 1989a; NATO/CCMS, 1988). This approach uses the available toxicological data and structure/activity relationship of the biologically available PCDDs and PCDFs identified in a sample. The significance of the exposure is estimated and expressed as an equivalent amount of 2,3,7,8-TCDD. This approach uses the hazard information on 2,3,7,8-TCDD and assumes additivity of effects.

The criteria used for deriving the toxicity equivalency factors, were (USEPA, 1989a):

1. Definitive data on human carcinogenicity.

2. In the absence of definitive data on human carcinogenicity, information on carcinogenic potency is based on long-term animal studies which takes precedence over any other data.

3. When carcinogenic activity has not been demonstrated, data on reproductive effects become determinative because of the significance of this end point in humans. In, addition, the estimated exposure levels potentially resulting in reproductive and carcinogenic effects are similar.

4. When neither carcinogenic or reproductive effects have been demonstrated, the weight of the evidence of the in vitro test data is estimated. To simplify the approach and to acknowledge the approximate nature of the approach, these estimates are rounded off to the nearest order of magnitude. Somewhat more weight is placed on data from receptor binding interaction and oxidative enzyme induction, due to the correlations between these in vitro end points and certain in vivo systemic efforts (thymic atrophy and body weight loss).

Evaluation of the data on the basis of this criteria resulted in the following toxicity equivalent factors.

Toxicity Equivalency Factors (NATO/CCMS, 1988)

Congener	TEF
2,3,7,8-TCDD	1
1,2,3,7,8-PeCDD	0.5
1,2,3,4,7,8-HxCDD	0.1
1,2,3,6,7,8-HxCDD	0.1
1,2,3,7,8,9-HxCDD	0.1

Toxicity Equivalency Factors (NATO/CCMS, 1988)

1,2,3,4,6,7,8-HpCDD	0.01
OCDD	0.001
2,3,7,8-TCDF	0.1
1,2,3,7,8-PeCDF	0.5
2,3,4,7,8-PeCDF	0.05
1,2,3,4,7,8-HxCDF	0.1
1,2,3,7,8,9-HxCDF	0.1
1,2,3,6,7,8-HxCDF	0.1
2,3,4,6,7,8-HxCDF	0.1
1,2,3,4,6,7,8-HpCDF	0.01
1,2,3,4,7,8,9-HpCDF	0.01
OCDF	0.001

The TEF approach can be used for assessing the potential risk to human health through the following steps (USEPA, 1989a).

1. Analysis of the sample for the TEF PCDD and PCDF congeners.

2. Multiply the congener concentration by the TEF number in the above table.

3. Add the results of step #2.

4. The result of addition in step #3 is expressed in 2,3,7,8-TCDD equivalent units.

5. Estimate risk associated with mixture from toxicity information on 2,3,7,8-TCDD compared to the 2,3,7,8-TCDD equivalent units.

The USEPA has recommended the use of TEFs as interim science policy for evaluating human health risk for exposure to these chemicals (USEPA, 1989a). The USEPA Science Advisory Board has agreed with the USEPA that the TEF approach is a useful tool for risk management of PCDD and PCDF congeners. The SAB also agreed with USEPA that the method may lack scientific validity and efforts need to be made to provide the scientific testing to validate the methodology. The recommendation from the SAB is that the method should be reviewed and re-evaluated as new information becomes available.

Some of the concerns with the method are:

1. The mechanism of toxicity of PCDDs and PCDFs is not known.

2. In vitro studies may not represent chemicals administered in vivo and single exposures to a chemical may not mimic long-term chronic exposures.

3. Interaction of mixtures of PCDD and PCDF congeners is not well understood.

4. Uncertainties related to estimated intakes, bioavailability, interspecies extrapolation, safety factors, and mathematical models.

The exact mechanism for the expression of toxicity is not known. The receptor binding AHH induction model can be used for accounting for some but not all of the toxic effects (NATO, 1988).Additional mechanisms of toxicity are being studied. These alternative methods are interference with thyroid hormones, general interference with cellular mechanisms, and reduction of vitamin A storage. No one method can account for the mechanism of action observed in the whole animal assays.

There is conflicting data on whether complex mixtures of PCDD and PCDF congeners are additive or antagonistic in their toxic effects (NATO/CCMS, 1988). Additive toxicity was observed in teratogenic studies with rats exposed to 2,3,7,8 substituted PCDDs and PCDFs (Birnbaum et al. 1987 in NATO/CCMS, 1988). Antagonistic effects on toxicity were observed in other studies with 2,3,7,8 substituted congeners (Safe, 1987 in NATO/CCMS, 1988).

Application to risk assessment of the TEF concept relies on the quantitative risk assessment methodology developed for 2,3,7,8-TCDD. Uncertainties inherent in the 2,3,7,8-TCDD methodology is carried over to the TEF approach. These uncertainties would include the estimation of intake, the bioavailability, extrapolating information from one species to another, safety factors used, and the assumptions made in mathematical modelling.

The issue of risk associated with exposure to complex mixtures of PCDDs and PCDFs has been identified as a concern by several states and countries. The best method identified to date to address the issue has been the TEF approach. An international forum was convened to review the information on complex mixtures of these chemicals. The review of the

various TEF approaches adopted by different countries resulted in agreement on a single approach among the attending nations. The TEF approach has been accepted by regulatory agencies in Norway, Sweden, Netherlands, Canada, United Kingdom, and United States (USEPA) (USEPA, 1989a). The approach is also being used in the states of New York, California, Minnesota, Maine, Wisconsin.

IV. DEPARTMENT PROPOSAL FOR PUBLIC COMMENT

The Department recommends the following:

1. TEF should be used when assessing water quality standards violations when using fish tissue residue data.

2. The use of TEF should be examined for effluent data. The public workshops will serve as a forum for discussing the questions related to TEF and recommendations will be made based on comments received on the use of TEF.

V. PUBLIC COMMENTS RECEIVED ON ISSUE PAPER

The Department received the following public comment on the use of TEF's:

There is insufficient data to support the additivity of toxicity of the 2,3,7,8 substituted congeners of dioxins and furans.

The use of TEF's should be limited to risk assessment tasks.

TEF's should be used not only for additivity of toxicity of dioxins and furans but also co-planar PCB's and various chlorinated phenolics.

TEF's should be measured in terms of the enzymatic induction of AHH and EROD.

TEF's should be used for all media: tissue, sediment and water.

VI. DEPARTMENT RESPONSE TO ISSUE PAPER COMMENTS

There is insufficient information for use of TEF's as a water quality standards at this time. The best use of TEF's would be in risk assessment. The Department proposes no action on TEF's at this time, but will refer this issue to advisory committee for review.

Literature Citation

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ISSUE PAPER # 9
2,3,7,8-TCDD
Revised as of 10/22/90

I. INTRODUCTION

2,3,7,8-Tetrachlorodibenzo-para-dioxin (TCDD) is one of seventy-five (75) congeners in a group of chlorinated compounds commonly called dioxins (USEPA, 1987). The Environmental Quality Commission in 1987 adopted a numerical in-stream water quality standard for TCDD of 0.013 picograms per liter (pg/l) (OAR 340-41 Table 20). This standard was adopted from the USEPA water quality criteria developed for TCDD (USEPA, 1984). This issue paper was developed to evaluate the state's water quality standard for TCDD.

Areas discussed in this paper were TCDD physical and chemical characteristics, fate and transport in the environment, TCDD toxicity, the water quality standard, factors used for water quality standard development, the related issues of toxicity of other dioxin and furan isomers (Toxicity Equivalency Concentration / Toxicity Equivalency Factors), and Department recommendations.

II. CURRENT RULE

TCDD Water Quality Standard OAR 340-41 Table 20

Compound	Water and Fish Ingestion	Fish Consumption Only
Dioxin (2,3,7,8-TCDD)	0.013 pg/l	0.014 pg/l

Water and Fish Ingestion = Values represent the maximum ambient water concentration for consumption of both contaminated water and fish or other aquatic life.

Fish Ingestion Only = Values represent the maximum ambient water concentration for consumption of fish or other aquatic organisms.

III. CONCERNS WITH THE CURRENT RULE

Several concerns have been raised with the TCDD water quality standard by the public. Some of these concerns were:

1. The cancer potency factor is to low. That is 2,3,7,8-TCDD is not as potent a carcinogen as the USEPA has calculated.

2. The bioconcentration factor is not high enough. That 2,3,7,8-TCDD bioaccumulates to a higher degree than the USEPA has calculated in the water quality criteria.

3. The fish ingestion rate is not representative of fish consumption by some groups of people.

TCDD Chemical Structure

Dioxin is a term commonly used for the family of chlorodibenzo - para-dioxins (CDD). TCDD is one of seventy-five (75) different congeners of CDD's and is one of 22 different isomers of tetrachloro dibenzo-para-dioxin. Throughout this text TCDD will be specific for 2,3,7,8-TCDD. A group of compounds closely related to dioxins are chlorodibenzofurans of which there are 135 different congeners (USEPA, 1987). In this text chlorodibenzo furans will be referred to as furans.

Dioxins and furans are composed of carbon, hydrogen, chlorine, and oxygen. The chemical structure for dioxins is two benzene rings connected by two oxygen atoms (USEPA, 1987). Congeners of dioxin can have one to eight chlorine atoms attached to the benzene rings. The number and position of the chlorine atoms distinguish the congeners. The chemical formula for TCDD is $C_{12}H_4Cl_4O_2$ with the chlorine atoms attached to the two, three, seven, and eight positions around the benzene rings. The chemical structure for furans are similar to dioxins except furans have one less oxygen.

TCDD Physical & Chemical Properties

The congeners of dioxins exhibit similar physical and chemical properties. Generally, dioxins are hydrophobic, lipophilic, low volatility, resistant to thermal destruction, biologically stable, and susceptible to photolysis.

TCDD specific physical and chemical properties are as follows.

Hydrophobic -- slight solubility in water

Water Solubility (ppt = ng/l)	19.3 ± 3.7	@ $22^{o}C$	Miller (1987)
	7.91 ± 2.7	@ $25^{o}C$	Schroy et al. (1985)

Lipophilic -- moderate solubility in non-polar solvents

Octanol/Water partition coefficient ($\times 10^6$)	6.9 ± 1.6	@ 25 °C	USEPA (1988)
	10.5 ± 1.1	@ 25 °C	USEPA (1988)
	14.5 ± 1.6	@ 25 °C	USEPA (1988)
Benzene Solubility (ppt = ng/l)	5.7×10^8		Miller (1987)

Volatility -- low volatility into the air

Vapor Pressure ($\times 10^{-9}$ mm Hg)	3.49 ± 0.55	@ 30.1°C	Schroy et al. (1985)
	1.52	@ 25 °C	Schroy et al. (1985)
	0.74 ± 0.04	@ 25 °C	USEPA (1988)

Thermal Destruction -- resistant to thermal destruction

Decomposition Temperature		
	700 °C	Miller (1987)

Biologic Stablility -- resistance to biological transformation (USEPA, 1985)

Photolysis -- decomposition with exposure to uv radiation (USEPA, 1987).

<u>TCDD Fate & Transport</u>

The physical and chemical properties of TCDD would determine fate and transport in the aquatic environment. TCDD behavior in the aquatic environment is expected to be adsorption to dissolved and suspended solid particles, particularly organic matter (USEPA, 1987). TCDD would also be available for uptake and bioaccumulation in biological systems (Muir, 1989; Batterman et al., Kuehl et al., 1987; Mehrle et al., 1988; Cook, 1987). TCDD in the aquatic environment is expected to break down very slowly (USEPA, 1985, 1987).

Transport of TCDD in an aquatic system would be expected to be with the movement of solids particles and biological systems following uptake (Mackay et al., 1982, 1985; Rappe, 1987; Kenaga, 1980; Crunkilton, 1987).

Toxicological Effects

Most of the information on toxic effects of TCDD to humans have come from epidemiological investigation of worker exposure studies, exposure from industrial accidents, and exposure from disposal practices (USEPA, 1985, 1988a, 1988b; Pollock, 1989). The most common effect reported was chloracne which is a skin lesion that resembles acne and may persist for several years (Pollock, 1989). Other reported effects were nausea, liver damage, weight loss, fatigue, and neurological symptoms (Huff et al., 1980). Long term human health effects have not been adequately studied (Pollock, 1989).

TCDD has been identified as being very toxic to a number of mammalian species (Table 1) (Kociba, 1982). Toxic responses have been observed through oral and injection methods of exposure for mammalian species and oral and water column methods of exposure for aquatic species. Toxic responses which have been reported in the literature are carcinogenesis, teratogenesis, immunological, and reproductive. Toxic responses have been exhibited at acute and chronic exposure.

TCDD has been identified as toxic to birds (Eisler, 1986). Toxic effects include reproductive, behavioral, and lethality (Eisler, 1986; Hart, 1989; Kubiak, 1989). Studies have been performed investigating TCDD effects on Great Blue Herons and Forster's Tern with studies in progress on Peregrine Falcons (Hart, 1989; Moul, 1989; Kubiak, 1989; Pagel, 1989 pers. comm.).

TCDD has been identified to be acutely and chronically toxic to aquatic life (USEPA, 1985). Acute toxicity LC_{50} values range from 1.0 ppt for Guppies to 5.6 ppt for Coho Salmon. Chronic toxicity has been investigated in rainbow trout with a LOAEL observed at 3.8 ppt (Mehrle, 1989).

Carcinogenesis Mammalian

Carcinogenesis is the development of a malignant tumor or growth. TCDD has caused increased incidence of cancer in liver, pharynx, skin, lung, and thyroid tissues of rats and mice (Kociba et al., 1978; NTP, 1982a & 1982b; Eisler 1986). The development of cancer, in mammals, has been identified as the most sensitive response to TCDD exposure. The Kociba Study (Kociba, 1978) has been used in the water quality standard to estimate the carcinogenic human health risk for exposure to TCDD (USEPA, 1985).

Epidemiological studies have been used to study the human carcinogenic response to TCDD exposure. These studies have been performed on workers exposed to TCDD during the manufacture or application of herbicides, workers and people at industrial accident sites, and people at areas contaminated by TCDD from improper disposal practices (USEPA, 1985; 1988a; Pollock, 1989). The results of the epidemiological studies are conflicting as to whether TCDD exposure causes cancer in humans (USEPA, 1988b)

Hexachlorinated dibenzo-p-dioxins (HxCDD) mixtures have caused an increased incidence of liver tumors in rats and mice (NTP, 1980). Long-term whole animal carcinogenic studies have not been performed on all PCDD and PCDF congeners. PCDD and PCDF congeners with chlorine atoms attached at the 2,3,7, and 8 positions are considered potential human carcinogens. This was based on

Table 1

LD_{50} Values for Animals Exposed to TCDD

Animal	LD_{50} (ug/kg body weight)
Guinea Pig	1
Rat - Male	22
Rat - Female	45
Monkey	<70
Mouse	114
Rabbit	115
Dog	>300
Hamster	5,000

TCDD LD_{50} is the dose of TCDD which causes mortality in 50% of the animals exposed. Generally, delayed mortality occurred on the order of two to eight weeks (Connell et al., 1984).

similarity of chemical structure and mechanistic response to TCDD and HxCDD (NATO, 1988; USEPA, 1989b). Additional information on this subject is contained in the Department's issue paper on Toxicity Equivalency Concentrations for PCDD's and PCDF's.

Teratogenesis Mammalian

Teratogenesis is the development of abnormal tissues in an embryo. TCDD has caused increased incidence of cystic kidney, cleft palate, and spinal column deformities in fetuses of rats (Eisler, 1986).

Immunological Mammalian

Immunological effects are suppression of immune system function. TCDD has caused immunological effects of thymic atrophy, depressed bone marrow function, reduced host resistance, and suppression of both humoral and cell mediated immunity (Pollock, 1989; USEPA, 1985).

Reproduction Mammalian

Reproductive effects are those that cause a reduction in the number of young born. Several epidemiological studies have been performed on human reproductive effects from exposure to TCDD. These studies were performed on populations exposed to TCDD from industrial accidents, work related activities, herbicidal spraying, and disposal practices (USEPA, 1985, 1989a; Pollock, 1989). Some of the studies reviewed indicated an increase in miscarriages following an industrial accident in Seveso Italy while a study of children of soldiers exposed to 2,4,5-T indicated a higher rate of malformations (Pollock, 1989). Other studies were unable to establish an association between TCDD exposure and human reproductive effects (Pollock, 1989).

Cause and effect relationships from environmental exposures of TCDD are difficult to establish from epidemiological studies due to difficulty in quantifying exposure and categorization of exposed individuals (Pollock, 1989). Factors affecting reliability of epidemiological studies are difficult to control and may affect the results of studies. Because of these factors the studies can not be used to state a no adverse effect to reproduction due to TCDD (Pollock, 1989).

Laboratory animal studies have shown adverse effects to reproduction due to TCDD exposure. Rats and nonhuman primates have been the most sensitive species studied to date (USEPA, 1985; Pollock, 1989). Rats have exhibited impaired reproduction due to a decrease in litter size, gestational survival, neonatal survival, growth, and fertility (Murray, 1979). Pregnant Rhesus monkeys exposed to TCDD had increased incidences of abortions, stillbirths, and a decrease in rate of conceptions (Allen, 1979; Schantz et al., 1979).

Avian Toxic Effects

TCDD single oral doses of 15 ug/kg, >108 ug/kg, and .810 ug/kg have caused acute toxicity, calculated as an LD_{50}, in Northern bobwhite quail, mallards, and ringed turtle-doves, respectively (Eisler, 1986).

TCDD exposure has been proposed as a cause for increased nesting failure of Great Blue Herons in a study in Canada (Moul, 1989). Subcutaneous edema and distended abdomens were observed in Great Blue Heron chicks hatched from eggs collected near a known source of TCDD (Hart, 1989). Reproductive success was reduced for Forster's Tern nesting in areas that had elevated concentrations of organochlorines, including TCDD (Kubiak, 1989).

TCDD had not been identified to have the same bioaccumulative characteristics in birds as other organochlorines such as DDT and PCBs (Eisler, 1986). However, more recent information indicates that TCDD does bioaccumulate to some degree in birds (Paasivirta, 1987; Van den Berg, 1987). The New York State Department of Environmental Conservation has estimated the concentration of TCDD in fish which could be detrimental to populations of fish eating birds. This concentration is two to three parts per trillion (Newell et al., 1987).

Aquatic Life Toxic Effects

Acute toxicity is defined as an adverse effect from a short term exposure. The adverse effect could be mortality, growth, or reproduction and would be exhibited shortly after exposure. The period of exposure is usually 96 hours or less.

Acute exposures of TCDD has caused growth retardation in northern pike and growth retardation and edema in rainbow trout (Table 2) (Eisler, 1986).

Table 2

Acute Toxicity from TCDD Exposure (Eisler, 1986)

Species	Conc. (ppt)	Duration of Exposure	Effects
Northern Pike	0.1	96 hrs	Reduced growth
Rainbow Trout	10	96 hrs	Reduced Growth, edema

Conc. (ppt) = the concentration in parts per trillion of TCDD in the ambient medium at start of test.

Generally, chronic toxicity is defined as an adverse effect caused from a long term exposure. The length of exposure would be

greater than 96 hours. Chronic exposures to TCDD have caused mortality, growth reduction, and behavioral changes in rainbow trout as well as mortality of Guppies, Coho Salmon, and channel catfish (Mehrle, 1988; Eisler, 1986).

Table 3

Chronic Toxicity to TCDD Exposure (Eisler, 1986)

Species	Conc. (ppt)	Duration of Exposure	Effects
Rainbow Trout	0.038	28 days	46% mortality at day 56, reduced growth, behavior impairment
Rainbow Trout	0.1	96 hrs	Reduced growth at day 72
Rainbow Trout	10	96 hrs	26% mortality at day 72
Guppies	1.0	24 hrs	50% mortality at day 42
Coho Salmon	0.56	48 hrs	12% mortality at day 60
Coho Salmon	5.6	96 hrs	50% mortality at day 60
Channel Catfish	4.2	20 days	100% mortality at day 15 - 20

Other effects included reduced resistance to fungal infestations, fin erosion, and degeneration of the liver (Eisler, 1986).

Mammalian Dose Response Relationship

Dose response relationship is a quantitative estimate of the amount and frequency of a substance which causes a response (USEPA, 1989a). A summary of the dosages and responses from TCDD have been summarized.

NEIL GOLDSCHMIDT
GOVERNOR

Environmental Quality Commission

811 SW SIXTH AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

REQUEST FOR EQC ACTION

Meeting Date: November 2, 1990
Agenda Item: E
Division: Air Quality
Section: Planning & Development

SUBJECT:

Proposed Adoption of Rules for PM_{10} Control Strategy for Grants Pass

PURPOSE:

To consider adoption of a revision to the State Implementation Plan (SIP) Rule (OAR 340-20-047) to include the PM_{10} air pollution control strategy for the Grants Pass Nonattainment Area.

ACTION REQUESTED:

___ Work Session Discussion
- ___ General Program Background
- ___ Potential Strategy, Policy, or Rules
- ___ Agenda Item ___ for Current Meeting
- ___ Other: (specify)

___ Authorize Rulemaking Hearing
_X_ Adopt Rules

Proposed Rules	Attachment A
Rulemaking Statements	Attachment B
Fiscal and Economic Impact Statement	Attachment C
Public Notice	Attachment D

___ Issue a Contested Case Order
___ Approve a Stipulated Order
___ Enter an Order

Proposed Order	Attachment ___

___ Approve Department Recommendation

___ Variance Request	Attachment ___
___ Exception to Rule	Attachment ___
___ Informational Report	Attachment ___
___ Other: (specify)	Attachment ___

DESCRIPTION OF REQUESTED ACTION:

This report requests that the Environmental Quality Commission (EQC, Commission) adopt the proposed PM_{10} control strategy for the Grants Pass Urban Growth Boundary (UGB) area within Josephine County. The control strategy documentation has been changed since the June 29, 1990, EQC hearing authorization to provide details on the operation of a voluntary woodburning curtailment program in Grants Pass.

The proposed control strategy document describes the State of Oregon's plan to meet Federal Clean Air Act requirements to attain the 24-hour PM_{10} standard by the end of 1992 and maintain both the annual and 24-hour PM_{10} standards within the area of the Grants Pass UGB through the year 2000. This control strategy document is proposed as a revision to the State Implementation Plan (OAR 340-20-047). The strategy includes previously adopted state rules for industrial sources of PM_{10} and a voluntary woodburning curtailment program.

Additional details on the proposal are outlined in the Executive Summary of the control strategy (Attachment A).

AUTHORITY/NEED FOR ACTION:

___	Required by Statute: _____	Attachment ___
	Enactment Date: _____	
_X_	Statutory Authority: 468.305	Attachment E
___	Pursuant to Rule: _____	Attachment ___
___	Pursuant to Federal Law/Rule: _____	Attachment ___
___	Other:	Attachment ___
___	Time Constraints: (explain)	

The U.S. Environmental Protection Agency (EPA) adopted new particulate National Ambient Air Quality Standards (NAAQS) for PM_{10} effective July 31, 1987. The Federal Clean Air Act requires that states develop and adopt SIP revisions to assure that areas which exceed the NAAQS are brought into attainment within a 49-month time frame following adoption of the new health standards (by September 1991 for PM_{10}).

The adopted PM_{10} control strategies were due to EPA as SIP revisions by May 1988, but none of the states were able to meet this deadline. The Sierra Club has sued EPA for failure to require states nationally to submit PM_{10} plans according to the Clean Air Act schedule. The Department of Environmental Quality (Department) and EPA Region 10 agreed to a November 1990 PM_{10} SIP submittal date which has been offered in the suit settlement negotiations. This date has been incorporated into the FY91 State/EPA Agreement as well.

While the plan submittal for Grants Pass is proceeding on this schedule, the plans for Eugene-Springfield, Medford and Klamath Falls are delayed due to their overall greater complexity and/or need for local government ordinances.

Congress is expected to complete the reauthorization of the Clean Air Act by the end of 1990. This may or may not result in extensions of the deadlines for PM_{10} SIP submittals and attainment of PM_{10} standards in Oregon.

DEVELOPMENTAL BACKGROUND:

X	Advisory Committee Report/Recommendation	Attachment F
X	Hearing Officer's Report/Recommendations	Attachment G
X	Response to Testimony/Comments	Attachment H
X	Prior EQC Agenda Items	Attachment I
___	Other Related Reports/Rules/Statutes:	Attachment ___
___	Supplemental Background Information	Attachment ___

Preliminary draft control plan documents were sent to EPA Region 10, City of Grants Pass, Josephine County and southern Oregon environmental organizations in the first part of 1990. As a result, changes were made and incorporated into a final, draft document that was authorized for hearing at the June 29, 1990, EQC meeting. Public hearings were held in Grants Pass on August 2, 1990 and September 13, 1990. With the submittal of supplemental appendix material to EPA in August 1990, all technical concerns expressed by EPA have been addressed. No further comments were received from EPA during the public hearing process.

REGULATED/AFFECTED COMMUNITY CONSTRAINTS/CONSIDERATIONS:

The testimony from the public hearings in Grants Pass is summarized in Attachment G. Department responses to the testimony are contained in Attachment H. A preponderance of the testimony from citizens was generally critical of the draft plan and there was specific opposition to the proposed voluntary woodburning curtailment program. Some of this may have been due to the fact that the draft plan did not contain sufficient operational details of a voluntary curtailment program, including the intention to exempt sole source and low income households. Such exemptions are now clearly labeled in the plan document.

The City of Grants Pass (Mayor Candace Bartow) expressed general support for the plan, but had some concerns about the use of non-local data (refer to Attachment H) to project emissions in Grants Pass and the impact of the upgraded industrial rules on the economy. Several other persons were concerned about the use of Medford woodburning

characteristics (percentage of households burning wood and cords of wood burned) to help derive the estimate of woodburning emissions in Grants Pass and urged the Department to conduct a wood heating survey in Grants Pass during 1991. The Department believes that the data is applicable, but has committed in the plan to conduct a wood heating survey in Grants Pass by July 1991.

The southern Oregon environmental groups have been critical of the draft plans for Medford, Klamath Falls and Grants Pass. The Oregon Environmental Council, while generally supportive of the proposed plan, expressed a number of concerns and suggested some alternative/supplementary control measures (refer to Attachment H). The Department believes that the basic strategy documented in the draft plan and now detailed in Attachment A provides an ample margin of safety for meeting and maintaining PM_{10} standards in Grants Pass, so additional measures and contingencies do not appear to be warranted at the present time.

PROGRAM CONSIDERATIONS:

The new industrial emission control and monitoring requirements, adopted by the Commission in September 1989, will require additional plan reviews, inspections, monitoring report reviews and other compliance assurance activities by Department staff. This additional work will be done by shifting existing resources, resulting in less attention to lower priority sources and an increased backlog in some permit or inspection activities. The Department intends to address this backlog problem in a base enhancement decision package in the next legislative session.

The daily decision on woodburning curtailment programs will be based on air quality information from the Department's existing air monitoring network and meteorological information from the National Weather Service. The daily woodburning decision will be made by Josephine County staff. A telephone announcement machine will be purchased by the Department through federal grant money and loaned to Josephine County to help disseminate the daily calls to the general public. Residual funds from the purchase will be used to pay the phone line costs for the first heating season. The Department is committed to seek funding assistance to operate the announcement machine after the 1990-1991 heating season.

In the future, if local governments do not implement voluntary curtailment, then the Department could proceed to carry out such a program.

ALTERNATIVES CONSIDERED BY THE DEPARTMENT:

The major alternatives are:

1. Proceed with completion and adoption of the Grants Pass PM_{10} control strategy as a revision to the State Implementation Plan;

2. Delay submittal of the State Implementation Plan until Congress reauthorizes the Clean Air Act and new PM_{10} schedules possibly go into effect;

3. Do not submit a State Implementation Plan and allow EPA to impose sanctions or develop and implement a Federal Implementation Plan for the Grants Pass area.

The Clean Air Act is expected to be reauthorized by the end of the year. A joint conference committee has been meeting to reconcile differences in the Senate and House Bills. In terms of PM_{10}, the Senate Bill is far more specific than the House Bill and it likely will be the pattern for the final Act. The Senate Bill directs EPA to negotiate a control plan submittal date with the states not to exceed two years. The Bill requires attainment to be demonstrated as expeditiously as practicable, but not later than the end of 1994.

With respect to the status of the state's current PM_{10} SIP development, most work has been completed. The Department negotiated a reasonable plan submittal and attainment date with EPA which was incorporated into the FY91 State/EPA Agreement. This agreement was adopted by the Commission at its May 25, 1990 meeting. Therefore, it is not certain that EPA would be inclined to allow Oregon much if any additional time to submit PM_{10} plans and reach attainment once the Clean Air Act is reauthorized. More importantly, delaying adoption of the PM_{10} plan could result in delaying achievement of healthful air quality for the public.

If the state does not adopt a plan, EPA may take federal action, such as promulgating its own plan under the authority of the Clean Air Act.

DEPARTMENT RECOMMENDATION FOR ACTION, WITH RATIONALE:

The Department recommends adoption of the proposed PM_{10} control strategy as a revision to the State Implementation Plan, which includes additional operational details of the voluntary woodburning curtailment program in the Grants Pass Urban Growth Boundary area. The Department believes the clarifications are responsive to EPA's expectations and to the public hearing testimony. The proposed strategy is a

balanced and reasonable combination of industrial and wood heating emission reduction elements that will be adequate to attain and maintain the PM_{10} health and welfare standards in the Grants Pass area in an expeditious manner.

CONSISTENCY WITH STRATEGIC PLAN, AGENCY POLICY, LEGISLATIVE POLICY:

The proposed PM_{10} control strategy for the Grants Pass area is consistent with Goals 2, 3, 4 and 5 of the Strategic Plan.

ISSUES FOR COMMISSION TO RESOLVE:

Should adoption of the proposed revisions to the State Implementation Plan be delayed until after reauthorization of the Clean Air Act?

INTENDED FOLLOWUP ACTIONS:

1. Submit the State Implementation Plan revision to EPA for approval.

2. Provide Josephine County necessary assistance to set up the tracking/surveillance element of the voluntary woodburning curtailment program.

3. Seek funding assistance for local government to continue the operation of the voluntary curtailment program beyond the 1990/1991 heating season.

Approved:

Section: John F. Kowalczyk

Division: Tom Bispham

Director: Fred Hansen

Report Prepared By: Howard W. Harris
Phone: 229-6086
Date Prepared: October 15, 1990

HWH:a
PLAN\AH10936

State Implementation Plan

for Particulate Matter

Grants Pass, Oregon
Nonattainment Area

A Plan for Attaining and Maintaining the National Ambient Air Quality Standard for PM_{10}

State of Oregon
Department of Environmental Quality
Air Quality Division

November 1990

Preface and Acknowledgements

This document describes the State of Oregon's plan for attaining and maintaining the National Ambient Air Quality Standard (NAAQS) for PM_{10} in Grants Pass, Oregon. The plan is part of the State Implementation Plan (SIP), under OAR 340-20-047, required by the Federal Clean Air Act.

This plan is based on the Grants Pass Clean Air Policy Advisory Committee Report of April 20, 1988. The Committee consisted of eight members, equally divided between appointees of the City of Grants Pass and the Josephine County Commission. The Committee's work was coordinated by the Josephine County Health Department, with technical assistance provided by the Department of Environmental Quality.

Table of Contents

List of Tables

List of Figures

Appendices

Appendix 1: Grants Pass Clean Air Policy Committee Report
Appendix 2: Grants Pass Particulate Survey Report
Appendix 3: Grants Pass PM_{10} Monitoring Data
Appendix 4: Grants Pass PM_{10} Design Value Calculations
Appendix 5: Grants Pass Detailed Emission Inventory
Appendix 6: Grants Pass Receptor Modeling Results
Appendix 7: Grants Pass Voluntary Curtailment Program
Appendix 8: Notices of Public Hearings

Note: Appendices are available upon request

Executive Summary

The US Environmental Protection Agency (EPA), in accordance with the provisions of the Clean Air Act, adopted a new particulate national ambient air quality standard (NAAQS), known as PM_{10}, on July 1, 1987. PM_{10} is an abbreviation for particulate matter that is ten (10) micro-meters (microns) or less in aerodynamic diameter. The 10 micron size corresponds roughly to one-tenth of the diameter of a human hair. EPA identified the Grants Pass area as having a strong likelihood of violating the new standard. Subsequent monitoring conducted by the Department of Environmental Quality has confirmed that the Grants Pass area did not meet the standard as of the end of 1988.

The Clean Air Act requires that states develop and adopt State Implementation Plan (SIP) revisions to assure that areas which exceed the PM_{10} NAAQS are brought into attainment within the time frames prescribed by the Clean Air Act (September 1991), and that healthful air quality is maintained. This document describes the State of Oregon's plan to attain the PM_{10} standard in Grants Pass.

High exposure to particulate matter is of concern because of human health effects such as changes in lung functions and increased respiratory symptoms, aggravation of existing respiratory and cardiovascular disease, alternation in the body's defense system against foreign materials, damage to lung tissue, increased risk of cancer and, in extreme cases, premature death. Most sensitive to the effects of particulate matter are people with chronic obstructive pulmonary cardiovascular disease and those with influenza, asthmatics, the elderly, children and mouth-breathers.

Air quality measurements taken in Grants Pass have determined that the 24-hour PM_{10} health NAAQS may potentially be exceeded about 3-4 days per year during an average winter season. The annual average concentration of PM_{10} does not exceed the annual average PM_{10} NAAQS. The NAAQS adopted by the US Environmental Protection Agency were established to protect public health and welfare.

The 24-hour PM_{10} NAAQS is 150 micrograms per cubic meter of air ($\mu g/m^3$). Excluding the pollution episode due to the Silver Complex wildfire which occurred in September, 1987, the maximum concentration of PM_{10} measured at the 11th and K Streets monitor in Grants Pass was 208 $\mu g/m^3$ on January 21, 1987. The 24-hour standard cannot be exceeded more than three times averaged over three calendar years. The annual average PM_{10} concentration in Grants Pass is 42 $\mu g/m^3$ (four years of data) as compared to the average annual PM_{10} NAAQS of 50 $\mu g/m^3$.

An inventory of PM_{10} emissions developed for the Grants Pass Urban Growth Boundary (UGB) indicates that the major sources of particulate emissions during winter periods of worst-case 24-hour PM_{10} concentrations are residential wood combustion (54%), industrial emissions (25%) and soil dust (13%). On an annual basis, these sources contribute 31%, 39%, and 17% respectively. Emission inventory information representative of worst-case 24-hour conditions have been qualitatively confirmed through receptor modeling techniques which apportion source contributions on the basis of their chemical "fingerprints".

An air monitoring survey conducted in October 1985 showed that the PM_{10} problem area in Grants Pass includes the central portion of the urban area (city limits and the urbanized area south of the Rogue River). Based on this survey, ambient air monitoring conducted at 11th & K Streets represents the highest PM_{10} levels within the Urban Growth Boundary.

PM_{10} design values are those 24-hour worst case and annual average concentrations from which reductions must be made to achieve the NAAQS. Analysis of all of the available PM_{10} air quality data over the period of December, 1985 to November, 1989 indicates a 24-hour design value of 171 $\mu g/m^3$. and an annual average design value of 42 $\mu g/m^3$. For the control strategy analysis, these design values were compared to a 1986 base year emission inventory. Control strategies included in this plan have been designed to reduce current 24-hour concentrations of PM_{10} by at least 22 $\mu g/m^3$. The strategy will also reduce the annual average PM_{10} concentration.

The control strategies needed to assure attainment and maintenance of the PM_{10} National Ambient Air Quality Standard focus on control of industrial emissions and residential wood combustion. Additional reductions are expected from statewide efforts to reduce slash burning smoke.

Although residential wood combustion (RWC) emissions are the predominant source contributing to the occasionally high winter 24-hour concentrations found in Grants Pass, industrial controls will contribute substantially (approximately 55%) to the necessary reduction to meet the 24-hour standard. A voluntary curtailment program on woodstove and fireplace use during pollution episodes, coupled with a public information effort and normal phase-in of certified stoves, will provide the balance of control needed to meet the PM_{10} health standard. The Department estimates that 25% of the wood burning households will forego use of their woodstoves during the 3-4 days of voluntary curtailment likely to occur on average each winter. These strategies will bring the area into attainment by the end of 1992 with an ample safety margin at the 11th & K critical monitoring site, which is near the City's industrial area. This safety margin will insure attainment at other non-monitored sites where the source impacts are more oriented toward residential wood combustion. In fact, the wood

heating control strategy alone will be sufficient to achieve attainment in these areas.

With respect to slash burning, those emissions will be reduced in western Oregon by about 50% between 1978 and year 2000 as part of the Oregon Visibility Protection Plan. These emission reductions will further insure that background PM_{10} concentrations will not increase in future years.

Implementation of the PM_{10} control strategy will require the efforts of residents and industries within the Grants Pass UGB, Josephine County, the Oregon Department of Environmental Quality, the State Forestry Department, U.S. Forest Service and Bureau of Land Management.

Maintenance of ambient PM_{10} concentrations below the NAAQS will rely on the same strategies. To demonstrate continued maintenance of the annual and 24-hour NAAQS for PM_{10}, annual and worst case day emissions were projected to the year 2000. For the worst case day, the emissions for each individual source category were forecast, taking into account expected growth and the application of the relevant control strategy element. Individual source impacts were then determined directly from the change in emissions between 1992 and 2000. The projection indicates a worst case day concentration in the year 2000 of 135 $\mu g/m^3$, which is significantly less than the 24-Hour standard of 150 $\mu g/m^3$. To check for continued maintenance of the annual standard, the total annual emissions for 1986 (the base year for which the annual design value was determined to be below the annual standard) and 2000 were compared. Annual emissions are expected to be approximately 18% lower in 2000 than in 1986. Thus, continued maintenance of the annual standard will be achieved.

4.13.0 State Implementation Plan for Grants Pass PM_{10} Nonattainment Area

4.13.0.1 Introduction

On July 1, 1987, the Environmental Protection Agency promulgated new federal ambient air quality standards for particles less than or equal to 10 micrometers in aerodynamic diameter (PM_{10}) to replace the Total Suspended Particulate (TSP) standard.[1] The standard became effective 30 days later on July 31, 1987. On August 7, 1987, EPA designated Grants Pass as a Group 1 PM_{10} nonattainment area (52 FR 29383). Group 1 areas are those which have a greater than 95 percent probability of exceeding the PM_{10} NAAQS. Subsequent air monitoring has shown that air quality within the central area of Grants Pass exceeds the 24-hour PM_{10} NAAQS.

Section 110 of the Federal Clean Air Act requires states to adopt and submit plans (State Implementation Plans or SIPs) to EPA within nine months after the effective date of the standard. The Clean Air Act allows EPA four months to approve or disapprove the plan. The plan must provide for attainment of the standard as expeditiously as practicable but no later than three years from the date of EPA approval of the SIP.[2] Hence, attainment theoretically must be reached by September 1, 1991.

The Air Quality Division of the Department of Environmental Quality has developed this plan in consultation with officials of the City of Grants Pass and Josephine County and the U.S. Environmental Protection Agency. The plan is based on the Grants Pass Clean Air Policy Advisory Committee Report dated April 20, 1988 (Appendix 1). The plan was prepared in accordance with the regulations and requirements of the Federal Clean Air Act and the US EPA. The Department expects the plan to achieve attainment of the NAAQS within the time frame required by the Act and to maintain ambient PM_{10} concentrations below the level of the standards until at least the year 2000.

4.13.0.2 SIP Overview

The State Implementation Plan (SIP) for Grants Pass has five sections. The first (4.13.1) provides a description of PM_{10} ambient air quality. Section 4.13.2 is an analysis of the PM_{10} air quality problem within the Grants Pass Nonattainment Area. Section 4.13.3 provides an analysis of control strategies for

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[1] A micrometer (μm) is a unit of length equal to 1/1,000,000 of a meter, about 1/25,000 of an inch. For comparison, the thickness of a human hair is about 100 to 200 micrometers. Common bacteria are about 1 to 2 micrometers in length.

[2] Clean Air Act Section 110 (a)(1).

attaining the NAAQS. Section 4.13.4 describes implementation of the control strategies and commitments to track the effectiveness of the SIP. Section 4.13.5 discusses public involvement including work with a Citizen Advisory Committee and public hearing participation.

4.13.0.3 Area Description

Grants Pass is located in southwestern Oregon. It lies in the Rouge River Valley at an elevation of 948 feet and is surrounded by the Siskiyou Mountains and the Coast Range. The City of Grants Pass had an incorporated population of 16,290 in 1986, the base year for this analysis. The population within the Urban Growth Boundary was estimated to be 27,650 in 1986.

The Grants Pass PM_{10} problem area is located in the urbanized portion of Grants Pass, including the city limits and the urbanized land outside the city limits. Figure 4.13.0-1 shows the boundaries of the Grants Pass Urban Growth Boundary which was recommended by the Grants Pass Clean Air Policy Advisory Committee as the Nonattainment Area boundary. The criteria for selection of the UGB are as follows:

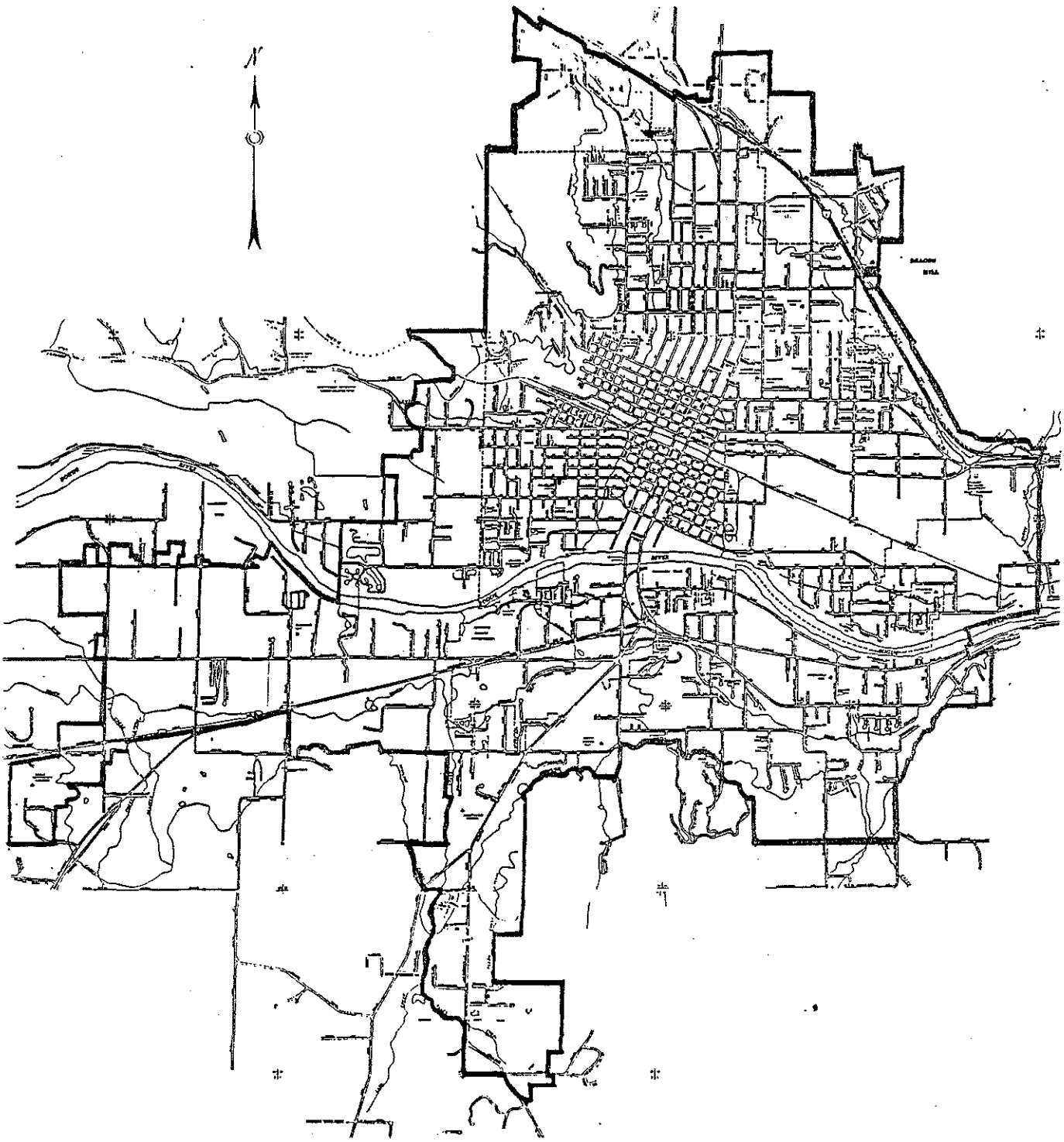
1. The nonattainment area boundary must include the geographical area within which national ambient air quality standards are currently being exceeded. Air Sampling surveys and ongoing monitoring indicate that maximum concentrations are found at the industrial/residential interface, consistent with local topography and the emission density of industrial and residential wood combustion sources.

2. The nonattainment boundary must include the area within which air standards may be exceeded in the future. EPA requires that SIP control strategies consider future population, transportation, housing and industrial growth to assure that air standards will be attained and maintained. Development of a strategy to assure maintenance of air standards therefore requires that the nonattainment area boundary be consistent with the regional planning boundary for which community growth projections are available.

3. The nonattainment area must be a legally defined boundary recognized by local governments. Legal definition is required for rulemaking purposes. Additionally, some component of the control strategy may need to be implemented through county land use planning ordinances tied to the Urban Growth Boundary.

Designation of the Urban Growth Boundary as the nonattainment area is the only legally defined boundary that meets all of the above criteria.

Figure 4.13.0-1: Nonattainment Area Map



4.13.0.4 Grants Pass Meteorology

The climate of the Rogue River Valley is moderate, with marked seasonal changes. The annual rainfall is approximately 32 inches. Winds are fairly light. Surface winds are often channeled to the east, or to the west, in general alignment with the River, which runs through the center of the urbanized area.

The topography of the area restricts natural ventilation of the valley. The combination of low wind speeds, frequent temperature inversions and topography results in a high potential for air pollution. During the winter episodic stagnation conditions may persist for a period of 3 to 4 days, or longer.

4.13.0.5 Health Effects of PM_{10} and Wood Smoke

Particulate matter measuring less than or equal to 10 micrometers is considered a risk to human health due to the body's inability to effectively filter out particles of this size. These particles can become lodged in the alveolar regions of the respiratory system where they trigger biochemical and morphological changes in the lungs.[3]

For example, constriction of air passages (i.e., reduced air flow) occurs rapidly upon exposure to PM_{10}. Episodic and continuous exposure aggravates chronic respiratory diseases such as asthma, bronchitis, and emphysema which in turn restrict the lung's ability to transfer oxygen into the bloodstream. Traditionally, children, the elderly, and cigarette smokers are the most susceptible to lung dysfunctions and are, therefore, at greatest risk from PM_{10} exposure.[4] Episodic exposure can also cause changes in the activity of the lung's mucous secretions and accelerates the mucociliary action in an attempt to sweep the particulates out of the lungs. This results in increased symptoms of cough, phlegm, and dyspnea (difficulty in breathing). Continuous exposure can inhibit this defense mechanism by introducing new particles into the lungs and redistributing those being swept out. This slows the clearance of the bronchial system thus increasing susceptibility to acute bacterial and viral infections.

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[3]J. Koenig, T.V. Larson, P. Jenkins, D. Calvert, N. Maykut and W. Pierson, "Wood Smoke: Health Effects and Legislation," Health Effects of Woodsmoke, Northwest Center for Occupational Health and Safety, January 20, 1988.

[4]U.S. Environmental Protection Agency, Second Addendum to Air Quality Criteria for Particulate Matter and Sulfur Oxides (1982: Assessment of Newly Available Health Effects. EPA 600/8-86-020-F. NTIS # PB-87-176574. 1987b.

The increased stress on the pulmonary system caused by PM_{10} exposure is usually tolerable for those with healthy respiratory systems, however, it can lead to irreversible or fatal damage in people already suffering from cardiopulmonary disease, typically children, the elderly, the ill, and cigarette smokers.[4] Another group that falls into the high risk category are people who breathe through their mouths.[4] This group includes a wide range of people from chronic mouth-breathers to anyone involved in outdoor exercise and heavy labor. During mouth-breathing, particulate matter is breathed more directly into the lungs since it bypasses the filtering systems of the nasal passages.

Among the sources of PM_{10} emissions, wood smoke is of particular concern in Grants Pass because it accounts for a majority of the small particulate matter measured in the nonattainment area. (A description of emission sources in found in Section 4.13.2.2). These particles are less than 1 μm in diameter and remain suspended in the air for long periods of time. Because of their small size and their ability to remain airborne, they are easily inhaled and lodged in the alveolar region of the lungs. These particles can also act as carriers for toxic chemicals which are transported deep into the respiratory system. Some of these toxic substances are then absorbed into the bloodstream.

Wood smoke contains fourteen carcinogenic compounds including benzo(a)pyrene, benzo(a)anthracene, and other polycyclic organic materials.[5] Additionally, wood smoke contains several other hazardous compounds such as aldehydes, phenols, carbon monoxide and volatile organic vapors. These compounds can cause or contribute to illness ranging from neurological dysfunctions and headaches to lung cancer.3 Many of the components of wood smoke are also found in cigarette smoke and coke oven emissions and can affect the cilia in a similar manner making it difficult for the body to expel the particulate matter. Because wood smoke concentrations are highest in residential areas, a large segment of the population is routinely exposed to wood smoke pollution in the winter months. Additionally, it is those people who are most sensitive, children, the elderly, and the ill, who spend the most time in their homes, thereby increasing their risk .[5]

4.13.1 Ambient Air Quality

The historical ambient particulate monitoring site in Grants Pass was located at the Josephine County Courthouse near Sixth and C Streets. Total Suspended Particulate (TSP) was measured at this site year around starting in November 1969. Sampling was

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[5]P.G. Jenkins, Washington Wood Smoke: Emissions, Impacts and Reduction Strategies, Washington Department of Ecology, Olympia, Washington. December, 1986.

conducted on a generally every-sixth-day schedule. Monitoring continued at this site until September 1987, when it was succeeded by monitoring for PM_{10} at a new site located near Eleventh and K Streets.

The concentrations of smoke and dust particles in the central Grants Pass area have occasionally exceeded the old secondary (welfare based) TSP ambient air quality standard in the past. However, TSP levels have generally improved in recent years in the Grants Pass area. This improvement is apparently due to the combination of improved industrial controls and reduced road dust (from paving unpaved roads). The maximum and second highest daily TSP concentrations are shown in Figure 4.13.1-1 for the years 1974 to 1986.

PM_{10} air quality monitoring began in December, 1985 following completion of an area-wide survey designed to characterize the spatial distribution of PM_{10} concentrations (Appendix 2). Sampling was then conducted at the Josephine County Courthouse site and at a new site near 11th and K Streets. Based on the survey, the latter site appeared to be representative of maximum PM_{10} impact in the Grants Pass area. Both Total Suspended Particulate and PM_{10} samplers were operated from December 1985 to March 1986 to obtain comparison data. Since that time, PM_{10} sampling has been conducted at the 11th and K site.

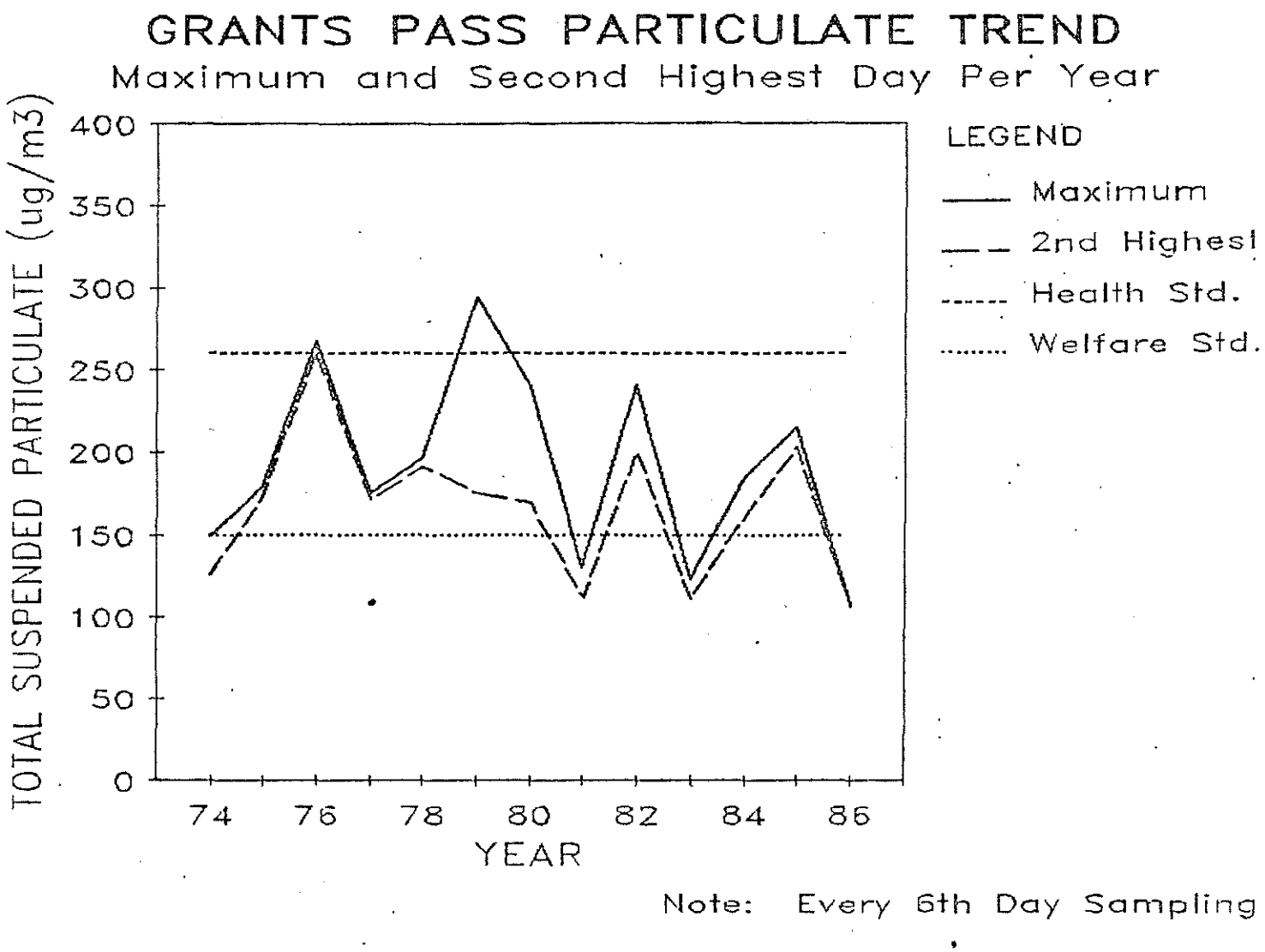
4.13.1.1 Air Monitoring Methods

Several sampling methods have been used to measure suspended ambient particulate concentrations in Grants Pass:

The PM_{10} Medium-Vol. sampler collects PM_{10} aerosol using a 12 port, 47 mm filter sequencing system that is programmed to collect 24-hour samples. The sampler pulls ambient air at a 4 CFM flow rate through a 10 μ Sierra-Anderson 254 inlet providing a PM_{10} cut point. A dual-port system capable simultaneously collecting aerosol on both Teflon and quartz filter substrate is used to allow complete chemical analysis for Chemical Mass Balance receptor modeling purposes. Because of the excellent agreement between PM_{10} concentrations measured by the Medium-Vol and the HV-SSI reference method, EPA has designated the Medium-Vol sampler as an acceptable equivalent method in Oregon.

The PM_{10} High Volume Size Selective Inlet (HV-SSI) is a High Volume air sampler equipped with a Sierra-Anderson SA321A, SA321B or SA1200 PM_{10} cut-point inlet. This method has been designated by EPA as a reference method to be used to judge attainment with the NAAQS. Sampling occurs every 6th day.

Figure 4.13.1-1: Grants Pass Total Suspended Particulate



The High Volume air sampler collects samples of Total Suspended Particulate (TSP). The method uses pre-weighed 8" X 10" filters through which air is drawn at 50 CFM over a 24 hour period. Because these samplers are not equipped with a size selective inlet, the upper limit of particle size captured on the filter may reach 100 μ. Prior to EPA's adoption of the PM_{10} NAAQS, this method was the standard reference method for measurement of airborne particulate matter at the Josephine County Courthouse.

Sampling for total suspended particulate (TSP) had been conducted at the Josephine County Courthouse since 1969. PM_{10} sampling has been conducted at both the Courthouse and 11th & K sites. Table 4.13.1-1 lists the data collection period for each measurement method at these two sites.

Table 4.13.1-1: Data Collection Periods by Method Courthouse and 11th & K

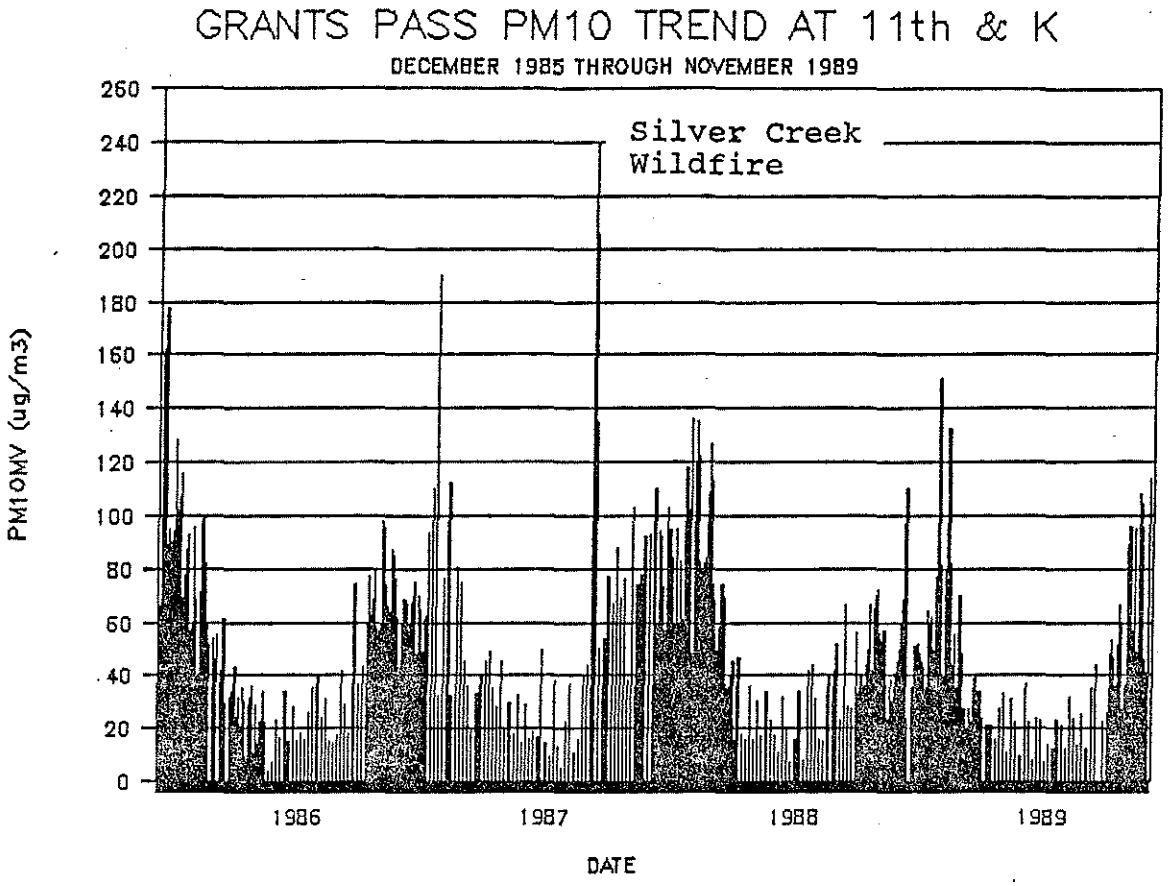
Measurement Method	Began	Terminated
Courthouse		
PM_{10} Medium-Vol.(MV) *	Dec. 1985	Mar. 1986
High-Volume TSP (TSP)	Nov. 1969	Oct. 1987
11th & K Streets		
PM_{10} High-Vol. SSI (SA321B & SA1200 inlets)	Dec. 1985 Sept. 1987	Apr. 1988 (SA321B) Sept. 1989 (SA1200)
PM_{10} Medium-Vol. (MV) *	Dec. 1985	Current
High-Volume TSP (TSP)	Dec. 1985	Jan. 1987

* Both Teflon and Quartz filter substrate are used.

4.13.1.2 PM_{10} Air Quality in Grants Pass

Figure 4.13.1-2 illustrates the seasonal variations in PM_{10} concentrations in Grants Pass. In general the highest 24-hour concentrations occur during the winter space heating season when PM_{10} concentrations have reached levels as high as 208 $\mu g/m^3$ (measured by a High-Volume sampler, January 1987). Peak 24-hour concentrations decrease dramatically during the spring months and reach a low of about 20 to 40 $\mu g/m^3$ during the summer months. Concentrations then rise again in the fall months as woodstove use increases and atmospheric dispersion decreases.

Figure 4.13.1-2: Seasonal Variation in PM_{10} Concentrations



Note: The PM10 trend shown above depicts actual Medium-Volume sampler concentrations, or measurements by other particulate sampling instruments that have been adjusted by formula to equivalent Medium-Volume concentrations. Hence, the previously mentioned January 1987 concentration of 208 $\mu g/m^3$ is roughly equivalent to 190 $\mu g/m^3$, because the High-Volume SSI samplers were determined to measure approximately 10% to 12% higher than the Medium-Volume samplers (refer to Appendix 4).

Review of PM_{10} Concentrations

The maximum and second highest daily concentrations of PM_{10} measured in 1985 through 1989 are summarized in the following table.

Table 4.13.1-2: PM_{10} Maximum Concentrations, 24 Hour Averages

Josephine County Courthouse			11th & K		
	ug/m3			ug/m3	
Year	Max.	2nd High	Year	Max.	2nd High
1985	217	181	1985	200	183
1986	91	79	1986	148	104
			1987	268	230
			1988	136	135

The above listed, relatively high concentrations of PM_{10} for 1987 were measured in early September 1987 and were attributable to the Silver Creek forest fire. Wildfires, such as the Silver Creek fire, are considered to be exceptional events that do not affect the development of plans to meet ambient air quality standards. A complete summary of the PM_{10} monitoring data from 1985 to 1988 is contained in Appendix 3.

Background Air Quality

PM_{10} aerosols from sources external to the UGB collectively contribute to background air quality, which constitutes a portion of locally measured PM_{10}. Sources such as wildfires, slash, agricultural and open burning, wind entrained soil, and secondary aerosols are believed to be the principal contributors to background air quality. PM_{10} concentrations at the Dodge Road site, which is in Sams Valley approximately 18 miles to the southeast of Grants Pass, are considered to be indicative of background concentrations in the Grants Pass urbanized area. Based on the Dodge Road site measurements, the 24-hour background concentration for worst case winter days is estimated to be approximately 44 $\mu g/m^3$.

Aerosol Chemistry

Chemically, Grants Pass winter-season PM_{10} aerosol is principally composed of organic carbon (34%), elemental carbon or soot (0.5%), crustal elements (5%), other trace elements (2%) and secondary sulfate and nitrates (3%). The balance is associated oxygen, hydrogen, water and ammonium. While the winter season aerosol is chemically very similar to the composition of woodsmoke with small amounts of soil elements, the composition of the aerosol during the summer months is quite different and is largely composed of crustal elements (Al, Si, Ca and Fe). Lead concentrations are very low, averaging 0.1 $\mu g/m^3$, 24-hour

average. The aerosol composition for either the summer season or winter cannot be used to directly infer source contributions.

4.13.2 Nonattainment Area Analysis

This section describes the Department's analysis of PM_{10} air quality in Grants Pass as it relates to the National Ambient Air Quality Standards. Source contributions to the airshed's PM_{10} air quality are discussed both in terms of emission strengths and source contributions to air quality as measured at the 11th & K site.

4.13.2.1 Design Values Determination

Attainment of the NAAQS for PM_{10} requires that annual average concentrations not exceed the annual standard of 50 $\mu g/m^3$ and that the expected number of exceedances of the daily standard must be less than or equal to one per year, averaged over a three-year period. Once an area has been identified as exceeding either standard, a PM_{10} design value must be based on concentrations measured during the baseline period. The design value can be used to determine the emission reductions needed to meet the NAAQS. Relative to the daily standard, the 24-hour design value is roughly comparable to the fourth highest measured PM_{10} concentration for the latest three full years of PM_{10} monitoring data. The annual design value is determined by computing the arithmetic average of the latest three full years of data. If the 24-hour design value requires a greater degree of control than the annual design value (as is the case in Grants Pass), then the 24-hour NAAQS becomes the controlling standard for purposes of SIP control strategy development.

The <u>EPA PM_{10} SIP Development Guidelines</u> specify that the preferred approach for estimating a design value is through the use of an applicable dispersion model corroborated by receptor models.[6] If there is no applicable dispersion model and at least one complete year of PM_{10} data is available, then the PM_{10} data should be used to estimate the design value. Because the absence of an adequate meteorological data base prohibits dispersion modeling in Grants Pass, the methodology used by the Department focuses on evaluation of the ambient PM_{10} concentrations. EPA specifies that the annual design value should be calculated as the arithmetic average of 3 years of PM_{10} monitoring data and that the 24-hour design concentration should be estimated using the empirical frequency distribution of at least three years of data. In the event that a full three years of monitoring data are not available, a table look-up procedure is specified. Both of these

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[6] <u>PM_{10} SIP Development Guidelines</u>. US Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, N.C. June, 1987. EPA-450/2-86-001.

procedures have been applied to the Grants Pass data and are described in Appendix 4.

Determination of Annual Design Value

Based on the analysis described in Appendix 4 and summarized below, the Annual Design Value PM_{10} concentration is 42 ug/m3. This calculated concentration indicates that Grants Pass is in compliance with the annual NAAQS of 50 ug/m3.

Determination of the 24-Hour Design Value

For Grants Pass the 24-Hour PM_{10} Design Value is 171 $\mu g/m^3$. This peak-day PM_{10} concentration, calculated for the baseline period, indicates that Grants Pass is not in compliance with the 24-Hour NAAQS of 150 $\mu g/m^3$. This is the starting point for determining the strategy needed to attain the standard in 1992. A description of the method used to calculate this value is also found in Appendix 4.

Table 4.13.2-1: Design Values Summary

Averaging Time	Method	Design Value
24 Hour	Graphical Procedure	171 $\mu g/m^3$
Annual	Quarterly Averaging	42

Once the 24-Hour and Annual design values have been determined, they must both be adjusted for emission changes due to growth and control strategies likely to occur by 1992, the year in which attainment must be demonstrated.

4.13.2.2 Emission Inventory

Introduction

Emission inventories provide useful information on the relative strength of sources within an airshed and provide a basis for control strategy evaluations. In addition, emission inventories provide a basis for tracking emission reductions and growth within an airshed. They cannot, however, estimate with certainty the impact of a source, or group of sources, at a specific location. Atmospheric dispersion caused by wind movements within the airshed and transport of pollutants into the airshed from exterior sources (i.e., wildfires, slash burning smoke and secondary aerosols) must be considered.

PM_{10} emissions (usually expressed in tons of particulate per year or TPY) are calculated from emission factors and source activity records. Emission factors are the weight of pollutant

emitted per unit of material processed such as grams of PM_{10} emitted per pound of cordwood burned; pounds of road dust emitted per vehicle mile driven or pounds of particulate emitted per unit area of plywood veneer processed. Emission factors used in this analysis are principally from the Environmental Protection Agency's compilation of emission factors AP-42.[7]

Information on activities which result in air contaminant emissions, such as the amount of cordwood burned by residents, vehicle miles driven, or veneer production volumes are obtained from a variety of sources. This includes industrial air contaminant discharge permit reports, mail surveys of the public, and data gathered from other government agencies.

Estimation of seasonal or worst-case day PM_{10} emissions requires development of a source operating schedule which describes the percent of annual emissions that occur during specific seasons, months, or 24-hour periods.

Base Year Emission Inventory

PM_{10} emissions for the 1986 base year within the Urban Growth Boundary (UGB) were estimated for industrial sources, residential heating (gas, oil and wood), commercial space heating, residential open burning, burning for agriculture and forestry, paved and unpaved roads, construction and agricultural dust and transportation sources (cars, trucks, railroads and aircraft). The basis of the emission estimates for the most significant sources are described below:

Industrial Sources: 469 TPY PM_{10}. These emissions are principally from the wood products industry, mainly wood-fired boilers and veneer dryers.

Residential Wood Heating: 373 TPY PM_{10}. Information obtained from the Department's 1987 wood heating survey[8] in Medford was combined with locally based population estimates to project emissions from woodheating appliances in the Grants Pass UGB. (Medford woodheating characteristics are considered to be representative of Grants Pass, since Grants Pass is only 29 miles to the west of Medford.) Approximately 11,012 housing units (1986 estimate) were located within the UGB, and

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[7] Compilation of Emission Factors, U.S. Environmental Protection Agency AP-42 Fourth Edition and subsequent supplements. US EPA Office of Air Quality Planning and Standards. Research Triangle Park, N.C. 27711.

[8] Oregon Woodheating Survey for 1987: Medford Area. State of Oregon Department of Environmental Quality, Air Quality Division. February, 1987.

approximately 5,950 housing units used wood burning devices. Approximately 66% of the devices were woodstoves while the remainder were fireplaces. The survey indicated that, on average, residents burn 2.7 cords/year of firewood in their woodstoves and 1.2 cords/year in fireplaces. At 40 pounds of PM_{10} emitted per ton of wood burned in a woodstove, 323 tons of PM_{10} are emitted per year. Fireplace emissions at 27 pounds per ton of wood burned total 50 TPY. About 12% of the woodstoves are DEQ-certified models.

Fugitive Dust Emissions: 206 TPY PM_{10}. The principal sources of dust within the UGB are paved and unpaved road dust (143 and 37 TPY, respectively). These figures are calculated from a 1986 estimate of 613,922 vehicles miles per day and a calculated PM_{10}/TSP ratio of 23.7%. The ratio is based on Department studies conducted for the compilation of base year emission inventories for the state Group I PM_{10} areas (refer to the memorandum in Appendix 5). There are also 158 miles of unpaved roads within the UGB.

Transportation Sources: 134 TPY PM_{10}. Highway vehicles (autos and trucks) emit 130 TPY PM_{10} in tailpipe and tire wear particulate; off highway vehicles 3 TPY and railroad diesel engines 1 TPY.

Other Sources: 14 TPY PM_{10}. Residential and Commercial space heating with fuels other than wood contribute 6 TPY. Approximately 354 tons of backyard debris is burned each year generating 1 TPY of PM_{10}. About an equal amount is generated from solid waste incineration on-site at industrial facilities. There is no significant agricultural burning conducted within the UGB. Structural Fires contribute 6 TPY.

Table 4.13.2-2 summarizes annual PM_{10} emissions within the UGB for 1986 and Table 4.13.2-3 summarizes the 24-hour worst case emissions for 1986. Figure 4.13.2-1 illustrates the percent contribution from each major source group for both annual and 24-hour worst case periods.

Table 4.13.2-2: Grants Pass UGB Annual Emission Inventory for 1986

Source	Tons/Year PM_{10}	Percent
Industry	469	39 %
Residential Wood Burning	373	31
Fugitive Dust	206	17
Transportation	134	11
Other Sources	16	2
Totals	1198	100 %

24-Hour Worst Case Inventory

Development of an inventory representative of emissions during a 24 hour period when PM_{10} ambient air concentrations reach their highest levels is important to understanding the sources that cause winter season, high PM_{10} episodes in Grants Pass. The relative proportion of emissions during these periods is expected to be quite different than those reflected in the annual emission inventory, because some sources (such as open burning) are not as active, while others (such as residential wood heating) are much more active.

The 24-hour worst case inventory for the UGB is based on the following information and assumptions:

Industrial Source emissions were factored to 24-hour values on the basis of the respective ratios from the operating permits of 24-hour PSEL's to the annual PSEL's. The 24-hour PSEL's incorporate shift capacity estimates. To reflect maximum production, the plants were assumed to be operating 350 days per year.

Transportation Source emissions are assumed to be constant throughout the year. The worst case day inventory therefore assumes that 1/365 of the annual emissions from this source occurs during the period.

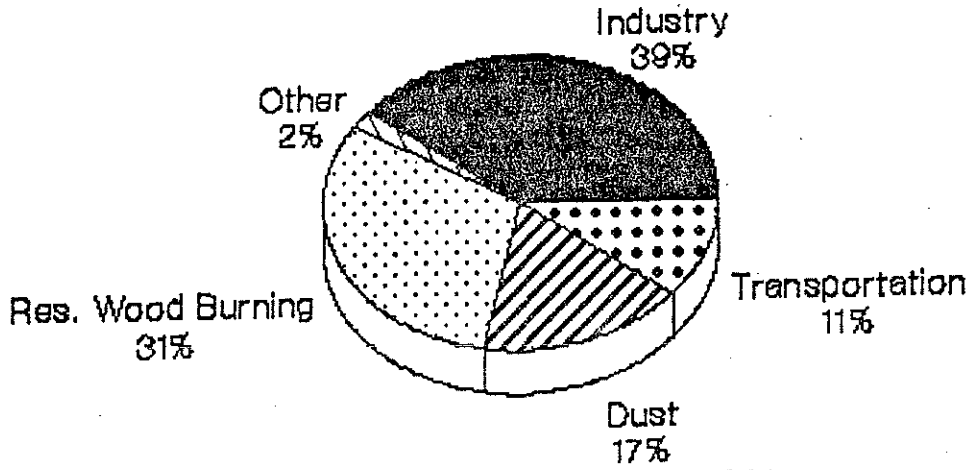
Residential Wood Burning emissions are assumed to be proportional to the coolness of the weather as reflected in the degree heating days statistic calculated by the Department using maximum and minimum temperatures recorded in Grants Pass and reported by the National Weather Service. The highest winter time PM_{10} concentration recorded in Grants Pass through the end of 1988 was 190 ug/m3 (January 21, 1987). The heating degrees for this day (29.0) was used to determine a worst case emission rate.

Table 4.13.2-3: 24-Hour Worst Case 1986 Emission Inventory

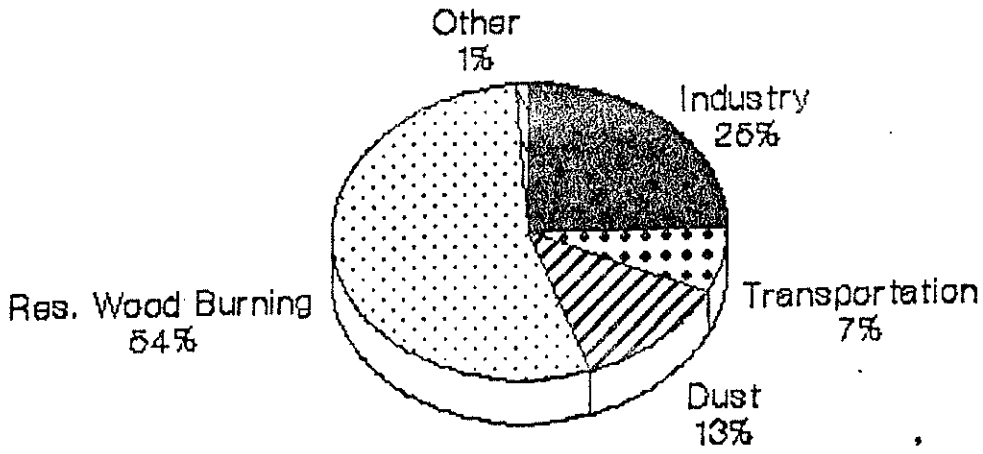
Source	Pounds/Day PM_{10}	Percent
Wood Products Industry	2600	25 %
Residential Wood Burning	5732	54
Fugitive Dust	1346	13
Transportation	774	7
Other Sources	99	2
Totals	10551	100 %

Appendix 5 provides a more detailed summary of the annual and worst case day emission inventory for Grants Pass in 1986.

Figure 4.13.2-1: Grants Pass PM10 Emission Inventories



ANNUAL INVENTORY FOR 1988



24-HR WORST CASE INVENTORY FOR 1988

Growth Factors

PM_{10} emission growth factors were used to estimate future year emission inventories. The primary growth indicator that affects the major area source categories is the population growth rate. For transportation sources, the rate of growth in vehicle miles of travel (VMT) is the primary indicator.

To estimate the industrial component of emission growth, it was assumed that the affected wood products mills will be operating at the Plant Site Emission Limits (PSEL) allowed under the revised Industrial Rules discussed in Section 4.13.3. Furthermore, any major new industrial facilities would be required to secure offsets. Based on these considerations, the emissions for the Wood Products Industry in 1992 could increase for the annual and worst case day by approximately 4 percent over the 1986 level. However, this is not the case, because of the permanent shutdown of a major industrial wood products complex.

The selection of a growth factor for population for the period from 1986 to 1992 was complicated by the fact that actual population growth in the Grants Pass urbanized area during the mid to late 1980's has been lower than the rates that were officially forecast for the Comprehensive Plan. The original forecast expected that population would grow at a rate of approximately 2.4% per year to 1990 and then accelerate to approximately 5.0% per year for the period from 1990 to 1995, based on the upper end of the year 2000 forecasting range for the Urban Growth Boundary (UGB) of 36,000 to 44,800. The actual growth rate between 1984 and 1986 was approximately 1% per year.

With the need for a more realistic population forecast to carry out the planning work for the Grants Pass Carbon Monoxide (CO) section of the State Implementation Plan (Section 4.11), the City of Grants Pass officially revised the 1990 population forecast to 29,742. This had the effect of lowering the original growth rate forecast to a level of 1.7% per year. The sewage treatment Facility Plan (dated 1985) for Grants Pass is predicated on a year 2000 UGB population forecast of 35,300. Use of the 1990 CO SIP population figure and 35,300 for 2000 results in an annual growth rate (compounded) of 1.7%.

Therefore, to project 1992 and 2000 emissions, a growth rate of 1.7% was assumed between 1990 and 2000 for both population and vehicle miles of travel.

Woodburning for woodstoves is expected to increase by 1% per year (6% total) by the year 1992 as a result of an increased amount of firewood burned. At the same time, firewood use in fireplaces is expected to decline by 2% per year. The one percent growth rate for woodstoves, which is lower than the population growth rate, is based on energy projections and fuel cost modeling performed to estimate future woodburning emission growth in the

Pacific Northwest.[9] These projections do not account for emission reductions that will occur as a result of woodstove certification programs, as these reductions are explicitly accounted for in the Section 4.13.3.2, Evaluation of Potential Control Measures.

Projected Emissions in 1992

PM_{10} emissions were projected for the 1992 attainment year. The emissions projections are based on the foregoing growth factors. Table 4.13.2-4 shows both the annual and worst case day PM_{10} emissions for 1992. The Industry category shows lower emissions for 1992 than for 1986 due to the shutdown and subsequent dismantling of the Southern Oregon Plywood mill, which occurred in 1988.

Table 4.13.2-4: Projected 1992 Emission Inventory (No Controls)

Source	--Annual-- Tons	%	-24-Hr Worst Case- Pounds	%
Industry	376	32	2086	20
Residential Wood Burning	386	33	5938	57
Fugitive Dust	230	20	1500	14
Transportation	149	13	864	8
Other Sources	17	2	111	1
Totals	1158		10499	

Projected Emissions Beyond 1992

Analysis of the ability to maintain compliance with the NAAQS during the period 1992 to the year 2000 requires development of a third set of emission estimates. For this maintenance analysis the 1992 inventory must be adjusted to reflect the reductions which are expected to be achieved by the attainment strategy. The growth rates used for the period 1992 to 2000 are [projected to be different from those of the preceding years and their effect on emissions is] described below:

- Population growth rate of 1.7% per year applied to residential oil, gas and wood combustion emissions; solid waste incineration emissions and structural fires;

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[9] U.S. Environmental Protection Agency, Region X, "Residential Wood Combustion Study, Task 3, Fuel Wood Use Projections", EPA 910/9-82-089 (1984).

- Transportation growth rate of 1.7% per year applied to transportation sources and paved, unpaved and construction dust;

- Industrial emissions are held constant at the annual and 24 hour PSEL emission rates shown in the 1992 emission inventory;

The projected residential wood combustion emissions, following application of a 1.7% per year growth rate, were adjusted to reflect emission reduction credits associated with the woodstove certification program resulting in a 7% decline in emissions.

Projected Annual emissions for 1992 before and after implementation of the control strategy, growth factors and estimated Annual emissions for the year 2000 are summarized in Table 4.13.2-5. The 24 Hour Worst Case projected emissions are summarized in Table 4.13.2-6.

Table 4.13.2-5: Projected Annual Emission Inventory for the Year 2000

Source	1992 Before Control (Tons)	1992 After Control* (Tons)	1992-2000 Growth	2000 (Tons)
Industry	376	169	0 %	169
Residential Wood Burning	386	351	-7 %	325
Fugitive Dust	230	230	14 %	263
Transportation	149	149	14 %	169
Other Sources	17	17	14 %	19
Totals	1158	916		945

* See Section 4.13.3.3 for discussion of emission reductions

Table 4.13.2-6: Projected 24 Hour Emission Inventory for the Year 2000

Source	1992 Before Control (lbs)	1992 After Control* (lbs)	1992-2000 Growth	2000 (lbs)
Industry	2086	939	0 %	939
Residential Wood Burning	5939	3851	- 7 %	3578
Fugitive Dust	1500	1500	14 %	1707
Transportation	864	864	14 %	984
Other Sources	111	111	14 %	126
Totals	10499	7265		7334

* See Section 4.13.3.3 for discussion of emission reductions

Comparison of these Tables to Tables 4.13.2-2 and Table 4.13.2-3 shows that the projected total Annual emissions for the year 2000 are reduced from 1986 levels by 253 tons per year and by 3217 pounds per day on the worst case day. Although on an annual basis Dust, Transportation and Other Sources increase, the effect of the Industrial Controls and woodstove certification is a net decrease in total airshed emissions. On the worst case winter day Industrial emissions are still reduced but the most significant reduction occurs in Wood Burning emissions due to the implementation of voluntary curtailment and the other wood smoke control elements.

4.13.2.3 Source Contributions by Receptor Modeling

Introduction

The Environmental Protection Agency PM_{10} SIP Development Guidelines Section 4.4 describes procedures to be used by the states for using receptor models to estimate source contributions to PM_{10} concentrations. These guidelines support the use of receptor models as an important element of the SIP strategy development process. In cases such as Grants Pass, where dispersion modeling cannot be applied because of the absence of meteorological data, receptor modeling (specifically, Chemical Mass Balance or CMB) has been recommended. The specific application of the CMB Receptor Model to PM_{10} source apportionment in Oregon's Group 1 areas is described elsewhere.[10]

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[10] PM_{10} Receptor Modeling for Oregon's Group I Areas: Medford, Grants Pass and Klamath Falls. State of Oregon Department of Environmental Quality, Air Quality Division. March, 1989.

Chemical Mass Balance (CMB) is a mathematical/statistical form of receptor modeling which is based upon regression analysis of aerosol chemistry features. The CMB model does not provide an exact solution to the source apportionment problem but instead attempts to find the most likely combination of source contribution estimates (SCE's). This is done by minimizing the difference, or variance, between the measured and model-predicted concentration of aerosol features. Values for the ambient aerosol matrix are obtained through chemical analysis of PM_{10} filters taken at the 11th & K Streets site, while the source "fingerprint" values are obtained through representative analysis of stack emissions. The CMB modeling protocol applied follows EPA guidance.[11] All of the CMB modeling has been conducted using EPA's Version 6.0 CMB program.[12]

Ambient Aerosol & Source Emission Analysis

Nine PM_{10} samples collected between December 7, 1987 and February 10, 1989, were selected for analysis. These samples are composed of the highest concentrations during this two month winter period that were at least 100 ug/m3. Only one 24 hour sample has exceeded the NAAQS of 150 $\mu g/m^3$ since the end of the Silver Creek wildfire episode in early September 1987. Chemical characterization of the samples includes 19 trace elements analyzed by x-ray fluorescence, 3 inorganic anions, and elemental/organic carbon, providing a data set that is compatible with the source emission profiles. Analytical uncertainties for each of the values are routinely reported and included in the CMB calculations.

PM_{10} source profiles (listed in Table 4.13.2-7) representing all major emission groups within the airshed were used in the modeling. All of the profiles were obtained from the Pacific Northwest Source Profile Project.[13] A list of the sources included in the analysis is presented below:

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[11] Protocol for Reconciling Differences Among Receptor and Dispersion Models. US EPA 450/4-87-008. March, 1987.

[12] Receptor Model Technical Series, Volume III (Revised): CMB User's Manual (Version 6.0) US EPA 450/4-83-014R. May, 1987.

[13] Pacific Northwest Source Profile Library Project, Final Report Prepared by the State of Oregon Department of Environmental Quality, Air Quality Division, J. Core, Ed. September, 1989.

Table 4.13.2-7: Source Profile Names

No.	Acronym	Description
1	GPSOIL	Resuspended soil dust from Grants Pass
2	SLASH	Forestry slash broadcast burning (Also may be vegetative burning such as yard debris.)
3	RWC MED	Residential wood combustion profile for Medford
4	LD AUTO	Light duty autos (leaded gasoline)
5	HOGFUEL	Boiler burning plywood trim in the fuel
6	WOOD	Wood Fiber including sander dust
7	HDDIESEL	Diesel Exhaust (Fed. Test Cycle)
8	SECSO4	Secondary Sulfate estimated as ammonium sulfate
9	SECNO3	Secondary Nitrate estimated as ammonium nitrate
10	SECNH4	Secondary Ammonium ion
11	CONST	Construction Dust - Medford Aerosol Study
12	VENEER	Steam heated veneer drier emissions

Receptor Model Source Contribution Estimates

Table 4.13.2-8 is a summary of the average source contributions obtained for the nine worst case winter days that were modeled. Average PM_{10} concentration for these samples was 120 $\mu g/m^3$.

Table 4.13.2-8: Average Winter Worst Case Day Source Contributions

Source	PM_{10}	$\%PM_{10}$
Wood Smoke	82.1 $\mu g/m^3$	68.2 %
Industry	10.2	8.5
Soil Dust	17.2	14.3
Transportation	0.2	0.2
Sec. Aerosol	2.5	2.1
Others	8.1	6.7
Total PM_{10}	120 $\mu g/m^3$	

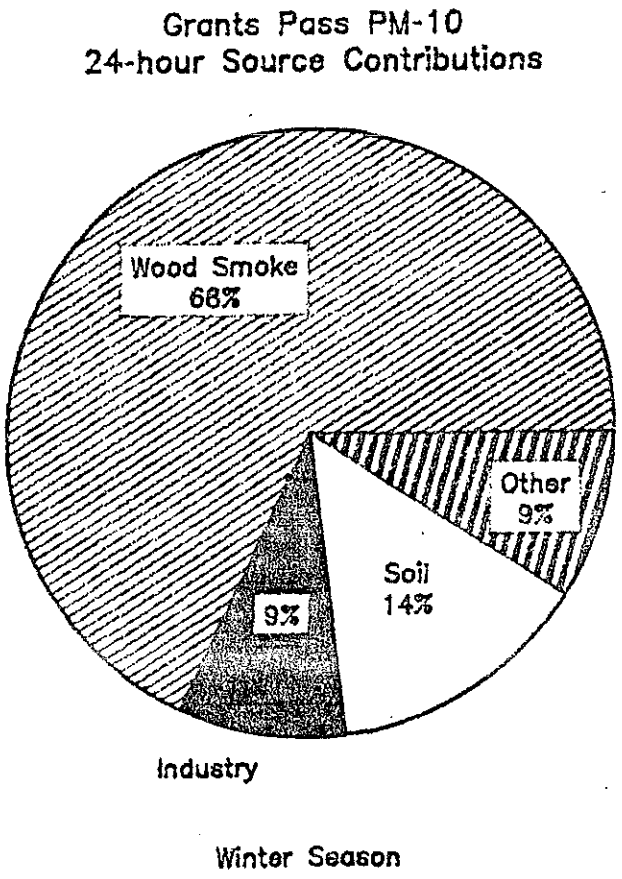
Because of the similarities between source fingerprints for residential wood combustion and veneer driers the apportionment of these two sources cannot be done with CMB alone. The contribution of veneer driers was estimated by applying the 1986 estimated emission rate ratio of Veneer Drier to Hog Fuel Boilers (1,044 lb/day / 760 lb/day) to the HOGFUEL aerosol percentage (3.9 %) which was determined by CMB. Veneer Driers and Hog Fuel Boilers were summed to give the Industrial contribution. The Wood Smoke contribution was then reduced by the percent going to Veneer Driers. Average source contribution uncertainties

(relative percent of mass) vary from 18% for wood smoke, to 11% for hog fuel boilers and 8% for soil dust.

Receptor modeling of these samples collected on high winter days shows that residential wood smoke is the major source of PM_{10}. Of the nine days that were analyzed, the wood smoke contribution ranged from 41% to 98% of the PM_{10} mass. The emissions ratio method of estimating the veneer drier component yields an upper bound estimated industrial source impact of 16%.

Over ninety percent of the aerosol is accounted for in this analysis. The remainder of the PM_{10} includes water associated with the aerosol, contributions from minor sources, and the uncertainty in the apportionment method. Figure 4.13.2-2 illustrates the source contribution estimates determined by the CMB analysis.

Figure 4.13.2-2: Grants Pass PM_{10} Source Contributions by Aerosol Chemistry



Background PM_{10} Air Quality

Receptor modeling of local PM_{10} cannot, however, distinguish between particulate which has been generated within the airshed and particulate which has been transported into the airshed. The control of this "locally" generated particulate requires determination of the local source contributions, which means subtraction of the background contribution. Annual and 24-Hour average background PM_{10} being transported into the Grants Pass UGB is estimated from measurements made at a site in Sam's Valley (Dodge Road). This site is located approximately 18 miles to the northeast of Grants Pass, and the monitored levels are expected to be representative of general background conditions for southwest Oregon. Analysis of the Dodge Road site data indicates that peak day and average PM_{10} concentrations are 44 $\mu g/m^3$ and 15 $\mu g/m^3$, respectively.

Chemical Mass Balance analysis of the sources contributing to this background particulate is needed to be able to subtract the appropriate background value in each source category. Table 4.13.2-9 shows the background source contributions for both Annual and 24-Hour average PM_{10}.

Table 4.13.2-9: Background PM_{10} Source Contributions

Source	Annual Average	24-Hr Average Worst Case
Industry	0.7 $\mu g/m^3$	3.0 $\mu g/m^3$
Wood Smoke	7.1	31.6
Soil Dust	4.6	2.3
Transportation	---	---
Sec. Aerosol	1.4	4.8
Others	1.0	2.3
Total	14.8	44.0

Estimation of "Local" Air Quality Impacts

Estimation of the impact of emission sources within the UGB requires that the background components listed in Table 4.13.2-9 be subtracted from the comparable source contributions listed in Table 4.13.2-8. This difference is presented in Table 4.13.2-10 which lists the "local" source contribution estimates to PM_{10} on average worst case winter days. For comparison the source contributions as determined from the 1986 emission inventory are also shown.

Table 4.13.2-10: Average Worst Case Day "Local" Source PM_{10} Contributions

Source	Receptor Modeling $\mu g/m^3$	Receptor Modeling %	Emission Inventory %
Industry	7.2	9	24
Wood Smoke	50.5	64	54
Soil Dust	14.9	19	13
Transportation	0.2	< 1	7
Sec. Aerosol	0.0	0	--
Others	5.8	7	2
Total	78.6		

The values shown in the last two columns demonstrate that qualitatively the emission inventory and receptor modeling analysis provide roughly comparable results with respect to the contribution of Wood Smoke. Both methods indicate secondary contributions from Industrial and Dust sources. The wood products industry contributions, as estimated by emission inventory, are significantly higher than that estimated by receptor modeling, most likely because dispersion of the emissions are not being considered. Transportation emissions are also higher by the inventory method than indicated by receptor modeling, probably for the same reason. In order to take into account the differences in source contribution estimates, the control strategy analysis was conducted in two ways: 1) rollback was applied to the individual source categories based on the emission inventory relative source strength; 2) rollback was applied to the individual source categories based on the receptor modeling relative source strength.

4.13.3 Emission Reduction Analysis

This section describes the emission reductions necessary to attain the 24-hour PM_{10} standard (4.13.3.1); reviews potential control measures that could be applied in Grants Pass (4.13.3.2); and presents a technical assessment of the adequacy of the control measures to attain the standard within the time limits specified by Section 110(a) of the Clean Air Act (4.13.3.3).

4.13.3.1 Emission Reduction Necessary for Attainment

The EPA PM_{10} SIP Development Guidelines specify that a proportioning method, which separates out the individual source contributions, should be used to estimate the control strategy requirements of the SIP. In the analysis below, the contribution of emission sources to the 1992 design values have been apportioned based on the projected 1992 emission inventories

described in Section 4.13.2.2. The sum of the 1992 source impacts, plus background, provides the 1992 24-Hour worst case day design value.

Projected Source Impacts in Future Years

Table 4.13.3-1 lists 1992 source contribution estimates for the 24-hour worst case scenario. Source contributions at the 1992 design value were apportioned using the 1986 24-hour worst case day emission inventory percentages (see Table 4.13.2-9) applied to the "local" design value of 127 $\mu g/m^3$ (171 $\mu g/m^3$ design value less the background of 44 $\mu g/m^3$).

Table 4.13.3-1: Projected Future Source Category Impacts (Emission Inventory)

Source	1986 Worst Day	"Local" Design ($\mu g/m^3$)	1986-92 Growth (%)	"Local" Design ($\mu g/m^3$)	1992 Worst Day
Wood Smoke	54%	69	6	73	57%
Industry*	24%	30	-20	24	19%
Fugitive Dust	13%	17	11	19	15%
Transportation	7%	9	12	10	8%
Other Sources	2%	2	12	2	1%
Subtotals		127		128 $\mu g/m^3$	
Background				44	
Total				172 $\mu g/m^3$	

* Industrial emissions decrease due to the closing of a major facility in September, 1988.

Air quality improvement needed = 22 $\mu g/m^3$ (172-150 $\mu g/m^3$) or a 17% (22/128) reduction in worst case day emissions. This is equivalent to 1785 pounds per day.

As a crosscheck on the adequacy of the proposed control strategies, a separate rollback calculation was done based on the source contributions determined from the receptor modeling analysis.

Table 4.13.3-2 lists the projected 1992 source category contributions based on the receptor modeling analysis. In this case the 1992 source category contributions were apportioned using the average worst case day percentages derived from Chemical Mass Balance. Again, the percentages are applied to the "local" design value of 127 $\mu g/m^3$.

Table 4.13.3-2: Projected Future Source Category Impacts (Receptor Modeling)

Source	1986 Worst Day	"Local" Design ($\mu g/m^3$)	1986-92 Growth (%)	"Local" Design ($\mu g/m^3$)	1992 Worst Day
Wood Smoke	64%	81	6	86	64%
Industry	9%	11	-20	9	7%
Fugitive Dust	19%	24	11	27	20%
Transportation	<1%	1	12	1	<1%
Other Sources	7%	9	12	10	8%
Subtotals		127		133 $\mu g/m^3$	
Background				44	
Total				177 $\mu g/m^3$	

Air quality improvement needed = 27 $\mu g/m^3$ (177-150 $\mu g/m^3$) or a 20% (27/133) reduction in worst case day concentration.

Both analyses lead to similar reduction requirements. The control strategy selected must be comprised of a mix of individual source reduction measures such that their sum is equal to, or greater than, the total reduction requirement. Adopted control strategies must be shown, through a demonstration of attainment (Section 4.13.3.3), to attain and maintain the NAAQS by reducing emissions such that the 24-Hour worst case PM_{10} concentrations are also reduced.

It should also be noted that since the 24-hour control strategy will reduce all worst case day PM_{10} levels it should result in a reduction in the annual average PM_{10} from the design value as well. Therefore, implementation of strategies to assure attainment of the 24-Hour standard will assure continued compliance with the annual NAAQS. The emission inventory trends described earlier provide confidence that this is true.

4.13.3.2 Evaluation of Potential Control Measures

A number of potential strategies could be used to achieve the required reduction in the 24-hour worst case day PM_{10} concentration. The Grants Pass City Council and the Josephine County Commissioners appointed a citizens committee in December 1987 to evaluate the particulate problem and recommend a strategy that would achieve the health standard consistent with the requirements of the Federal Clean Air Act. The Committee produced a report (Appendix 1) and presented its recommendations to a joint meeting of the City Council and the County Commission on May 21, 1988. The Committee considered a package of control

strategy alternatives, labeled Options A, B and C, which are summarized in Table 4.13.3-3.

Table 4.13.3-3: Potential Control Measures for Grants Pass Urban Growth Boundary

Option A
Firewood Seasoning Education
Voluntary Curtailment During Pollution Episodes (5-10 days/year)
Clean Air Utility Rates
Upgraded Industrial Controls

Option B
Firewood Seasoning Education
Mandatory Curtailment During Pollution Episodes (5-10 days/year)
Clean Air Utility Rates

Option C
Firewood Seasoning Education
Retrofit Subsidy for All Freestanding Stoves
Voluntary Curtailment During Pollution Episodes (5-10 days/year)
Clean Air Utility Rates

Clean Air Utility Rates and Firewood Seasoning Education were common to all three options. One of the main differences between Options A and B was voluntary curtailment versus mandatory curtailment. Also, Option A included upgraded industrial controls, whereas they were not included in Options B and C.

Discussion of Options A, B and C

Option A

The first element of this option consists of a voluntary curtailment program on woodstove and fireplace use that would be activated on an estimated 5 to 10 days during the winter. (Air monitoring data collected through November 1989 indicates that curtailment would be activated less frequently, approximately 3 to 4 days during the heating season.) The curtailment program would be set up to run locally, with assistance from the Department in providing forecasted air quality levels. Firewood seasoning education would be an informational program supported by DEQ materials and tools developed in other areas. Clean Air Utility Rates would be a program of reduced rates applied to baseline consumption levels that would be offered to the customers of utility companies serving the Grants Pass area. The reduced rate program would have to be approved by the Oregon Public Utility Commission. The combination of these measures was estimated to reduce PM_{10} emissions from residential wood combustion by as much as 45%.

The industrial component of this option would require upgraded pollution control equipment for veneer dryers and wood-fired boilers. The upgraded equipment for the boilers would be similar to what has been required in Medford. The upgraded industrial control equipment was estimated to provide an emissions reduction of 56% (refer to the Point Source spread sheets in Appendix 5).

Option B

The sole focus of control under this option would be residential wood combustion. Implementation of this program would require the adoption of local ordinances, including enforcement provisions to carry out a mandatory curtailment program. Again, curtailment would be required approximately 3 to 4 days per winter heating season. Mandatory curtailment was estimated to reduce wood heating emissions (PM_{10}) by approximately 65%--even if sole source heating and a few other exemptions were provided. (Note: Subsequent information developed by the Department indicates that mandatory curtailment could reduce emissions by 80 to 90%.)

Option C

This strategy would also focus on residential wood combustion. Voluntary curtailment would be the same as outlined under Option A. Under this option, existing, high emitting woodstove appliances would be replaced, or retrofitted. The local area would have the primary responsibility for developing funding to support this conversion program. The total cost of retrofits, or replacements is estimated to range between $1 million and $2 million, depending upon the mix of retrofits and replacements. Option C would reduce wood heating emissions by approximately 65%.

Evaluation of Options A, B and C

The three control options have different cost structures. Option A spreads the burden of control between the community (wood heating) and local industry. On a per participating household basis, the additional cost of a voluntary curtailment program would be approximately $2 to 4 for each day of curtailment. The per household cost varies according to the degree of weatherization, the size of the structure and the type of alternative heat. Upgraded industrial pollution control equipment is estimated to have a capital cost of $3 to 4 million.

Because of the much greater participation for a mandatory curtailment program, the overall cost of Option B for the wood heating households would be four times as much as for Option A. There would also be additional costs on local government for enforcement.

Option C costs would depend upon the mix of retrofits and stove replacements. A 100% retrofit program would cost approximately $1.0 million, while a 100% replacement program would cost approximately $2.0 million. The costs to individual households could be reduced through subsidies. Potential sources of subsidy funds could include: Community Development Block Grants (HUD), private foundation grants, state income tax credits, local property tax credits, industry or business contributions, city or county bond issues, state lottery funds, oil overcharge settlement funds, or increased wood cutting fees.

The Committee's deliberations on the options focused mostly on Option A. Given the relatively marginal nature of the PM_{10} problem in Grants Pass, Option B appeared to be too harsh and unpopular. It also would be uneven in its application with a sole focus on residential wood combustion. The major drawback of Option C was the perceived difficulty in securing the necessary funding. The short time frame for implementation also appeared to be a major problem. The Committee thought that an extension for meeting the standard would be needed to implement Option C.

PM_{10} Control Strategy Elements

The Committee recommended Option A as the basic framework for a PM_{10} control strategy in the Grants Pass area. Potential control strategy elements are described below. Emission reduction credits associated with each element are listed and discussed. A PM_{10} emission reduction credit is a measure of the reduction in PM_{10} emissions that would be accomplished through adoption and implementation of the program element. Section 4.13.3.3 demonstrates how the Committee's recommendation will assure attainment of the 24-Hour PM_{10} NAAQS.

Residential Woodsmoke Control Elements

There are two basic approaches to reducing woodsmoke from stoves and fireplaces: (1) improving the performance of the wood heating systems such as through a certified woodstove program; and (2) burning less wood through woodstove curtailment programs. Some strategies have multiple advantages. Certified woodstoves, for example, improve emission performance by reducing the amount of woodsmoke per cord of wood burned while improving energy efficiency, thus reducing the amount of wood burned. Other examples are well designed public information, energy conservation, or firewood seasoning programs that result in better combustion (lower emissions) and better energy efficiency (less fuel burned). The key elements of the residential wood smoke control program are described below.

Woodstove Certification Program

In 1983, the Oregon Legislature directed the Department to require that all new woodstoves sold in the state be certified through laboratory testing of prototypes for emissions and efficiency to assure compliance with established woodstove emission standards. As a result, stoves sold after July, 1986 were required to emit 50% less emissions than conventional woodstoves. After July 1988 new woodstoves were required to emit 70% less emissions.

Subsequent to the adoption of Oregon's emission standards, the Environmental Protection Agency adopted a slightly more restrictive national certification program which will become effective in July, 1990. In December, 1989, the Department began rule making to modify the Oregon Woodstove Certification Rules (OAR 340 Division 21) to assure consistency with EPA's national program. The modified rule is expected to be adopted by March, 1990.

In-home studies of first generation certified woodstoves have indicated that they actually reduce emissions by about 30%. Second generation certified woodstoves have been shown to reduce emissions by about 50%. This lesser than expected performance has to a large extent been due to durability problems with critical stove components. The majority of the stoves certified by the department and sold in Oregon have been second generation stoves.

Second generation catalytic stove designs have incorporated new advancements in combustor technology which in part accounts for the stoves increased effectiveness. First generation catalytic stoves, incorporate less effective catalytic elements which are currently reaching the end of there useful life. When replaced with new generation catalysts, the first generation catalytic stoves will provide effective emissions reductions approaching that of second generation stoves. These improved first generation stoves will make up in part the stove population in 1992.

Recent in-home studies have also shown that woodstove designs which met experimental durability criteria have demonstrated emission reductions averaging 79%. Durability criteria are those design features, and methods of construction which will help ensure that the initial emission performance achieved by a stove is maintained over it's usable life. Some of these units will also make up the woodstove population in 1992.

Additionally, sales of pellet stoves in non-attainment areas, as well as state wide are reported to have significantly increased and are expected to accelerate in the foreseeable future. Pellet stoves are expected to provide a 90% reduction in emissions in the home and are expected to become a significant segment of the woodstove population in non-attainment areas where they have

typically been exempted from curtailment programs. Considering the above factors, the Department is using a conservative 50% emission reduction credit overall for the stove population of 1992.

Basis for Woodstove [10%] Certification Program Credit

As noted in Section 4.13.2.2 on Growth Factors, firewood use is projected to increase by 1% per year over 6 years for woodstoves and decrease by 2% per year for fireplaces. This is the basis of the growth factor used in calculating projected 1992 wood smoke emissions. Therefore, in the absence of any certification program, woodstove emissions would increase by:

1% per year x 6 years = + 6%

With respect to the replacement of stoves, a conservative estimate of the average useful life of woodstoves is 20 years. Therefore, approximately 5% of the stove population will replaced each year.

Building permit authorities in other areas of the state indicate that about 90% of permitted installations are certified stoves. Therefore, if ten percent of the new woodstoves installed are non-certified (i.e., there are no restrictions on the installation of used non-certified woodstoves) and the typical certified woodstove emits 50 % of that emitted from a conventional stove, then 1992 woodstove emissions can be expressed in terms of 1986 woodstove emissions as follows:

$$WS92 = [.06][BL86WS][(0.90)(0.5) + (0.10)(1.0)] + (6\ Yrs)(0.05/Yr)(BL86WS)[(0.90)(0.5) + (0.10)(1.0)] + (BL86WS)[1.0 - (6\ Yrs)(0.05/Yr)]$$

$$= (0.033)(BL86WS) + (0.165)(BL86WS) + (0.70)(BL86WS)$$

$$= (0.898)(BL86WS)$$

Where WS92 = 1992 Woodstove Emissions and

BL86WS = 1986 Baseline Woodstove Emissions

Therefore, the woodstove certification program provides a 10.2% credit ((1. - 0.898) x 100) against the Baseline 1986 woodstove emissions by 1992.

A similar projection was made for determining the effect of the certification program to 2000. The year 2000 woodstove emissions were expressed in terms of a 1992 baseline (refer to calculations in Appendix 5). The certification program results in a 10.3% reduction, or approximately 1% per year after taking into consideration 1.7% annual growth.

Public Information Programs

A comprehensive, professional, and well-financed public information program is essential for public cooperation and support in reducing woodsmoke emissions. The program should describe clearly the need for the public's cooperation, the health-safety-energy-economic benefits to individuals and the community, and precisely what individuals can do to help. Key elements include: home weatherization, firewood seasoning, cleaner burning practices, proper stove installation and sizing, maintenance of woodburning systems and most importantly curtailment of woodburning during poor ventilation episodes. Although no emission reduction credits are taken for the public information program, it is critical to the success of all of the other woodsmoke reduction elements.

EPA's Guidance Document for Residential Wood Combustion Emission Control Measures recognizes public education programs as an essential element of any residential wood burning control strategy. Although EPA recognizes public education programs as an essential element of wood burning control programs, no emission reduction credits can be assigned to the program without further technical justification.[14]

Curtailment During Poor Ventilation Episodes

Woodburning curtailment forecasts can be made twice daily, or whenever PM_{10} air quality levels, as measured by an integrating nephelometer, are forecast to exceed a 24 hour average NAAQS. The advisory is generally based on National Weather Service upper air and barometric pressure data, forecasts of synoptic meteorology, surface temperatures, and wind speed/direction. Nephelometer measurements of hourly light scattering and local observations of air quality conditions are also used.

Woodburning curtailment advisories are generally issued at three levels:

> "Green" advisories are issued for periods during which NAAQS violations are unlikely. Woodburning is unrestricted during these periods but the public is asked to follow good woodburning practices.
>
> "Yellow" advisories are issued for periods approaching exceedence of the NAAQS. The public is asked to curtail all unnecessary woodburning, excepting only pellet stoves, certified woodstoves, and those people that use wood as their sole source of heat.

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[14] US EPA, "Guidance Document for Residential Wood Combustion Emission Control Measures," EPA-450/2-89-015 (1989).

"Red" advisories are issued for periods of severely restricted ventilation during which PM_{10} levels are expected to exceed the NAAQS. Only households in which woodburning is the sole source of heat are permitted to burn during these periods.

Compliance with the advisories can be determined through evening surveys of woodburning activity during "Green", "Yellow" and "Red" curtailment periods using infrared cameras. Data from the surveys is used to direct the public education program, evaluate progress toward achieving program goals, and in evaluating trends in PM_{10} concentrations.

Basis for Woodburning Curtailment Credits (Worst Case Day)

Over the past several heating seasons a number of woodburning communities in Oregon, and other western states, have instituted voluntary woodburning curtailment programs as a means of reducing wood heating emissions. Nearby Medford, Oregon has reported 25% compliance per year for the past 4 years. Klamath Falls, Oregon reported 14% compliance in its first year of voluntary curtailment and 27% in its second year. Missoula, Montana has reported 30% compliance. The goal of the Grants Pass Woodburning Advisory Program is to reduce wood use by 25% on the 1 - 10 days per year on which violations of the PM_{10} health standard would be expected. The goal is to be achieved by the end of the second year of the program. Compliance with the advisory will be based on field surveys. A credit of 25% is justified based on the experience of other communities and Grants Pass' commitment to achieve the National Ambient Air Quality Standards.

Industrial Control Elements

In September, 1988 the Environmental Quality Commission adopted changes to the Industrial Rules (OAR 340-30-005 to 067) specific to Grants Pass and Medford. These rules will significantly reduce PM_{10} emissions from veneer dryers and wood-fired boilers.

The new rules impose emission limits for veneer dryers based on state-of-the-art technology. For dryers using gas, or steam as the heat source, the emission limit is 0.30 pounds per thousand square feet (lb/Msf) of 3/8" veneer dried. For dryers heated directly by combustion gases from wood burning, the emission limit is 0.45 lb/Msf. These emission limits boost the control efficiency from 45% to a minimum of 70%. The upgraded control equipment for veneer dryers is expected to result in an emissions reduction of 99 tons per year, approximately 54% of 1986 emissions.

For existing large, wood-fired boilers (heat-input capacity of greater than 35 million Btu/Hr), the new Rules impose an emission limit of 0.05 grains per standard dry cubic foot (gr/SDCF). The imposition of the reduced emission limit is expected to result in an emissions reduction of 82 tons per year. By the end of 1994, the large wood-fired boiler emission control equipment must meet an emission limit of 0.015 gr/SDCF. However, any such modification, or replacement will be legally limited to 0.030 gr/SDCF. The difference in emissions between 0.030 gr/SDCF and a lower actual emission rate can be banked for offsetting new sources.

The overall industrial PM_{10} emissions reduction is predicted to be 55% between 1986 and 1992.

Long-Term Wood Heating Control Strategy

Wood heating curtailment is viewed as a short-range control strategy to allow rapid attainment of the short-term (24-hour) PM_{10} air quality standard. The Department of Environmental Quality is committed to pursue permanent reductions in wood heating emissions as a long-range strategy to reduce and even eliminate the reliance on curtailment and to provide significant improvement in annual PM_{10} air quality.

At least the following measures will be pursued to reduce permanently wood heating emissions:

- Public education activities will include more specific information on the true cost of wood heating in relation to other alternative cleaner heating sources. The major goal of this effort is to persuade those households that are spending more money to heat with wood than with conventional fuels, such as natural gas, to convert from wood heat.

- Further information and studies on the toxicity, health effects and other detrimental effects of woodsmoke will be pursued and heavily publicized in a continuing effort to convince more people that they should reduce wood burning.

- In home emission control performance of certified stoves will be improved through promotion of durable design criteria and development of a stress test which will aid in identifying durable certified stoves.

- Financial incentive programs will be pursued through the Oregon Legislature and other avenues to promote replacement of conventional wood heating appliances with less polluting systems. These programs could include tax credits, low interest loans and total buy-outs for low income households. An objective would be to graduate these incentives in proportion to the emission reduction potential of the

alternative heating systems, with electric and gas systems qualifying for the largest financial incentives followed by pellet stoves, durable certified woodstoves and finally, other certified woodstoves.

4.13.3.3 Demonstration of Attainment

This section describes the application of emission reduction credits described in Section 4.13.3.2 for demonstrating attainment with the NAAQS. The methodology used is based on a proportional rollback of 1992 emission estimates.

24 Hour Worst Case Day Strategy

Based on the Emission Inventory approach, attainment of the 24 hour NAAQS in 1992 will require a 17% or 1785 pounds of reduction in worst case day emissions. The necessary reduction is achieved through the strategy elements listed below.

Table 4.13.3-4: Summary of 24 Hour Emission Reductions

Strategy Element	Credit	Emission Reduction
Industrial Controls	2086 lbs/d x 55%	1147 lbs/d
Woodstove Strategies		
Certification	4964 lbs/d x 10.2%	506 lbs/d
Curtailment	5134 lbs/d x 25%	1284 lbs/d
	Total Reduction	2937 lbs/d
	Required Reduction	1785
	Excess Reduction Achieved	1152 lbs/d

Especially noteworthy in the above table is the fact that the Woodstove Strategies alone provide sufficient emissions reduction (1790 lbs/d) to meet the standard. This gives a high degree of assurance that the 24 hour NAAQS for PM_{10} will be met in areas within the UGB which are not significantly impacted by industrial sources and where no monitoring data exists. Conversely, the great reduction in emissions within the industrial area from 1986 to 1992 (64%), as a result of the plant shutdown and Industrial Controls, in combination with the Woodstove Strategies provides reasonable assurance that non-monitored areas within and around the industrial area will meet the standard.

The alternative analysis, based on Receptor Modeling, requires a 20% or 27 $\mu g/m^3$ of reduction in worst case day PM_{10} concentrations. This reduction is achievable through the same strategy elements as shown below.

Table 4.13.3-5: Summary of 24 Hour PM_{10} Reductions

Strategy Element	Credit	PM_{10} Reductions
Industrial Controls	55%	5 $\mu g/m^3$
Woodstove Strategies		
Certification	10.2%	8
Curtailment	25%	20
Total Reduction		33 $\mu g/m^3$
Required Reduction		27
Excess Reduction Achieved		6 $\mu g/m^3$

This analysis also demonstrates that the Woodstove Strategies (28 $\mu g/m^3$ reduction) alone are sufficient to meet the 24 hour NAAQS, thus providing a high degree of assurance that the standard will be met everywhere within the UGB.

4.13.3.4 Emission Offsets and Banking

There are no currently banked emissions in the industrial source permits within the Grants Pass UGB.

4.13.3.5 Demonstration of Maintenance

To demonstrate continued maintenance of the annual and 24-hour NAAQS for PM_{10}, annual and worst case day emissions were projected to the year 2000. For the worst case day the emissions for each individual source category were forecast taking into account expected growth and application of the relevant control strategy element to the uncontrolled emissions projected for 1992 (Table 4.13.2-6). Individual source impacts (in $\mu g/m^3$) were determined by applying growth predictions and the application of controls to the values in Table 4.13.3-1.

With the addition of the 44 $\mu g/m^3$ background, the projection indicates a year 2000 worst case day concentration of 135 $\mu g/m^3$, which is less than the 24-hour standard of 150 $\mu g/m^3$. The year 2000 worst case day projections are tabulated below.

Table 4.13.3-6: Grants Pass UGB Worst Case Day Year 2000 Maintenance Analysis

Source	1992 lbs/Day	1992 $\mu g/m^3$	1992-2000 Growth	2000 lbs/Day	2000 $\mu g/m^3$
Industry	939	11	0 %	939	11
Res. Wood Comb.	3851	47	-7 %	3578	44
Fugitive Dust	1500	19	14 %	1707	22
Transportation	864	10	14 %	984	11
Other	111	3	14 %	126	3
Totals	7265	90		7334	91

To check for continued maintenance of the annual standard, the total annual emissions for 1986 and 2000 were compared. Using the same rationale (growth combined with controls) the annual emissions are projected to be approximately 18% lower in 2000 than in 1986, thus indicating continued maintenance of the annual standard (See Table 4.13.2-5).

4.13.4 Implementation of the Control Strategy

4.13.4.1 Schedule for Implementation

The schedule for implementation of the recommended set of measures is shown in Table 4.13.4-1.

Table 4.13.4-1: Control Strategy Implementation

Program Element	Implementation Date	Organization Involved
1. Nephelometer to support voluntary curtailment program	Nov. 1, 1989	EPA/DEQ
2. Volunteer, or appointed Air Quality Coordinator	Nov. 1, 1989	Local Gov.
3. Voluntary Woodheating Curtailment	1990/1991 Heating Season	DEQ/Local Gov.
4. Short Term Public Information	1988/1989 Heating Season	DEQ/Local Gov. & Media
5. Long Term Public Information	1988/1989 Heating Season	DEQ/Local Gov.
6. Updated Woodheating Survey	July 31, 1991	DEQ
7. Industrial Rules	September 30, 1989	DEQ

Discussion of Program Elements

1. Nephelometer: The Department secured Special Project funding from the Environmental Protection Agency for 1989 to install and operate a nephelometer. The funding also covered the installation and operation of meteorological equipment. Nephelometer data collected during the winter of 1989/1990 was regressed against PM_{10} data and exhibited a high degree of correlation. Further regression work was done with meteorological data to develop a PM_{10} forecasting equation for use in making burn/no burn calls on a timely basis. Details on the regression results are contained in Appendix 7.

2. Volunteer Coordinator: The City of Grants Pass and Josephine County in December 1989 jointly appointed Bill Olson (Josephine County Health Department) to serve as the air quality coordinator for Grants Pass.

3. Voluntary Curtailment: The Department worked with local government to set up a voluntary curtailment program. A "red", "yellow", "green" day type of program, similar in operation to the existing program in Medford, was developed. The basic operational aspects of the voluntary curtailment program are summarized below. The announcement of

curtailment calls was anticipated to start on December 1, 1990. Operational details are contained in Appendix 7.

4. Short-Term Public Information: The basic focus of this measure is on future (1990-1991) media contact/Public Service Announcements with respect to voluntary curtailment of woodheating. On a current basis, the Department developed three 30-second Public Service Announcements called "Burning Tips" for the PM_{10} problem areas which were made available to Grants Pass radio stations for the 1988-1989 heating season. Information on voluntary curtailment will be developed for media use to coincide with voluntary curtailment program start-up in 1990.

5. Long-Term Public Information: This program element is focused on written materials, mostly the development and distribution of informational brochures targeted at wood burning households. Several informational brochures have been published by the Department and have been distributed in the PM_{10} problem areas of the State. For the 1989-1990 heating season, the Department developed informational materials around the theme "Burn Smart". The "Burn Smart" brochure includes basic information on the relationship of wood heating to air pollution and tips on energy conservation, woodstove operation and installation. The brochure also has information on proper seasoning of wood that is specific to commonly used wood species.

6. Updated Wood Heating Survey: The residential wood combustion component of the emissions inventories for Grants Pass depended upon statistics that were generated from the Medford Wood Heating Survey conducted in 1987. In order to improve the accuracy of the emissions inventories in the future, the Department will budget for a Grants Pass survey to be conducted by July 1991.

7. Industrial Rules: The Environmental Quality Commission adopted Industrial Rules covering the southern Oregon PM_{10} problem areas in September 1989. Based on the schedule contained in the proposed Rules, upgraded boiler and veneer dryer controls would have to be in place and demonstrate compliance with the Rules by August 1991.

<u>Summary of the Chief Operational Aspects of the Voluntary Woodburning Curtailment Program</u>

Public Awareness	Local media Public Service Announcements (PSA's) have been set up for the 1990-1991 heating season. This will be an ongoing effort. An informational booth was set up at the August 14-18, 1990, Josephine County Fair. The Department of Environmental Quality (DEQ) participated

	in the Jackson County Air Fair week (September 10-15, 1990), which had a regional focus on air quality. The DEQ is committed to participate in future local air quality related fairs.
Prediction of when to call curtailment	B-Scat, wind speed and temperature data from the 11th & K monitoring site will be used in conjunction with upper air temperature data from Medford to make curtailment calls. This will be done on a 9 A.M. to 9 A.M. basis, so calls can be made for the day in question by noon. The prediction formula and operational details are contained in Appendix 7.
Action Point	Curtailment calls have been set at a PM_{10} level of 120 $\mu g/m^3$ for a period from 9:00 A.M. to 9:00 A.M., so that the curtailment announcement can appear in the local evening newspaper (Daily Courier). Based on the design value statistical analysis, the expected number of "red" days will be 3 to 4 during the heating season.
Notifications	Daily calls will be made to the Daily Courier in Grants Pass. The general public will have access to an announcement machine operated by Josephine County.
Exemptions	Households with wood as the only source of heat will be exempt from the curtailment program. Low income households will also be exempt.
Surveillance/Tracking	A surveillance/tracking program will be conducted by local government, with initial program setup assistance by the DEQ. The program details are contained in Appendix 7.

4.13.4.2 Rules, Regulations and Commitments

The Oregon Revised Statutes (ORS) 468.020, 468.295 and 468.305 authorize the Oregon Environmental Quality Commission to adopt programs necessary to meet and maintain state and federal standards. The mechanisms for implementing these programs are the Oregon Administrative Rules (OAR).

Specific air pollution rules applicable to the Grants Pass area (OAR 340-30-005 to 070) are included in Section 3.1 of the Oregon State Implementation Plan.

OAR	Subject
340-30-005 (revised)	Purposes and Application (Adds Grants Pass Urban Growth Boundary Area)
340-30-015 (revised)	Wood Waste Boilers
340-30-021 (added)	Veneer Dryer Emission Limitations
340-30-040 (revised)	Charcoal Producing Plants
340-30-046 (added)	Compliance Schedules
340-30-050 (revised)	Continuous Monitoring
340-30-055 (revised)	Source Testing
340-30-065 (revised)	New Sources
340-30-067 (new)	Rebuilt Sources

Additional rules applicable statewide include:

OAR	Subject
340-20-220 to 275	New Source Review
340-20-300 to 320	Plant Site Emission Limits
340-21-100 to 190	Woodstove Certification Program

On July 18, 1990, the City of Grants Pass passed Ordinance No. 4671, banning open burning on a year-round basis within the city limits of Grants Pass.

Interagency Commitments

Oregon Department of Forestry Smoke Management Plan, OAR 629-43-043

Enforceability

The Clean Air Act requires SIP control strategies to be enforceable. The Industrial Rules cited above provide the means to enforce the industrial control element of the strategy. The Woodstove Certification Program provides enforcement of the residential woodburning control element. Implementation of the voluntary woodstove curtailment strategy element will assure that attainment of the PM_{10} NAAQS is achieved and maintained. This strategy does not need to be enforceable, as the credit of less than 30% is consistent with EPA guidance for such programs.

4.13.4.3 Emergency Action Plan Provisions

OAR 340 Division 27 describes Oregon's Emergency Action Plan. The rule is intended to prevent the excessive accumulation of air contaminants during any periods of air stagnation which, if unchecked, could result in concentrations of pollutants which

could cause significant harm to the public health. The rules establish criteria for identifying and declaring air pollution episodes below the significant harm level, and were adopted pursuant to requirements of the Clean Air Act. The action levels found in the Plan were established by the Environmental Protection Agency and subsequently adopted by the Department.

The "Significant Harm" level for PM_{10} particulate matter is 600 $\mu g/m^3$; the "Alert" level is 350 $\mu g/m^3$; the "Warning" level is 420 $\mu g/m^3$; and the "Emergency" level is 500 $\mu g/m^3$ (all 24 hour averages). These levels were adopted by the Environmental Quality Commission in April, 1988. They must be coupled with meteorological forecasts for continuing air stagnation to trigger the Action Plan.

Authority for the Department to regulate air pollution sources during emergency episodes, including emissions from woodstoves, is provided under ORS 468. When there is an imminent and substantial endangerment to public health (the Significant Harm level) ORS 468.115 authorizes the Department, at the direction of the Governor, to enforce orders requiring any person to cease and desist actions causing the pollution. State and local police are directed to cooperate in the enforcement of such orders.

4.13.5 Public Involvement

Development of the Grants Pass PM_{10} control strategy included several areas of public involvement including Citizen Advisory Committees, public participation at hearings on proposed industrial source rules and meetings with local elected officials.

4.13.5.1 Citizen Advisory Committee

In August 1987 the Department requested that the City of Grants Pass and the Josephine County Commission appoint a citizens committee of eight members with equal representation from the City and the County (four appointments each). The citizen appointments were completed by December 1987. The eight members designated their group the Grants Pass Clean Air Policy Advisory Committee. The main purpose of the Committee was to evaluate the particulate problem in Grants Pass and make recommendations to the City and County on a strategy to meet the PM_{10} standards in Grants Pass.

4.13.5.2 Public Notice

Public notice of proposed rule revisions is done through mailing lists maintained by the Department, through notifications published in local newspapers and through Department press releases.

The public notice for the amendments to Oregon's Industrial Rules affecting the Medford-Ashland and Grants Pass areas was published in the Secretary of State Bulletin on December 15, 1988. The public notice for the entire SIP control strategy was published in the Secretary of State Bulletin on July 1, 1990. Copies of these notices are in Appendix 8 (4.13.5-1). Copies of the notices that were published in the local newspapers are also contained in Appendix 8 (4.13.5-1).

4.13.5.3 Public Hearings

Public hearings on the Industrial Rules were held in Medford on January 10, 1989 and in Grants Pass on January 12, 1989. Public hearings on the entire SIP control strategy were held in Grants Pass on August 2, 1990 and September 13, 1990.

4.13.5.4 Intergovernmental Review

Public hearing notices regarding adoption of this revision to the State Implementation Plan were distributed for local and state agency review through the A-95 State Clearinghouse, 45-day process, which commenced on August 6, 1990. No comments were received through the A-95 review process.

HWH:a
PLAN\AH10915
(10/15/90)

RULEMAKING STATEMENTS FOR PROPOSED GRANTS PASS PM_{10} CONTROL STRATEGY AS A REVISION TO THE STATE OF OREGON CLEAN AIR ACT IMPLEMENTATION PLAN

STATEMENT OF NEED FOR RULEMAKING

Pursuant to ORS 183.335(7), this statement provides information on the intended action to amend a rule.

(1) Legal Authority

This proposal amends Oregon Administrative Rules (OAR) 340-20-047. It is proposed under authority of Oregon Revised Statutes (ORS) Chapter 468.

(2) Need for these Rules

Air quality measurements taken in Grants Pass indicate that the federal 24-hour PM_{10} air quality standard is exceeded about 1-10 days per year during the winter months. PM_{10} refers to particulate matter ten micrometers or smaller in diameter. PM_{10} particles are considered a risk to human health due to the body's inability to effectively filter out particles of this size.

The Federal Clean Air Act requires that states develop and adopt State Implementation Plan (SIP) revisions to assure that areas which violate the PM_{10} health and welfare standards are brought into attainment with those standards within prescribed time frames. The proposed control strategy document describes the State of Oregon plan to attain and maintain the annual and 24-hour PM_{10} standards within the Grants Pass Urban Growth Boundary (UGB).

The principal means of achieving the necessary air quality improvements is through PM_{10} emission reductions from woodstoves and fireplaces and the wood products industries. Additional reductions are expected from statewide efforts to reduce slash burning smoke.

(3) Principal Documents Relied Upon

PM_{10} SIP Development Guideline, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park NC, June 1987, EPA-450/2-86-001.

Report of Grants Pass Clean Air Policy Advisory Committee, April 20, 1988.

Previous staff reports to the Environmental Quality Commission (EQC):

Agenda Item D, January 22, 1988, EQC Meeting, Informational Report: New Federal Ambient Air Quality Standard for Particulate Matter (PM_{10}) and Its Effects on Oregon's Air Quality Program.

Agenda Item H, November 4, 1988, EQC Meeting, Request for Authorization to Conduct Public Hearings on New Industrial Rules for PM_{10} Emission Control in the Medford-Ashland AQMA and Grants Pass and Klamath Falls Urban Growth Areas (Amendments to OAR 340, Divisions 20 and 30).

Agenda Item E, September 8, 1989, EQC Meeting, Industrial PM_{10} Rules for Medford-Ashland and Grants Pass: Adoption of New Industrial Rules That Were Taken to Public Hearings in January 1989.

Agenda Item E, June 29, 1990, EQC Meeting, Grants Pass Particulate Matter (PM_{10}) Control Strategy: Rulemaking Hearing Authorization.

Guidance Document for Residential Wood Combustion Emission Control Measures, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park NC, September 1989, EPA-450/2-89-015.

All documents referenced may be inspected at the Department of Environmental Quality, Air Quality Division, 811 S.W. 6th Avenue, Portland, Oregon, during normal business hours.

LAND USE CONSISTENCY STATEMENT

The proposed rule changes appear to affect land use as defined in the Department's coordination program with DLCD, but appear to be consistent with the Statewide Planning Goals.

With regard to Goal 6, (air, water, and land resources quality), the proposed changes are designed to enhance and preserve air quality in the State and are considered consistent with the goal. The proposed rule changes do not appear to conflict with the other Goals.

Public comment on any land use issue involved is welcome and may be submitted in the same fashion as indicated for other testimony on these rules.

It is requested that local, state, and federal agencies review the proposed action and comment on possible conflicts with their programs affecting land use and with Statewide Planning Goals within their expertise and jurisdiction.

The Department of Environmental Quality intends to ask the Department of Land Conservation and Development to mediate any appropriate conflicts brought to our attention by local, state, or federal authorities.

HWH:a
PLAN\AH11025
(10/12/90)

Attachment C

FISCAL AND ECONOMIC IMPACT STATEMENT FOR PROPOSED GRANTS PASS PM_{10} CONTROL STRATEGY AS A REVISION TO THE STATE IMPLEMENTATION PLAN

PROPOSAL SUMMARY

The Grants Pass area exceeds the federal 24-hour PM_{10} air quality standard about 1-10 days per year during the winter months. PM_{10} refers to particulate matter ten micrometers or smaller in diameter. PM_{10} particles are considered a risk to human health due to the body's inability to effectively filter out particles of this size.

The Federal Clean Air Act requires that states develop and adopt State Implementation Plan (SIP) revisions to assure that areas which violate the PM_{10} health and welfare standards are brought into attainment with those standards within prescribed time frames. The proposed control strategy document describes the State of Oregon plan to attain and maintain the annual and 24-hour PM_{10} standards within the Grants Pass Urban Growth Boundary (UGB).

The principal means of achieving the necessary air quality improvements is through PM_{10} emission reductions from woodstoves and fireplaces and the wood products industries. Additional reductions are expected from statewide efforts to reduce slash burning smoke.

The implementation of the PM_{10} control strategy involves residents, industries, local governments, and state and federal agencies. The two groups most affected by the proposed PM_{10} control strategy for the Grants Pass area are the owners/operators of wood products industries and residents with woodstoves or fireplaces.

COSTS TO WOOD PRODUCTS INDUSTRIES

Wood products industry emissions will be reduced by additional control requirements on veneer driers and large wood-fired boilers at plywood plants, more extensive source testing and continuous emission monitoring in order to maximize performance of pollution control equipment, and more restrictive emission offset requirements to insure a net air quality benefit from any new or expanded industries. The new industrial emission control and monitoring requirements will result in estimated capital costs in the range of $3 to 4 million; there will also be related increases in maintenance costs, but those costs are more difficult to quantify. Industrial PM_{10} rules to implement these requirements were adopted by the Environmental Quality Commission in September 1989.

COSTS TO RESIDENTS WITH WOODSTOVES OR FIREPLACES

The residential woodsmoke reduction strategies are closely patterned after the April 1988 recommendations of the Grants Pass Clean Air Policy Advisory Committee. Woodstove and fireplace emissions will be reduced by an expanded public information program, an areawide local voluntary woodburning curtailment program, the Oregon woodstove certification program and continued improvements in firewood seasoning and woodstove operation.

The typical cost of woodburning curtailment is estimated at $2-4 per curtailment day per woodburning home, depending primarily on the type of alternative heat, amount of weatherization, and size of home. Up to 4,200 homes in the critical PM_{10} control area would be affected on the 1-10 days of the year that curtailment would be needed. Actual compliance with the voluntary program is estimated at 25%, based on experience in other areas.

COSTS TO STATE AND LOCAL GOVERNMENT AGENCIES

The new industrial emission control and monitoring requirements will require additional plan reviews, inspections, monitoring report reviews, and other compliance assurance activities by Department of Environmental Quality staff. This additional work will be done by shifting existing resources.

The operational details of the voluntary curtailment program are expected to be developed in the latter half of 1990 and be fully documented by the time of final SIP control strategy adoption. The program probably will operate similarly to the Medford program minus the features that are specific to a mandatory program. The daily decision on woodburning curtailment programs will be based on air quality information from the Department's existing air monitoring network, including Grants Pass B-Scat measurements, and meteorological information from the National Weather Service.

PLAN\AH10939

Oregon Department of Environmental Quality

A CHANCE TO COMMENT ON...

PM_{10} CONTROL STRATEGY FOR GRANTS PASS AREA
NOTICE OF PUBLIC HEARING

Hearing Date: August 2, 1990
Comments Due: August 9, 1990

WHO IS AFFECTED: Residents, local governments and industries within the Grants Pass Urban Growth Boundary.

WHAT IS PROPOSED: The Department of Environmental Quality is proposing to amend OAR 340-20-047, the State of Oregon Clean Air Act Implementation Plan.

WHAT ARE THE HIGHLIGHTS:

1) The Grants Pass area has a PM_{10} air pollution problem. (PM_{10} refers to particulate matter ten micrometers or smaller in diameter.) PM_{10} particles are considered a risk to human health due to the body's inability to effectively filter out particles of this size.

2) The proposed control strategy document describes the overall plan to meet the 24-hour PM_{10} standard by the end of 1992 and maintain the annual and 24-hour PM_{10} health and welfare standards within the Grants Pass Urban Growth Boundary at least through the year 2000.

3) The principal means of achieving the necessary air quality improvements is through PM_{10} emission reductions from woodstoves and fireplaces and the wood products industries. Additional reductions are expected from statewide efforts to reduce slash burning smoke.

HOW TO COMMENT: Copies of the complete proposed rule package may be obtained from: Air Quality Division, Department of Environmental Quality, 811 S.W. Sixth Avenue, Portland, OR 97204 or the regional office nearest you. For further information contact Howard Harris at (503) 229-6086.

A public hearing will be held before a hearings officer at:

7:00 p.m.
August 2, 1990
Grants Pass City Council Chambers
101 NW A
Grants Pass, Oregon

811 S.W. 6th Avenue
Portland, OR 97204

FOR FURTHER INFORMATION:
Contact the person or division identified in the public notice by calling 229-5696 in the Portland area. To avoid long distance charges from other parts of the state, call 1-800-452-4011.

11/1/86

Oral and written comments will be accepted at the public hearing. Written comments may be sent to the DEQ, but must be received by no later than August 9, 1990.

WHAT IS THE NEXT STEP: After public hearing the Environmental Quality Commission may adopt rule amendments identical to the proposed amendments, adopt modified rule amendments on the same subject matter, or decline to act. The adopted rules will be submitted to the U.S. Environmental Protection Agency as part of the State Clean Air Act Implementation Plan. The Commission's deliberation should come in November 1990 as part of the agenda of a regularly scheduled Commission meeting.

A Statement of Need, Fiscal and Economic Impact Statement, and Land Use Consistency Statement are attached to this notice.

HWH:a
PLAN\AH10006
(6/90)

NOTICE OF PUBLIC HEARING

on

Proposed Air Quality Rule Amendments

The Oregon Department of Environmental Quality is proposing to amend OAR 340-20-047, the State of Oregon Clean Air Act Implementation Plan by adding a control strategy plan to meet the federal particulate matter (PM10) standard by the end of 1992 within the Grants Pass urban growth boundary.

The Department will hold a public hearing on the above rule changes on September 13, 1990, 7:00 P.M., Grants Pass City Council Chambers, 101 NW A, Grants Pass, Oregon. Oral and written comments will be accepted at that time. Copies of the complete proposed rule package may be obtained from the Air Quality Division in Portland, 811 SW 6th Avenue, Portland, OR 97204, or call Howard Harris at (503) 229-6086. Written comments may be submitted anytime to the above address, but must be received no later than September 17, 1990.

HWH:a
PLAN\AH10467

LEGAL NOTICE

NOTICE OF PUBLIC HEARING
on
Proposed Air Quality Rule Amendments

The Oregon Department of Environmental Quality is proposing to amend OAR [illegible] the State of Oregon Clean [illegible]

[illegible]

[illegible] but must be received no later than September 17, 1990.

No. 8728014 August 11, 1990

AFFIDAVIT OF PUBLICATION

State of Oregon
County of Josephine } ss.

I, William G Parker, being first duly sworn, depose and say that I am the owner, editor, publisher, manager, advertising manager, principal clerk of the Grants Pass Daily Courier, printer or his foreman of the Grants Pass Daily Courier, a newspaper of general circulation, as defined by ORS 193 010 and 193.020, printed and published at Grants Pass, in the aforesaid county and state; that the NOTICE OF PUBLIC HEARING a printed copy of which is hereto annexed, was published in the entire issue of said newspaper [illegible] August 11, 1990

William G Parker

Subscribed and sworn to before me this 11th day of August, 19 90

[signature]
Notary Public of Oregon.

My commission expires 21st day of February, 19 94.

Courier Publishing Company

409 S.E. 7th Street
P.O. Box 1468

PUBLISHERS: THE DAILY COURIER
Grants Pass, Oregon 97526

Legal Publication Dept.
Telephone 474-3734

Date August 11, 1990

PUBLISHING CONCERNING: NOTICE OF PUBLIC HEARING on Proposed Air Quality Rule Amendments
DATES PUBLISHED: August 11, 1990
ORDERED BY

Dept of Environmental Quality
Attn: Howard Harris
811 SW Sixth Avenue, 11th Floor
Portland, Or 97204

#8728014

Amount Due $ 20.10

ADM 10-84

D-4

(2) In determining air purity standards, the commission shall consider the following factors:

(a) The quality or characteristics of air contaminants or the duration of their presence in the atmosphere which may cause air pollution in the particular area of the state;

(b) Existing physical conditions and topography;

(c) Prevailing wind directions and velocities;

(d) Temperatures and temperature inversion periods, humidity, and other atmospheric conditions;

(e) Possible chemical reactions between air contaminants or between such air contaminants and air gases, moisture or sunlight;

(f) The predominant character of development of the area of the state, such as residential, highly developed industrial area, commercial or other characteristics;

(g) Availability of air-cleaning devices;

(h) Economic feasibility of air-cleaning devices;

(i) Effect on normal human health of particular air contaminants;

(j) Effect on efficiency of industrial operation resulting from use of air-cleaning devices;

(k) Extent of danger to property in the area reasonably to be expected from any particular air contaminants;

(L) Interference with reasonable enjoyment of life by persons in the area which can reasonably be expected to be affected by the air contaminants;

(m) The volume of air contaminants emitted from a particular class of air contamination source;

(n) The economic and industrial development of the state and continuance of public enjoyment of the state's natural resources; and

(o) Other factors which the commission may find applicable.

(3) The commission may establish air quality standards including emission standards for the entire state or an area of the state. The standards shall set forth the maximum amount of air pollution permissible in various categories of air contaminants and may differentiate between different areas of the state, different air contaminants and different air contamination sources or classes thereof. [Formerly 449.785]

468.300 When liability for violation not applicable. The several liabilities which may be imposed pursuant to ORS 443.305, 454.010 to 454.040, 454.205 to 454.255, 454.405, 454.425, 454.505 to 454.535, 454.605 to 454.745 and this chapter upon persons violating the provisions of any rule, standard or order of the commission pertaining to air pollution shall not be so construed as to include any violation which was caused by an act of God, war, strife, riot or other condition as to which any negligence or wilful misconduct on the part of such person was not the proximate cause. [Formerly 449.825]

468.305 General comprehensive plan. Subject to policy direction by the commission, the department shall prepare and develop a general comprehensive plan for the control or abatement of existing air pollution and for the control or prevention of new air pollution in any area of the state in which air pollution is found already existing or in danger of existing. The plan shall recognize varying requirements for different areas of the state. [Formerly 449.782]

468.310 Permits. By rule the commission may require permits for air contamination sources classified by type of air contaminants, by type of air contamination source or by area of the state. The permits shall be issued as provided in ORS 468.065. [Formerly 449.727]

468.315 Activities prohibited without permit; limit on activities with permit. (1) Without first obtaining a permit pursuant to ORS 468.065, no person shall:

(a) Discharge, emit or allow to be discharged or emitted any air contaminant for which a permit is required under ORS 468.310 into the outdoor atmosphere from any air contamination source.

(b) Construct, install, establish, develop, modify, enlarge or operate any air contamination source for which a permit is required under ORS 468.310.

(2) No person shall increase in volume or strength discharges or emissions from any air contamination source for which a permit is required under ORS 468.310 in excess of the permissive discharges or emission specified under an existing permit. [Formerly 449.731]

468.320 Classification of air contamination sources; registration and reporting of sources. (1) By rule the commission may classify air contamination sources according to levels and types of emissions and other characteristics which cause or tend to cause or contribute to air pollution and may require registration or reporting or both for any such class or classes.

(2) Any person in control of an air contamination source of any class for which registration and reporting is required under subsection (1) of this section shall register

REPORT OF
GRANTS PASS
CLEAN AIR POLICY ADVISORY COMMITTEE

APRIL 1988

EXECUTIVE SUMMARY

In July 1987, the Environmental Protection Agency (EPA) revised the air quality standards (annual and daily) for particulate matter (PM). The new standards change the focus from Total Suspended Particulate to only fine particulate that is less than ten micrometers in diameter (referred to as "PM_{10}"). These smaller particles can penetrate the lower respiratory tract and cause adverse health effects.

The Grants Pass urbanized area appears to meet the new federal annual standard for fine particulate, but does not meet the new daily (24-hour) standard of 150 micrograms per cubic meter of air. Violations of the daily standard are estimated to occur five to ten days during the winter. Based on sampling conducted during two winters (1985-1986 and 1986-1987), a peak day concentration of 200 micrograms per cubic meter of air is the level that needs to be reduced to meet the daily health standard.

The peak particulate concentrations generally occur during air stagnation periods in December and January. Approximately 50% of the fine particulate on a peak day is due to residential wood smoke from stoves and fireplaces. The local wood products

industry is estimated to contribute approximately 20% of the fine particulate on a peak day.

The Grants Pass City Council and the Josephine County Commissioners appointed a citizens committee in December 1987 to evaluate the particulate problem and recommend a strategy consistent with Federal Clean Air Act standards. The Committee reviewed three major control alternatives for meeting the new daily federal health standard: 1) Option A - voluntary wood stove curtailment and upgraded industrial controls; 2) Option B - mandatory wood stove curtailment; 3) Option C - voluntary wood stove curtailment and a wood stove retrofit, or replacment program.

Based on an evaluation of the alternative control options, the Committee recommends the adoption of Option A and the following measures be included in the PM10 emissions reduction strategy:

1. Comprehensive Short Term and Long Term public information/education program;
2. Announcement of voluntary curtailment of wood stove/fireplace use on forecast days;
3. Clean air utility rates for electricity and natural gas;
4. Upgraded industrial pollution controls. ,
5. Nephelometer instrumentation to be installed by DEQ;
6. Local Air Quality Coordinator either volunteer, or appointed;
7. Updated Grants Pass wood heating survey.

ATTACHMENT G

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: September 24, 1990

TO: Environmental Quality Commission

FROM: Howard Harris, Hearing Officer

SUBJECT: Hearing Report for August 2, 1990, in Grants Pass

Proposed Grants Pass Particulate Matter (PM_{10}) Control Strategy for the Grants Pass Urban Growth Area

Schedule and Procedures

A public hearing was held at the Grants Pass City Council Chambers in Grants Pass on August 2, 1990. A public notice was published in the Secretary of State Bulletin 30 days prior to the hearing. Howard Harris was the Hearing Officer.

Of the 22 people in attendance, oral testimony was given by nine (9) persons. Written testimony was received from the Oregon Environmental Council.

Primary Positions

Of the nine people providing testimony, general support for the proposed PM_{10} control strategy was indicated by two persons, while seven persons indicated they were primarily opposed. A listing of persons providing testimony is attached to this report. The listing includes the name, affiliation and primary position on the proposed strategy.

Major Issues

A common theme among those who testified in opposition to the proposed PM_{10} control strategy was that people whose sole source of heat was from wood heating should not be required to curtail the use of their appliances on call (red) days. Another common theme was that a voluntary (wood heating) curtailment program would be just the first step toward a mandatory curtailment program.

Two individuals criticized the use of Medford survey data to project wood heating emissions in Grants Pass, urging the Department to conduct a local wood heating survey in 1991. Several individuals expressed the concern that the plan did not deal adequately with growth. Two individuals were critical of the Department's efforts with respect to slash burning. Mayor Bartow was concerned about the need for funding assistance to run a voluntary curtailment program after the first heating season. One individual expressed the need for a contingency plan to implement additional control measures. Summaries of the individual testimony are given below.

Candace Bartow, Mayor of Grants Pass

Mayor Bartow expressed support for the voluntary nature of the proposed control plan. She indicated the need to complete a wood heating survey of Grants Pass residents by 1991. The technical data for determining burn and non-burn days needs to be updated and tailored to reflect local conditions as closely as possible. She expressed concern that funding assistance would be needed to do curtailment calls after the first heating season. With respect to industrial controls, she stated that no further industrial controls should be implemented until such time as the proposed plan had been implemented and evaluated, as the loss of jobs needed to be weighed against the need for such controls.

George B. Hutchinson

Mr. Hutchinson, representing the Josephine County Recycling Advisory Commission, supported the City of Grants Pass open burning ban. As a private citizen, he supported the basic thrust of the proposed PM_{10} control plan, but raised several questions:

- How will the plan be enforced?
- How will the monitoring be accomplished?
- Why is the state focusing on woodstoves?
- The plan needs to address slash burning.
- The plan does not address growth.

Gene Bradley

Mr. Bradley said that many people are updating their old wood burning appliances to the new, higher standard devices. He

stated that the DEQ test procedures (for woodstoves) are not a quality form of testing. He indicated that he did not see the need for woodstove regulations in view of the fact that there had been no violations of the standard in Grants Pass during the last three years. He supports the ban on backyard burning, with some exceptions. He stated that the DEQ does not have authority to regulate the Department of Forestry. Wood gathering has been made more difficult by the foresters. Concluding, Mr. Bradley stated that the (control planning) efforts are totally unwarranted in Josephine County.

Jim Bruchie

Mr. Bruchie indicated that there were no problems before the growth started. He stated that existing uses (wood burning) should not be penalized, but new sources should be required to meet the new standards.

Floyd Covey

A long-time resident of Grants Pass (since 1939), Mr. Covey recited his experience in having his wood burning appliance inspected. He protested that the mills are being shut down, individuals can no longer burn in the open and trash cannot be burned.

LLoyd Kirk

Mr. Kirk stated his opposition to the voluntary woodburning curtailment program indicating that it would soon be turned into a mandatory program. He indicated that people do not have the money to curtail.

Dan Keck

Mr. Keck indicated that the $13 fee for unloading tree trimmings at the local land fill was prohibitive and represented an obstacle toward disposal. He thought the voluntary curtailment of woodburning represented the toe in the door and that a mandatory program would follow.

Madeline Forbuss

Ms. Forbuss indicated that she wanted to be able to continue to use wood heat, as alternatives cost too much money. She stated that the pollution occurs during the summer not in the winter.

Donald Kirk

Mr. Kirk indicated that the DEQ needs to have some responsibility toward people who cannot heat without woodstoves.

Paul Wyntergreen

Mr. Wyntergreen submitted written testimony upon the behalf of the Oregon Environmental Council. He indicated that the proposed control plan does not adequately deal with growth. To deal with growth, there should be a ban on the installation of non-certified woodstoves and a ban on the construction of new homes with wood as the sole source of heat. He stated that the DEQ should exercise its authority to prohibit all outdoor open burning in the Rogue Basin Open Burning Control Area during October through February. Slash burning should be prohibited from October through March in Jackson, Josephine and Klamath Counties.

Mr. Wyntergreen also indicated the need for a local woodburning survey in 1991. He criticized the use of non-local data for woodstove installations. He questioned the assumption that first generation stoves will approach the reductions of second generation stoves when the catalytic elements are replaced, because woodstove dealers indicate that the replacement process is not occurring.

Mr. Wyntergreen recommended that a contingency plan should supplement the control plan. This could include such measures as dual fuel capability for industrial sources, an opacity standard for woodstoves and a woodstove offset system. Also, a regional air pollution authority with the Medford-Ashland area could be explored. He urged a stronger emphasis on enforceability.

GRANTS PASS, AUGUST 2, 1990, HEARING TESTIMONY LISTING

Written	Oral	Name	Affiliation	Primary Position		
				Favor	Oppose	Neither
	X	Candace Bartow	Mayor of Grants Pass	X		
	X	George Hutchinson			X	
	X	Gene Bradley				
	X	Jim Bruchie				
	X	Floyd Covey				
	X	Lloyd Kirk				
	X	Dan Keck				
	X	Madeline Forbuss				X
	X	Donald Kirk				
X		Paul Wyntergreen	Oregon Environmental Council		X	

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: September 25, 1990

TO: Environmental Quality Commission

FROM: Merlyn Hough, Hearing Officer

SUBJECT: Hearing Report for September 13, 1990, in Grants Pass

Proposed Grants Pass Particulate Matter (PM_{10}) Control Strategy for the Grants Pass Urban Growth Area

Schedule and Procedures

A public hearing was held at the Grants Pass City Council Chambers in Grants Pass on September 13, 1990. Public notices were published in the Secretary of State Bulletin and the Grants Pass Courier 30 days prior to the hearing. This was the second hearing on the proposed plan, the first having been conducted on August 2, 1990. Merlyn Hough was the Hearing Officer for the second hearing.

Of the fourteen (14) people in attendance, oral testimony was given by six (6) persons. Written testimony was received separately from the Oregon Chapter of the Sierra Club.

Primary Positions

Of the six people providing oral testimony, general support for the proposed PM_{10} control strategy was indicated by two persons, while four persons indicated they were primarily opposed. Two persons recommended either supplementary measures, or alternative measures. A listing of persons providing testimony is attached to this report. The listing includes the name, affiliation and primary position on the proposed strategy.

Major Issues

A common theme among those who testified in opposition to the proposed PM_{10} control strategy was that people whose sole source of heat was from wood heating, or who faced an economic hardship should not be required to curtail the use of their appliances on call (red) days. Another theme was a concern

that a voluntary (wood heating) curtailment program would be just the first step toward a mandatory curtailment program.

Additional measures that were recommended by those persons who were primarily supportive of the proposed plan included: offering financial incentives for people to switch to cleaner burning wood heating appliances; using opacity limits; establishing new building code requirements for new houses for weatherization and backup heat sources; requiring that new subdivisions have access to natural gas; banning the installation of non-certified woodstoves. Summaries of the individual testimony are given below.

Steven Kefalianos

Mr. Kefalianos was critical of the plan. He indicated the need to consider long-range alternatives for energy use and home heating. He also stated his concern that voluntary curtailment of woodburning appliances was a precursor to mandatory curtailment and that he, therefore, opposed the plan.

Glenn Johnson

Mr. Johnson was concerned about the buildup of wood fuel in the woods, if not removed. He stated that a given parcel burns about every 25 years. He indicated that there was a need to burn more wood, but burn it cleaner.

Floyd Covey

Mr. Covey stated his opposition to the plan. He indicated that there was a need to get away from oil dependence and that trucks are a bigger problem.

Mike Kohn

Mr. Kohn stated that he is a chimney sweep who cleans approximately 700 homes per year. He has noticed that flues are much cleaner now than they were several years ago. While he was generally supportive of voluntary curtailment, he indicated that there was a need to do more (financial incentives) to get people to switch to cleaner burning units. He recommended opacity limits as being superior to voluntary curtailment. He cited two studies that demonstrated the lower polluting characteristics of certified stoves. He was concerned that low income families need financial help to

convert to cleaner burning stoves. Such families would face a hardship if forced to curtail.

Paul Wyntergreen

Mr. Wyntergreen stated that voluntary curtailment is a reasonable first step. However, he expressed concern about the long-term effect of growth. There may need to be a tightening unless preventative measures are included now. He recommended for consideration the following: new building code requirements for new houses requiring weatherization and backup heating sources; subdivision access to natural gas; bans on the installation of non-certified stoves; opacity limits; intensive education efforts.

Glenn Diller

Mr. Diller stated that he was very interested in clean air. He recited his experience in installing a woodstove with water coils, which he later modified to be assisted by solar energy. He utilized slash for his woodstove, so in that way he was helping to reduce the amount of slash burned in the forest. He was concerned about the effect of gas furnaces on interior paint, causing a yellowing of the paint. He was also concerned about the effect of gas furnaces on indoor air. He indicated the need for more emphasis on solar heating.

Bob Palzer

Mr. Palzer submitted written testimony on the behalf of the Oregon Chapter of the Sierra Club indicating support for the proposed control strategy for Grants Pass. In a subsequent phone call to Howard Harris (DEQ/Air Quality Division), he requested that his testimony be amended to request that the adoption by the City Council of Grants Pass of a year-round ban on open burning become part of the proposed PM_{10} control strategy.

GRANTS PASS, SEPTEMBER 13, 1990, HEARING TESTIMONY

Written	Oral	Name	Affiliation	Primary Position	
				Favor	Oppose
	X	Steven Kefalianos			X
	X	Glenn Johnson	Small Woodlands		X
	X	Floyd Covey			X
	X	Mike Kohn	Chimney Sweep Association	X	
	X	Paul Wyntergreen	Oregon Environmental Council	X	
	X	Glenn Diller		X	
X		Bob Palzer	Oregon Chapter of the Sierra Club	X	

ATTACHMENT H

RESPONSE TO TESTIMONY RECEIVED AT THE GRANTS PASS PUBLIC HEARINGS ON THE PROPOSED PARTICULATE MATTER (PM_{10}) CONTROL STRATEGY FOR THE GRANTS PASS URBAN GROWTH AREA

The major issues identified in the public hearing testimony are summarized and discussed in this report. The issues are grouped into the following categories: Voluntary Curtailment; Growth; Supplemental/Alternative Controls; Miscellaneous.

Voluntary Curtailment

Issue No. 1: Low income residents and those whose sole source of heat is from woodburning appliances should not be required to shut off their stoves, or fireplaces on called curtailment days.

> Response: The Department emphasizes that the proposed curtailment program for Grants Pass is voluntary. Even the mandatory curtailment program which is proposed for Medford includes by ordinance exemptions for low income households and sole source heaters. For clarity, the plan documentation has been changed to show that low income households and sole source (wood) heaters are exempt from the voluntary curtailment program.

Issue No. 2: A voluntary wood heating curtailment program is just the first step towards a mandatory program.

> Response: The Department is projecting a 25% curtailment rate for the attainment/maintenance calculations. In combination with the expected particulate emission reductions from the major industrial sources, the 25% curtailment rate provides an ample safety margin for meeting the 24-hour particulate standard. The 25% curtailment rate appears to be a reasonable expectation based on the experience with voluntary programs in other areas of the northwest. The Environmental Protection Agency is in agreement with the Department that a mandatory curtailment program does not appear to be needed in Grants Pass. Even in the event of shortfalls, other measures could be explored as a first priority.

Issue No. 3: Additional financial support is needed to run a voluntary curtailment program after the first year of operation.

> Response: The Department is hopeful of obtaining additional revenues to support the statewide air quality program either as a result of Clean Air Act reauthorization, or through action by the state Legislature. If additional funding is received, the Department would be in a better position to

support local governmental efforts with respect to air pollution control.

Growth

Issue No. 4: The proposed plan does not deal adequately with growth.

Response: In projecting particulate emissions to the year 2000, the Department utilized the Grants Pass Comprehensive Plan population forecasts and used a population forecast number of 35,300 for the Urban Growth Boundary. This number was used in the existing Facility Plan (for sewage treatment) on file with the Department. The Environmental Protection Agency requires that population forecast numbers be consistent across the various environmental planning programs under its jurisdiction. To be reached, the forecast year 2000 population for the Grants Pass UGB means that the growth rate has to average 1.7% compounded annually. This is a very high rate of growth. For comparison, the Oregon Department of Transportation in a recently released highway planning document expects the total state population to grow by 1.0% compounded over the 20-year period from 1985 to 2005. From 1980 to 1988, the Josephine County population grew at a compounded rate of 1.0%. With the proposed plan assuming a 1.7% annual, compounded rate of population growth, the emission projection shows that the year 2000 emissions level would be 18% lower than the level for the 1986 base year. If the rate of population growth is actually less than 1.7% than the margin for continued standard maintenance will be greater than 18%.

Supplemental/Alternative Controls

Issue No. 5: A contingency plan should supplement the proposed control plan, including such measures as: dual fuel capability for industrial sources; an opacity standard for woodstoves; a woodstove offset system. Other measures might include new building code requirements for new homes relative to weatherization and backup heating sources; subdivision access to natural gas; bans on the installation of non-certified stoves.

Response: Given the relatively marginal nonattainment situation in the Grants Pass air shed and the fact that the proposed control strategy provides an ample margin of safety for meeting the PM_{10} standard, a contingency plan does not appear to be warranted at the present time. An opacity standard would be difficult and costly for local governments to administer. Furthermore, even if a stove had no visible emissions, such a stove would still emit PM_{10} at a rate of approximately 30% of a conventional stove.

With respect to new building code requirements, subdivision access to natural gas, etc., such measures could be helpful with respect to long-term maintenance of PM_{10} standards, but do not appear to be necessary components of an overall strategy at the present time. Upgraded weatherization requirements and natural gas access make sense from an energy standpoint alone and could be pursued for reasons other than air quality.

Miscellaneous

Issue No. 6: Non-local data (Medford Wood Heating Survey) was used to help establish the amount of woodburning in the Grants Pass area. The Department should conduct a woodburning survey in Grants Pass during 1991.

Response: The close proximity of Grants Pass to Medford, the similarities of the two economies and physical features argued for applying information on Medford woodburning rates to the Grants Pass population statistics to estimate PM_{10} emissions from residential woodburning in Grants Pass. Furthermore, Pacific Power conducted a survey in 1986, called "Energy Decisions '86", among its customer base in Josephine and Jackson Counties and provided the Department with separate survey results for the Medford and Grants Pass Pacific Power service districts. To a question on preferred heating source, 35% of the Medford respondents favored wood heat. On the same question, 39% of the Grants Pass respondents favored wood heat. The two areas also indicated identical wood usage of 3 cords per heating season. The Pacific Power survey results indicated that the Department's Medford Wood Heating Survey could be reasonably applied to Grants Pass.

The Department has committed to conducting a wood heating survey in Grants Pass during 1991. If the results indicate that new estimates of PM_{10} emissions should be made, the State Implementation Plan will be amended accordingly.

Issue No. 7: The Department should exercise its authority to prohibit all outdoor open burning in the Rogue Basin Open Burning Control Area during October through February and should incorporate into the State Implementation Plan the year-round ban on open burning adopted by the City of Grants Pass.

Response: The Department feels local government restrictions are sufficient to assure attainment/maintenance. While the year-round ban on open burning would serve to bolster the proposed strategy, the ban is not necessary to meet standards. Also, there was local concern that confusion could result from listing different boundaries for burning controls, i.e., the Grants Pass city limits for the ban on

open burning and the Urban Growth Boundary for voluntary woodburning curtailment.

Issue No. 8: Slash burning should be prohibited from October through March in Jackson, Josephine and Klamath Counties. There was local concern that confusion could result from listing different boundaries for burning controls, i.e., Grants Pass city limits for the ban on open burning and the Urban Growth Boundary for voluntary woodburning curtailment.

Response: The Department is working through smoke management committees to provide better protection to nonattainment areas from wintertime slash burning. While the Department does not believe a total ban is necessary, or justified, there is an ongoing effort to work toward further restrictions on burning. This will help to assure that there is no impact from slash on woodstove curtailment days.

Issue No. 9: Catalytic elements of stoves are not being replaced, contrary to projections by the Department.

Response: The Department will evaluate air quality improvements annually. If at any time it appears improvements are not matching strategy expectations, then further investigation will be made to identify the cause. If catalytic element replacement becomes a serious problem, the Department will pursue remedial action.

HWH:a
PLAN\AH10940

Attachment I

Previous EQC Agenda Items

Agenda Item D, January 22, 1988, EQC Meeting, Informational Report: New Federal Ambient Air Quality Standard for Particulate Matter (PM_{10}) and Its Effects on Oregon's Air Quality Program.

Agenda Item H, November 4, 1988, EQC Meeting, Request for Authorization to Conduct Public Hearings on New Industrial Rules for PM_{10} Emission Control in the Medford-Ashland AQMA and Grants Pass and Klamath Falls Urban Growth Areas (Amendments to OAR 340, Divisions 20 and 30).

Agenda Item E, September 8, 1989, EQC Meeting, Industrial PM_{10} Rules for Medford-Ashland and Grants Pass: To Consider Adoption of New Industrial Rules That Were Taken to Public Hearings in January 1989.

Agenda Item E, June 29, 1990, EQC Meeting, Grants Pass Particulate Matter (PM_{10}) Control Strategy: Request to Authorize Rulemaking Hearing.

HWH:a
PLAN\AH10023

NEIL GOLDSCHMIDT
GOVERNOR

Environmental Quality Commission

811 SW SIXTH AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

REQUEST FOR EQC ACTION

Meeting Date: November 2, 1990
Agenda Item: F
Division: HSW
Section: Solid Waste

SUBJECT:

Proposed Adoption of Rule Amendments to Delegate Approval of Financial Assistance for Waste Tire Pile Cleanup to the Director

PURPOSE:

- Allows the Director to approve financial assistance to waste tire storage permittees for cleanup of waste tire piles.

- Establishes as rule waste tire guidelines which determine the amount of financial assistance to a local government waste tire storage permittee for waste tire pile cleanup.

- Allows the Department of Environmental Quality (DEQ, Department) to cover up to 100 percent of the cost of tire pile cleanups to permittees, who will then be responsible for paying back their share of the cost over time.

- Makes housekeeping changes in the reimbursement and tire carrier permit programs, and adopts as rule existing guidelines for Department reimbursements to local governments which remove illegal waste tire piles in their jurisdictions.

ACTION REQUESTED:

___ Work Session Discussion
___ General Program Background
___ Potential Strategy, Policy, or Rules
___ Agenda Item ___ for Current Meeting
___ Other: (specify)

___ Authorize Rulemaking Hearing
_X_ Adopt Rules
Proposed Rules — Attachment A
Rulemaking Statements — Attachment B
Fiscal and Economic Impact Statement — Attachment C
Public Notice — Attachment D

___ Issue a Contested Case Order
___ Approve a Stipulated Order
___ Enter an Order
Proposed Order — Attachment ___

___ Approve Department Recommendation
___ Variance Request — Attachment ___
___ Exception to Rule — Attachment ___
___ Informational Report — Attachment ___
___ Other: (specify) — Attachment ___

DESCRIPTION OF REQUESTED ACTION:

The Environmental Quality Commission (EQC, Commission) is requested to adopt proposed rule revisions as summarized above, pertaining to waste tire storage, hauling and cleanup, and reimbursement to persons using waste tires.

The Department proposal includes no major changes from the proposed rules submitted for public comment.

AUTHORITY/NEED FOR ACTION:

___ Required by Statute: _____ Attachment ___
Enactment Date: _____
_X_ Statutory Authority: ORS 459.785, .775, .780 Attachment ___
___ Pursuant to Rule: _____ Attachment ___
___ Pursuant to Federal Law/Rule: _____ Attachment ___

___ Other: Attachment ___

___ Time Constraints: (explain)

DEVELOPMENTAL BACKGROUND:

___ Advisory Committee Report/Recommendation — Attachment ___
_X_ Hearing Officer's Report/Recommendations — Attachment _E_
_X_ Response to Testimony/Comments — Attachment _F_
___ Prior EQC Agenda Items:

Agenda Item C, 8/10/90 EQC Meeting - Request for hearing authorization for present rulemaking — Attachment ___
Agenda Item J, 1/19/90 EQC Meeting - Amendments Regulating Waste Tire Beneficial Use, and Adding Criteria for Financial Assistance
Agenda Item K, 4/14/89 EQC Meeting - Amendments to Permitting Requirements for Waste Tire Storage Sites and Waste Tire Carriers
Agenda Item G, 7/8/88 EQC Meeting - Waste Tire Program Permitting Requirements
Permittee assistance approvals:
Agenda Item H, 9/8/89, to Larry Waliser;
Agenda Item N(1), 10/20/89, to DuBois;
Agenda Item E, 4/6/90, to Union County;
Agenda Item L, 6/29/90, to Richard Mishler;
Agenda Item J, 6/29/90, to Coos County;
Agenda Item K, 6/29/90, to Klamath County

___ Other Related Reports/Rules/Statutes: — Attachment ___
_X_ Supplemental Background Information — Attachment _G_

List of major remaining waste tire sites to be cleaned up

Note: This staff report discusses only those issues which were brought up as a result of public comment. For a complete discussion of the issues, please refer to Agenda Item C, 8/10/90 EQC Meeting, Request for Hearing Authorization.

REGULATED/AFFECTED COMMUNITY CONSTRAINTS/CONSIDERATIONS:

1. Delegation of authority to Director to approve financial assistance. DEQ received public testimony in opposition to delegating financial assistance approval for waste tire cleanups from the Commission to the Director of the Department. The testimony was from the representative of a firm which has participated in waste tire cleanups, and whose customers receive the reimbursement (and who is also a member of the Waste Tire Advisory Committee). The testimony suggested it was more appropriate for that decision-making authority to remain with the Commission for three reasons: 1) large sums of money may be involved (hundreds of thousands of dollars); 2) it is best to make such decisions in an open forum, more subject to public scrutiny; and 3) if funds in the Waste Tire Recycling Account become scarce, spending priorities will have to be approved or adjusted between competing program activities (cleanup vs. reimbursement, for example). The testimony noted that this is a policy issue which should be decided by the Commission.

   The testimony suggested that an alternative would be to set a threshold amount of $20,000 or less for decision delegation to the Director. This would relieve the Commission of having to deal with many small decisions.

   Department rules closely define the circumstances under which financial assistance may be given to a permittee, and the amount of assistance which may be given. In reviewing financial assistance requests, the Department first determines the degree of environmental risk (following criteria in program rules), and deals with sites that are high on the list. Then the Department applies criteria based on the permittee's financial situation to determine the amount of financial assistance to be recommended. The Department's rules leave little discretion in recommending the amount of financial assistance to a given permittee.

   Most waste tire piles which have not yet received approval for cleanup are relatively small; only four identified sites have 30,000 or more waste tires (see Attachment G). It is anticipated that only one of these larger sites (with 60,000 tires, estimated cleanup cost of about $100,000) will request financial assistance as a permittee for tire removal. Therefore, the Director is unlikely to make many decisions on funding hundreds of thousands of dollars for cleanup sites. The Department believes that the financial assistance

decision can in general be appropriately made by the Director.

The Department projects sufficient funds through the biennium to meet all anticipated waste tire cleanup costs, as well as all requests for reimbursement, including demonstration projects. If the tire fee is not extended by the 1991 Legislature, the Department will have to allocate any remaining funds between staff costs, cleanup and reimbursement. Waste tire rules (OAR 340-64-090) expressly state how available funds shall be used: 1) to reimburse people who use waste tires; 2) to clean up permitted or non-permitted waste tire sites based on criteria established by rule.

The Department agrees that the rule should leave the option for the Department to refer a financial assistance decision to the Commission. There may be cases where the Department deems it appropriate for the Commission to approve funding. Therefore, Sections 340-60-160 (1) and (3) have been changed from the draft to clarify that either the Commission or the Director may make the funding decision (rather than only the Director).

No testimony was received on other parts of the rule, and no other substantive changes from the proposed rule were made.

PROGRAM CONSIDERATIONS:

Delegation of Authority. Department staff currently makes recommendations to the Commission through the Director. With the proposed rule change, the Commission or the Director could now make the funding decision. The criteria used by staff to make the recommendation have been adopted in rule by the Commission.

ALTERNATIVES CONSIDERED BY THE DEPARTMENT:

1. Request adoption of the draft rules as proposed in Attachment A, including:

a. Delegating authority to the Director to approve financial assistance to waste tire storage permittees.

b. Establishing criteria for the amount of financial assistance to local government permittees.

c. Allowing the Department to advance 100 percent of the cost of waste tire pile cleanup to a waste tire permittee.

d. Making housekeeping changes for reimbursement recipients using waste tire materials for paving, local governments abating illegal waste tire piles, and waste tire carrier permits.

2. Modify draft rule to establish a cost threshold for delegation of authority to the Director to approve financial assistance to waste tire storage permittees for cleanup of tire piles.

3. Other alternatives were considered to determine the level of financial assistance to local governments, such as basing the percentage of assistance on per capita or median household income, on the tax base, on the assessed per capita value of the county, etc. Amount of financial assistance should be based on the financial capability of the permittee; each of the preceding could be considered a measure of a local government's financial capability. However, each has limitations. Water Quality Division examined these and other potential methods for establishing loan interest rates based on the amount a local community can afford to pay in its analysis of "local ability to pay" in providing loans from the State Revolving Fund for water pollution control facilities (Agenda Item P, 3/3/89 EQC Meeting). Their task force rejected all the methods because of lack of current data, inherent inequities, lack of comparability, or undue complexity of the method. The proposed index serves as an indicator of a local government's financial capability, and is a simple way to determine the amount of financial assistance appropriate for local governments.

DEPARTMENT RECOMMENDATION FOR ACTION, WITH RATIONALE:

The Department recommends that the Commission adopt Alternative 1.

The proposed rule has the support of the Advisory Committee (except for public testimony presented by one member as noted above). We do not expect any new policy issues to arise in providing financial assistance to permittees, especially since the Commission has already reviewed financial assistance requests from most large sites. Delegation of the decision-making authority will not change the basis on which financial assistance is given, but only the process. The Department could still refer decisions to the Commission, if appropriate. The rule change provides for efficient administration of the program. It establishes some Department guidelines as rule. It allows timely cleanup of sites for which a permittee cannot pay its share of the costs up front. Other housekeeping changes will improve administration of the waste tire program.

CONSISTENCY WITH STRATEGIC PLAN, AGENCY POLICY, LEGISLATIVE POLICY:

The rule follows agency policy in removing from Commission review a fairly routine set of decisions (amount of financial assistance) that do not involve policy and may not warrant continued Commission scrutiny. This is consistent with Strategic Goals 8 and 9.

The rule follows agency policy on specifying by rule what criteria are to be used in determining benefits.

ISSUES FOR COMMISSION TO RESOLVE:

1. Does the Commission wish to delegate to the Director the Commission's responsibility to make a "finding" that financial assistance should be given to a waste tire permittee?

2. Does the Commission wish to retain decision authority for funding of permittee waste tire cleanups costing over some threshold amount?

3. Is an index based on size of the waste tire pile related to the local government's population the correct way to

determine amount of financial assistance to a local government permittee?

INTENDED FOLLOWUP ACTIONS:

File adopted rules with the Secretary of State's Office.

Notify interested persons of the rule adoption.

Approved:

Section: Deanna Mueller-Crispin

Division: Steve Greenwood

Director: Jeff Lawson

Report Prepared By: Deanna Mueller-Crispin

Phone: 229-5808

Date Prepared: October 15, 1990

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ATTACHMENT A

Proposed Revisions: 10/2/90

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
ADMINISTRATIVE RULES
DIVISION 64 - SOLID WASTE MANAGEMENT: WASTE TIRES

EQC POLICY STATEMENT

In establishing the waste tire program by statute and rule, the Legislature and the Environmental Quality Commission determined that it is in the best interest of the state to provide a long-term solution to disposal of waste tires by developing incentives to create a stable market for uses of waste tires. In addition to establishing long-term solutions, existing environmental problems must be addressed by cleaning up waste tire piles and by regulating disposal.

Proposed additions to rule are underlined.
Proposed deletions are in brackets [].

Definitions

340-64-010 As used in these rules unless otherwise specified:

(1) "Abatement" -- the processing or removing to an approved storage site of waste tires which are creating a danger or nuisance, following a legal nuisance abatement procedure.

(2) "Beneficial use" -- storage of waste tires in a way that creates an on-site economic benefit, other than from processing or recycling, to the owner of the tires, such as in using the tires for raised-bed planters.

(3) "Buffings" -- a product of mechanically scarifying a tire surface, removing all trace of the surface tread, to prepare the casing to be retreaded.

(4) "Commission" -- the Environmental Quality Commission.

(5) "Common carrier" -- any person who transports persons or property for hire or who publicly purports to be willing to transport persons or property for hire by motor vehicle; or any person who leases, rents, or otherwise provides a motor vehicle to the public and who in connection therewith in the regular course of business provides, procures, or arranges for, directly, indirectly, or by course of dealing, a driver or operator therefor.

(6) "Department" -- the Department of Environmental Quality.

(7) "Director" -- the Director of the Department of Environmental Quality.

(8) "Dispose" -- to deposit, dump, spill or place any waste tire on any land or into any water as defined by ORS 468.700.

(9) "DMV" -- Oregon Department of Motor Vehicles.

(10) "End user":

(a) For energy recovery: the person who utilizes the heat content or other forms of energy from the incineration or pyrolysis of waste tires, chips or similar materials.

(b) For other eligible uses of waste tires: the last person who uses the tires, chips, or similar materials to make a product with economic value. If the waste tire is processed by more than one person in becoming a product, the "end user" is the last person to use the tire as a tire, as tire chips, or as similar materials. A person who produces tire chips or similar materials and gives or sells them to another person to use is not an end user.

(c) For paving projects: either the paving contractor laying the paving, or the person for whom the paving is done, depending on the agreement between the paving contractor and the person for whom the paving is done.

(11) "Energy recovery" -- recovery in which all or a part of the waste tire is processed to utilize the heat content, or other forms of energy, of or from the waste tire.

(12) "Financial assurance" -- a performance bond, letter of credit, cash deposit, insurance policy or other instrument acceptable to the Department.

(13) "Land disposal site" -- a disposal site in which the method of disposing of solid waste is by landfill, dump, pit, pond or lagoon.

(14) "Nonocean waters" -- fresh waters, tidal and nontidal bays and estuaries as defined in ORS 541.605.

(15) "Oversize waste tire" -- a waste tire exceeding a 24.5-inch rim diameter, or which is excluded from Federal excise tax (except a passenger tire).

(16) "Passenger tire" -- a tire with less than an 18-inch rim diameter.

(17) "Passenger tire equivalent" -- a measure of mixed passenger and truck tires, where five passenger tires are considered to equal one truck tire.

(18) "Person" -- the United States, the state or a public or private corporation, local government unit, public agency, individual, partnership, association, firm, trust, estate or any other legal entity.

(19) "Private carrier" -- any person who operates a motor vehicle over the public highways of this state for the purpose of transporting persons or property when the transportation is incidental to a primary business enterprise, other than transportation, in which such person is engaged.

(20) "PUC" -- the Public Utility Commission of Oregon.

(21) "Recycle" or "recycling" -- any process by which solid waste materials are transformed into new products in such a manner that the original products may lose their identity.

(22) "Retreader" -- a person engaged in the business of recapping tire casings to produce recapped tires for sale to the public.

(23) "Rick" -- to horizontally stack tires securely by overlapping so that the center of a tire fits over the edge of the tire below it.

(24) "Store" or "storage" -- the placing of waste tires in a manner that does not constitute disposal of the waste tires. "Storage" includes the beneficial use of waste tires as fences and other uses with similar potential for causing environmental risks. "Storage" does not include such beneficial uses as planters except when the Department determines such uses create environmental risks.

(25) "Tire" -- a continuous solid or pneumatic rubber covering encircling the wheel of a vehicle in which a person or property is

transported, or by which they may be drawn, on a highway. This does not include tires on the following:

(a) A device moved only by human power.

(b) A device used only upon fixed rails or tracks.

(c) A motorcycle.

(d) An all-terrain vehicle, including but not limited to, three-wheel and four-wheel ATVs, dune buggies and other similar vehicles. All-terrain vehicles do not include jeeps, pick-ups and other four-wheel drive vehicles that may be registered, licensed and driven on public roads in Oregon.

(e) A device used only for farming, except a farm truck.

(26) "Tire carrier" -- a person who picks up or transports waste tires for the purpose of storage or disposal. This does not include the following:

(a) Solid waste collectors operating under a license or franchise from a local government unit and who transport fewer than 10 tires at a time.

(b) Persons who transport fewer than five tires with their own solid waste for disposal.

(27) "Tire processor" -- a person engaged in the processing of waste tires.

(28) "Tire retailer" -- a person in the business of selling new replacement tires at retail, whose local business license or permit (if required) specifically allows such sale.

(29) "Tire derived products" -- tire chips or other usable materials produced from the physical processing of a waste tire.

(30) "Truck tire" -- a tire with a rim diameter of between 18 and 24.5 inches.

(31) "Waste tire" -- a tire that is no longer suitable for its original intended purpose because of wear, damage or defect, and is fit only for:

(a) Remanufacture into something else, including a recapped tire; or

(b) Some other use which differs substantially from its original use.

(32) "Waste Tires Generated in Oregon" -- Oregon is the place at which the tire first becomes a waste tire. A tire casing imported into Oregon for potential recapping, but which proves unusable for that purpose, is not a waste tire generated in Oregon. Examples of waste tires generated in Oregon include but are not limited to:

(a) Tires accepted by an Oregon tire retailer in exchange for new replacement tires.

(b) Tires removed from a junked auto at an auto wrecking yard in Oregon.

Waste Tire Carrier Permit Required

340-64-055 (1) After January 1, 1989, any person engaged in picking up, collecting or transporting waste tires for the purpose of storage or disposal is required to obtain a waste tire carrier permit from the Department.

(2) After January 1, 1989, no person shall collect or haul waste tires or advertise or represent himself/herself as being in the business of a

waste tire carrier without first obtaining a waste tire carrier permit from the Department.

(3) After January 1, 1989, any person who gives, contracts or arranges with another person to collect or transport waste tires for storage or disposal shall only deal with a person holding a waste tire carrier permit from the Department, unless the person is exempted by subsection (4)(a) or (b) of this rule.

(4) The following persons are exempt from the requirement to obtain a waste tire carrier permit:

(a) Solid waste collectors operating under a license or franchise from any local government unit and who transport fewer than 10 tires at any one time.

(b) Persons transporting fewer than five tires.

(c) Persons transporting tire-derived products to a market.

(d) Persons who use company-owned vehicles to transport tire casings for the purposes of retreading between company-owned or company-franchised retail tire outlets and company-owned or company-franchised retread facilities while transporting casings between those retail tire outlets and those retread facilities.

(e) Tire retailers or retreaders who transport used tires between their retail tire outlet or retread operation and their customers, after taking them from customers in exchange for other tires, or for repair or retreading while transporting used tires between their retail tire outlet or retread operation and their customers.

(f) The United States, the State of Oregon, any county, city, town or municipality in this state, or any department of any of them [except when vehicles they own or operate are used as a waste tire carrier for hire].

(5) Persons exempt from the waste tire carrier permit requirement under subsection (4)(d) of this rule shall nevertheless notify the Department of this practice on a form provided by the Department.

(6) A combined tire carrier/storage permit may be applied for by tire carriers:

(a) Who are subject to the carrier permit requirement; and

(b) Whose business includes or wants to establish a site which is subject to the waste tire storage permit requirement.

(7) The Department shall supply a combined tire carrier/storage permit application to such persons. Persons applying for the combined tire carrier/storage permit shall comply with all other regulations concerning storage sites and tire carriers established in these rules.

(8) Persons who transport waste tires for the purpose of storage or disposal must apply to the Department for a waste tire carrier permit within 90 days of the effective date of this rule. Persons who want to begin transporting waste tires for the purpose of storage or disposal must apply to the Department for a waste tire carrier permit at least 90 days before beginning to transport the tires.

(9) Applications shall be made on a form provided by the Department. The application shall include such information as required by the Department. It shall include but not be limited to:

(a) A description, license number and registered vehicle owner for each truck used for transporting waste tires.

(b) The PUC authority number under which each truck is registered.

(c) Where the waste tires will be stored or disposed of.

(d) Any additional information required by the Department.

(10) A corporation which has more than one separate business location may submit one waste tire carrier permit application which includes all the locations. All the information required in section (9) of this rule shall be supplied by location for each individual location. The corporation shall be responsible for amending the corporate application whenever any of the required information changes at any of the covered locations.

(11) An application for a tire carrier permit shall include a $25 non-refundable application fee and an annual compliance fee as listed in OAR 340-64-063.

(12) An application for a combined tire carrier/storage permit shall include a $250 application fee, $50 of which shall be nonrefundable, and an annual compliance fee as listed in OAR 340-64-063. The rest of the application fee may be refunded in whole or in part when submitted with an application if either of the following conditions exists:

(a) The Department determines that no permit will be required;

(b) The applicant withdraws the application before the Department has granted or denied the application.

(13) The application for a waste tire carrier permit shall also include a bond in the sum of $5,000 in favor of the State of Oregon. In lieu of the bond, the applicant may submit financial assurance acceptable to the Department. The Department will accept as financial assurance only those instruments listed in and complying with requirements in OAR 340-61-034(3)(c)(A) through (G) and OAR 340-71-600(5)(a) through (c).

(14) The bond or other financial assurance shall be filed with the Department and shall provide that:

(a) In performing services as a waste tire carrier, the applicant shall comply with the provisions of ORS 459.705 through 459.790 and of this rule; and

(b) Any person injured by the failure of the applicant to comply with the provisions of ORS 459.705 through 459.790 or this rule shall have a right of action on the bond or other financial assurance in the name of the person. Such right of action shall be made to the principal or the surety company within two years after the injury.

(15) Any deposit of cash, certificate of deposit, letter of credit, or negotiable securities submitted under sections (13) and (14) of this rule shall remain in effect for not less than two years following termination of the waste tire carrier permit.

(16) A waste tire carrier permit or combined tire carrier/storage permit shall be valid for up to three years.

(17) Waste tire carrier permits shall expire on March 1. Waste tire carrier permittees who want to renew their permit must apply to the Department for permit renewal by February 1 of the year the permit expires. The application for renewal shall include all information required by the Department, and a permit renewal fee.

(18) A waste tire carrier permittee may add another vehicle to its permitted waste tire carrier fleet if it does the following before using the vehicle to transport waste tires:

(a) Submits to the Department:

(A) The information required in OAR 340-64-055 (9); and

(B) A fee of $25 for each vehicle added.

(b) Displays on each additional vehicle decals from the Department pursuant to OAR 340-64-063 (1)(b).

(19) A waste tire carrier permittee may lease additional vehicles to use under its waste tire carrier permit without adding that vehicle to its fleet pursuant to section (18) of this rule, under the following conditions:

(a) The vehicle may not transport waste tires when under lease for a period of time exceeding 30 days ("short-term leased vehicles"). If the lease is for a longer period of time, the vehicle must be added to the permittee's permanent fleet pursuant to section (18) of this rule.

(b) The permittee must give previous written notice to the Department that it will use short-term leased vehicles.

(c) The permittee shall pay a $25 annual compliance fee in advance to allow use of short-term leased vehicles, in addition to any other fees required by OAR 340-64-055 (11), (12) and (18), and 340-64-063 (7) and (9).

(e) Every permittee shall keep a daily record of all vehicles leased on short term, with beginning and ending dates used, license numbers, PUC authority, PUC temporary pass or PUC plate/marker, and person from whom the vehicles were leased. The daily record must be kept current at all times, subject to verification by the Department. The daily record shall be maintained at the principal Oregon office of the permittee. The daily record shall be submitted to the Department each year as part of the permittee's annual report required by OAR 340-64-063(5).

(f) The permittee's bond or other financial assurance required under OAR 340-64-055 (13) must provide that, in performing services as a waste tire carrier, the operator of a vehicle leased by the permittee shall comply with the provisions of ORS 459.705 through 459.790 and of this rule.

(g) The permittee is responsible for ensuring that a leased vehicle complies with OAR 340-64-055 through 340-64-063, except that the leased vehicle does not have to obtain a separate waste tire carrier permit pursuant to OAR 340-64-055 (1) while operating under lease to the permittee.

(20) A holder of a combined tire carrier/storage permit may purchase special block passes from the Department. A person located outside of Oregon who is a holder of a waste tire carrier permit issued by the Department may also purchase special block passes from the Department if he or she also holds a valid permit allowing storage of waste tires issued by the responsible state or local agency of that state, and if such permit is deemed acceptable by the Department. The block passes will allow the permittee to use a common carrier or private carrier which does not have a waste tire carrier permit. Use of a block pass will allow the unpermitted common carrier or private carrier to haul waste tires under the permittee's waste tire carrier permit.

(a) Special block passes shall be available in sets of at least five, for a fee of $5 per block pass. Only a holder of a combined tire carrier/storage permit may purchase block passes. Any unused block passes shall be returned to the Department when the permittee's waste tire permit expires or is revoked.

(b) The permittee is responsible for ensuring that a common carrier or private carrier operating under a block pass from the permittee complies with OAR 340-64-055 through 340-64-063, except that the common carrier or private carrier does not have to obtain a separate waste tire carrier permit pursuant to OAR 340-64-055(1) while operating under the permittee's block pass.

(c) A block pass may be valid for a maximum of ten days and may only

be used to haul waste tires between the origin(s) and destination(s) listed on the block pass.

(d) A separate block pass shall be used for each trip hauling waste tires made by the unpermitted common carrier or private carrier under the permittee's waste tire permit. (A "trip" begins when waste tires are picked up at an origin, and ends when they are delivered to a proper disposal site(s) pursuant to OAR 340-64-063(4).)

(e) The permittee shall fill in all information required on the block pass, including name of the common carrier or private carrier, license number, PUC authority if applicable, PUC temporary pass or PUC plate/marker if applicable, beginning and ending dates of the trip, address(es) of where the waste tires are to be picked up and where they are to be delivered, and approximate numbers of waste tires to be transported.

(f) Each block pass shall be in triplicate. The permittee shall send the original to the Department within five days of the pass's beginning date, one copy to the common carrier or private carrier which shall keep it in the cab during the trip, and shall keep one copy.

(g) The permittee shall be responsible for ensuring that any common carrier or private carrier hauling waste tires under the permittee's waste tire permit has a properly completed block pass.

(h) While transporting waste tires, the common carrier or private carrier shall keep a block pass properly filled out for the current trip in the cab of the vehicle.

(i) An unpermitted common carrier or private carrier may operate as a waste tire carrier using a block pass no more than three times in any calendar quarter. Before a common carrier or private carrier may operate as a waste tire carrier more than three times a quarter, he or she must first apply for and obtain a waste tire carrier permit from the Department.

Waste Tire Carrier Permittee Obligations

340-64-063 (1) Each person required to obtain a waste tire carrier permit shall:

(a) Comply with OAR 340-64-025(1).

(b) Display current decals with his or her waste tire carrier identification number issued by the Department when transporting waste tires. The decals shall be displayed on the sides of the front doors of each truck used to transport tires.

(c) Maintain the financial assurance required under ORS 459.730(2)(d).

(2) When a waste tire carrier permit expires or is revoked or suspended, the former permittee shall immediately remove all waste tire permit decals from its vehicles and remove the permit from display. The permittee shall surrender a revoked or suspended permit, and certify in writing to the Department within fourteen days of revocation or suspension that all Department decals have been removed from all vehicles.

(3) Leasing, loaning or renting of permits is prohibited. No permit holder shall engage in any conduct which falsely tends to create the appearance that services are being furnished by the holder when in fact they are not.

(4) A waste tire carrier shall leave waste tires for storage or dispose of them only in a permitted waste tire storage site, at a land disposal site permitted by the Department, or at another site approved by the Department, such as a site authorized to accept waste tires under the laws or regulations of another state.

(5) The Department may allow a permittee to use up to two covered containers to collect waste tires. A maximum of 2,000 tires may be so collected at any one time, and for no longer than 90 days in each container, beginning with the date when a waste tire is first placed in a container. The containers must be located at the permittee's main place of business.

(6) A waste tire carrier permittee shall inform the Department within two weeks of any change in license plate number or ownership (sale) of any vehicle under his or her waste tire carrier permit.

(7) [(5)] Waste tire carrier permittees shall record and maintain for three years the following information regarding their activities for each month of operation:

(a) The approximate quantity of waste tires collected. Quantities may be measured by aggregate loads or cubic yards, if the carrier documents the approximate number included in each load;

(b) Where or from whom the waste tires were collected;

(c) Where the waste tires were deposited. The waste tire carrier shall keep receipts or other written materials documenting where all tires were stored or disposed of.

(8) [(6)] Waste tire carrier permittees shall submit to the Department an annual report that summarizes the information collected under section (7) [(5)] of this rule. The information shall be broken down by quarters. This report shall be submitted to the Department annually as a condition of holding a permit together with the annual compliance fee or permit renewal application.

(9) [(7)] A holder of a waste tire carrier permit shall pay to the Department an annual fee in the following amount:

Annual compliance fee (per company or corporation)	$175
Plus annual fee per vehicle used for hauling waste tires	25

(10) [(8)] A holder of a waste tire carrier permit who is a private carrier meeting requirements of subsection [(8)] (10)(b) of this rule shall, instead of the fees under section (9) [(7)] of this rule, pay to the Department an annual fee in the following amount:

(a) Annual compliance fee	$25

(b) To qualify for the fee structure under subsection (10) [(8)](a) of this rule, a private carrier must:

(A) Use a vehicle with a combined weight not exceeding 26,000 lbs;

(B) Transport only such waste tires as are generated incidentally to his business; and

(C) Use the vehicle to transport the waste tires to a proper disposal site.

(c) If a vehicle owned or operated by a private carrier is used for hire in hauling waste tires, the annual fee structure under section (9) [(7)] of this rule shall apply.

(11) [(9)] A holder of a combined tire carrier/storage permit shall pay to the Department by February 1 of each year an annual compliance fee for the coming calendar year in the following amount:

Annual compliance fee (per company or corporation)	$250
Plus annual fee per vehicle used for hauling waste tires	$ 25

(12) [(10)] A holder of a waste tire carrier permit shall pay to the Department by February 15 of each year an annual compliance fee for the coming year (March 1 through February 28) as required by sections (9) [(7)] through (11) [(9)] of this rule. The permittee shall provide evidence of required financial assurance when the annual compliance fee is submitted. For the first year's operation, the full fee(s) shall apply if the carrier permit is issued on or before December 1. Any new waste tire carrier permit issued after December 1 shall not owe an annual compliance fee(s) until March 1.

(13) [(11)] The fee is $10 for a decal to replace one that was lost or destroyed.

(14) [(12)] The fee for a waste tire carrier permit renewal is $25.

(15) [(13)] The fee for a permit modification of an unexpired waste tire carrier permit, initiated by the permittee, is $15. Adding a vehicle to the permittee's fleet pursuant to OAR 340-64-055 (18), dropping a vehicle from the permitted fleet, or updating a changed license plate number of a vehicle in the permitted fleet does not constitute a permit modification. However, adding a vehicle is subject to a separate fee pursuant to OAR 340-64-055(18).

(16) (14) A waste tire carrier permittee should check with the PUC and DMV to ensure that he or she complies with all PUC and DMV regulations.

Application for Reimbursement

340-64-120 (1) Application for reimbursement for use of waste tires shall be made on a form provided by the Department.

(2) An applicant may apply in advance for certification ("advance certification") from the Department that his or her proposed use of waste tires shall be eligible for reimbursement.

(a) Such advance certification may be issued by the Department if the applicant proves to the Department's satisfaction that:

(A) The use being proposed is an eligible use under OAR 340-64-110;

(B) The applicant is an eligible end user under OAR 340-64-010(10) [and OAR 340-64-115];

(C) The applicant will be able to document that the waste tires used were generated in Oregon; and

(D) The applicant will be able to document the number of net pounds of waste tires used.

(b) The applicant must still apply to the Department for reimbursement for waste tires actually used, and document the amount of that use, pursuant to sections (3) and (4) of this rule.

(c) Advance certification issued by the Department to an applicant shall not guarantee that the applicant shall receive any reimbursement funds. The burden of proof shall be on the applicant to document that the use for which reimbursement is requested actually took place, and corresponds to the use described in the advance certification.

(3) An applicant may apply to the Department directly for the reimbursement each quarter without applying for advance certification. The application shall be on a form provided by the Department.

(4) To apply for reimbursement for the use of waste tires an applicant shall:

(a) Apply to the Department no later than thirty (30) days after the end of the quarter in which the waste tires were used.

(b) Unless the applicant holds an advance certification for the use of waste tires for which they are applying, prove to the Department's satisfaction that:

(A) The use being proposed is an eligible use under OAR 340-64-010; and

(B) The applicant is an eligible end user under OAR 340-64-010(10) and OAR 340-64-115.

(c) Provide documentation acceptable to the Department, such as bills of lading, that the tires, chips or similar materials used were from waste tires generated in Oregon.

(d) Provide documentation acceptable to the Department of the net amount of pounds of waste tires used (including embedded energy from waste tires) in the quantity of product sold, purchased or used. Examples of acceptable documentation are:

(A) For tire-derived fuel: receipts showing tons of tire-derived fuel purchased.

(B) For incineration of whole tires producing process heat, steam or electricity: records showing net tons of rubber burned.

(C) For pyrolysis plants producing electricity or process heat or steam: billings showing sales of kilowatt hours or tons of steam produced by the tire pyrolysis, calculations certified by a professional engineer showing how many net pounds of tires were required to generate that amount of energy, and receipts or bills of lading for the number of waste tires actually used to produce the energy.

(D) For pyrolysis technologies producing combustible hydrocarbons and other salable products: billings to customers showing amounts of pyrolysis-derived products sold (gallons, pounds, etc.) with calculations certified by a professional engineer showing the number of net pounds of waste tires, including embedded energy, used to produce those products.

(E) For end users of tire strips, chunks, rubber chips, crumbs and the like in the manufacture of another product: billings to purchasers for the product sold, showing net pounds of rubber used to manufacture the amount of product sold.

(F) For end users of tire chips in rubberized asphalt, or as road bed material and the like: billings or receipts showing the net pounds of rubber used.

(G) For end users of whole tires: documentation of the weight of the tires used, exclusive of any added materials such as ballast or ties.

(5) The Department may require any other information necessary to determine whether the proposed use is in accordance with Department statutes and rules.

(6) An applicant for a reimbursement for use of waste tires, and the person supplying the waste tires, tire chips or similar materials to the applicant, for which the reimbursement is requested, are subject to audit by the Department (or Secretary of State) and shall allow the Department access to all records during normal business hours for the purpose of determining compliance with this rule.

(7) In order to apply for a reimbursement, an applicant must have used an equivalent of at least 10,000 pounds of waste tires or 500 passenger tires after the effective date of this rule. Waste tires may be used in more than one quarter to reach this threshold amount.

Use of Waste Tire Site Cleanup Funds

340-64-150 (1) The Department may use cleanup funds in the Waste Tire Recycling Account to:

(a) Partially pay to remove or process waste tires from a permitted waste tire storage site, if the Commission or Director finds that such use is appropriate pursuant to ORS 459.780(2) and OAR 340-64-160.

(b) Pay for abating a danger or nuisance created by a waste tire pile, subject to cost recovery by the attorney general pursuant to OAR 340-64-165.

(c) Partially reimburse a local government unit for the cost it incurred in abating a waste tire danger or nuisance. The Department may reimburse from 90 to 99 percent of the cleanup cost based on the degree of environmental risk posed by the site, as determined by OAR 340-64-155.

(2) The Commission authorizes the Director to make a finding of whether use of cleanup funds is appropriate to assist a permittee, pursuant to ORS 459.780(2), provided that the Director's finding is based on criteria in OAR 340-64-150, 340-64-155 and 340-64-160.

(3) [(2)] Priority in use of cleanup funds shall go to sites ranking high in criteria making them an environmental risk, pursuant to OAR 340-64-155.

(4) [(3)] For the Department to reimburse a local government for waste tire danger or nuisance abatement, the following must happen:

(a) The Department must determine that the site ranks high in priority criteria for use of cleanup funds, OAR 340-64-155.

(b) The local government and the Department must have an agreement on how the waste tires shall be properly disposed of.

(5) The Department may condition use of Waste Tire Recycling Account funds on use of a contractor who has a performance record free of significant violations of waste tire storage and carrier rules and statutes for the three years prior to a subject cleanup.

Criteria for Use of Funds to Clean Up Permitted Waste Tire Sites

340-64-155 (1) The Department shall establish an environmental ranking of permittees requesting cleanup funds based [base its recommendations on use of cleanup funds] on potential degree of environmental risk created by

the tire pile. Sites with a higher ranking will in general be cleaned up before lower ranked sites. The following special circumstances shall serve as criteria in determining the degree of environmental risk. The criteria, listed in priority order, include but are not limited to:

(a) Susceptibility of the tire pile to fire. In this, the Department shall consider:

(A) The characteristics of the pile that might make it susceptible to fire, such as how the tires are stored (height and bulk of piles), the absence of fire lanes, lack of emergency equipment, presence of easily combustible materials, and lack of site access control;

(B) How a fire would impact the local air quality; and

(C) How close the pile is to natural resources or property owned by third persons that would be affected by a fire at the tire pile.

(b) Other characteristics of the site contributing to environmental risk, including susceptibility to mosquito infestation.

(c) Other special conditions which justify immediate cleanup of the site.

(d) A local fire district or a local government deems the site to be a danger or nuisance, or an environmental concern that warrants immediate removal of all waste tires.

(2) In determining the degree of environmental risk involved in the two criteria above, the Department shall consider:

(a) Size of the tire pile (number of waste tires).

(b) How close the tire pile is to population centers. The Department shall especially consider the population density within five miles of the pile, and location of any particularly susceptible populations such as hospitals.

(3) In the case of a waste tire storage permittee which is also a local government:

(a) The following special circumstances may also be considered by the Department in determining whether financial assistance to remove waste tires is appropriate:

(A) The tire pile was in existence before January 1, 1988.

(B) The waste tires were collected from the public, and the local government did not charge a fee to collect the tires for disposal.

(C) The pile consists of at least 1,000 waste tires.

(b) If [both] all the above conditions are present, the Department may assist the local government with up to 80 percent of the net cost of tire removal[.], based on an index. The index will be determined by dividing the local government's population by the number of waste tires at the site. The percentage of cleanup cost which could be covered by financial assistance is as follows:

Table 1: Financial Assistance to Local Governments

Index	% Financial Assistance
Less than 1.0	80%
1.0 - 9.9	70%
10.0 - 99.9	60%
100.0 - 499.9	50%
Greater than 500	25%

(c) If a local government is out of compliance with its waste tire

storage permit, the percentage of financial assistance from Table 1 may be reduced by 10 percentage points.

(4) Financial hardship on the part of the permittee [or responsible party] shall be an additional criterion in the Department's determination of the amount of cleanup funds appropriate to be spent on a site. Financial hardship means that strict compliance with OAR 340-64-005 through 340-64-045 would result in substantial curtailment or closing of the permittee's business or operation, or the bankruptcy of the permittee. The burden of proof of such financial hardship is on the permittee. In interpreting when "financial hardship" may result, the Department may use the following as guidelines:

(a) In the case of a permittee who is not a corporation or a local government, the cost of cleaning up the tires:

(A) Would cause the permittee's annual gross household income to fall below the state median income as determined by the U.S. Department of Housing and Urban Development; and/or

(B) Would reduce the permittee's net assets (excluding one automobile and homestead) to below $20,000.

(b) In the case of a permittee which is a corporation, the cost of complying with the tire removal schedule required by the Department:

(A) Would cause the annual gross household income of each of the corporate officers who are also corporate stockholders to fall below the state median income as determined by the U.S. Department of Housing and Urban Development; and/or

(B) Would reduce the net assets (excluding basic assets of building, equipment and inventory) of the corporation to below $20,000; and

(C) Would, as certified in a statement from the corporation's accountant or attorney, cause substantial curtailment or closing of the corporation, or bankruptcy.

(5) The Department may assist a permittee with the cost of tire removal to the following extent:

(a) For a permittee whose income and/or assets are above the thresholds in section (4) of this rule: the permittee is required to contribute its own funds to the cost of tire removal up to the point where "financial hardship," as specified in section (4), would ensue. The Department may pay the remaining cost of the cleanup up to a maximum of 90 percent (for individuals) or 80 percent (for corporations) of the total cost of the cleanup.

(b) For a permittee whose income and assets fall below the thresholds in section (4) of this rule, the Department may pay up to the following percentage of the cost of cleanup:

(A) For an individual or a partnership: up to 90 percent of the cost (plus any cost of waste tire storage permit fees paid by the permittee);

(b) For a corporation: up to 80 percent of the cost.

(6) The Department may reduce to $1,500 the permittee's required contribution to the cleanup cost in the case of a permittee whose net equity in assets exempt under section (4) of this rule is less than $50,000, or who is over 65 years of age and whose net exempt assets are less than $100,000.

(7) A permittee may receive financial assistance for no more than one complete waste tire removal or processing job.

(8) The Department may advance funds for up to 100 percent of the cost of the cleanup of a permitted waste tire site, if:

(a) The permittee demonstrates that it cannot pay its share of the cleanup cost at the time the cleanup is completed;

(b) The permittee signs an agreement to repay the Department its share of the cleanup costs within a schedule agreeable to the Department, and with such guarantees as the Department deems appropriate.

Procedure for Use of Cleanup Funds for a Permitted Waste Tire Storage Site

340-64-160 (1) The Department may recommend to the Commission or the Director may find that cleanup funds should be made available to partially pay for cleanup of a permitted waste tire storage site, if all of the following are met:

(a) The site ranks high in the criteria making it an environmental risk, pursuant to OAR 340-64-155.

(b) The permittee submits to the Department a compliance plan to remove or process the waste tires. The plan shall include:

(A) A detailed description of the permittee's proposed actions, including how the waste tires will be processed or recycled;

(B) A time schedule for the removal and or processing, including interim dates by when part of the tires will be removed or processed[.];

(C) An estimate of the net cost of removing or processing the waste tires using the most cost-effective alternative. This estimate must be documented[.];

(D) Three bids obtained from responsible contractors. The plan shall also show that the permittee selected the lowest responsible contractor. The contractor shall either be or subcontract with a waste tire carrier permitted by the Department, or be capable of processing the waste tires on site.

(c) The plan receives approval from the Department.

(2) A permittee claiming financial hardship under OAR 340-64-155(4) must document such claim through submittal of the permittee's state and federal tax returns for the past three years, business statement of net worth, and similar materials. If the permittee is a business, the income and net worth of other business enterprises in which the principals of the permittee's business have a legal interest must also be submitted.

(3) If the Commission or the Director finds that use of cleanup funds is appropriate, the Department shall agree to pay part of the Department-approved costs incurred by the permittee to remove or process the waste tires. Final payment shall be withheld until the Department's final inspection and confirmation that the tires have been removed or processed pursuant to the compliance plan.

Use of Cleanup Funds for Abatement by the Department

340-64-165 (1) The Department may use funds in the Account to contract for the abatement of:

(a) A tire pile for which a person has failed to apply for or obtain a waste tire storage site permit.

(b) A permitted waste tire storage site if the permittee fails to meet the conditions of such permit.

(2) The Department may abate any danger or nuisance created by waste tires by removing or processing the tires. The Department shall follow environmental risk criteria in OAR 340-64-155 in determining which sites shall be subject to abatement.

(3) Before taking any action to abate the danger or nuisance, the Department shall give any persons having the care, custody or control of the waste tires, or owning the property upon which the tires are located, notice of the Department's intentions and order the person to abate the danger or nuisance in a manner approved by the Department.

(4) Any order issued by the Department under this subsection shall be subject to appeal to the Commission and judicial review of a final order under the applicable provisions of ORS 183.310 to 183.550.

(5) If a person fails to take action as required under subsection (3) of this section within the time specified, the Director may contract to abate the danger or nuisance.

(6) The order issued under subsection (3) of this section may include entering the property where the danger or nuisance is located, taking the tires into public custody and providing for their processing or removal.

(7) The Department may request the attorney general to bring an action to recover any reasonable and necessary expenses incurred by the Department for abatement costs, including administrative and legal expenses. The Department's certification of expenses shall be prima facie evidence that the expenses are reasonable and necessary. The Department may consider the financial situation of the person in determining the amount of abatement costs to be recovered.

ATTACHMENT B

RULEMAKING STATEMENTS
for
Proposed Revisions to Existing Rules
Pertaining to Transportation of Waste Tires,
Cleanup of Tire Piles,
and Eligibility for Reimbursement for Use of Waste Tires

OAR Chapter 340, Division 64

Pursuant to ORS 183.335, these statements provide information on the intended action to adopt a rule.

STATEMENT OF NEED:

Legal Authority

The 1987 Oregon Legislature passed the Waste Tire Act regulating the disposal, storage and transportation of waste tires, and establishing a fund to clean up waste tire piles and reimburse persons who use waste tires. ORS 459.785 requires the Commission to adopt rules and regulations necessary to carry out the provisions of ORS 459.705 to 459.790. ORS 459.770 requires the Commission to adopt rules to carry out the provision of that section pertaining to reimbursement for use of waste tires. The Commission is adopting revisions to existing rules which are necessary to carry out the provisions of the Waste Tire Act.

Need for the Rule

Improper storage and disposal of waste tires represents a significant problem throughout the State. The Waste Tire Act establishes a comprehensive program to regulate and disposal, storage and transportation of waste tires. The purpose of the reimbursement is to stimulate the market for waste tires, providing an alternative to landfill disposal. The rule revisions are needed to make changes the Department has found necessary in administering this program.

Principal Documents Relied Upon

a. Oregon Revised Statutes, Chapter 459.
b. Oregon Administrative Rules, Chapter 340, Division 64.

LAND USE CONSISTENCY STATEMENT:

The proposed rules appear to affect land use and appear to be consistent with Statewide Planning Goals and Guidelines.

With regard to Goal 6 (Air, Water and Land Resources Quality), the rules provide for the proper collection and storage of waste tires by waste tire carriers.

With regard to Goal 11 (Public Facilities and Services), the rule incorporates criteria for determining the amount of financial assistance for waste tire cleanup which could be given to a local government which is a waste tire storage permittee. This will assist local governments to properly dispose of waste tires.

The rules do not appear to conflict with other Goals.

Public comment on any land use issue involved is welcome and may be submitted in the manner described in the accompanying NOTICE OF PUBLIC HEARING.

It is requested that local, state and federal agencies review the proposed action and comment on possible conflicts with their programs affecting land use and with Statewide Planning Goals within their expertise and jurisdiction.

The Department of Environmental Quality intends to ask the Department of Land Conservation and Development to mediate any apparent conflicts brought to our attention by local, state or federal authorities.

rmkgst.del

ATTACHMENT C

FISCAL AND ECONOMIC IMPACT STATEMENT

I. Introduction

The rule delegates from the Environmental Quality Commission to the Director of the Department of Environmental Quality authority to approve financial assistance requests to waste tire permittees to help them clean up tire piles. This delegation would remove a fairly routine decision from consideration by the Commission.

The rule also establishes as rule, criteria which determine the amount of financial assistance which may be given to a local government waste tire storage permittee for waste tire pile cleanup. The Department has used these same criteria as guidelines in previous recommendations, but now intends to adopt them as rule.

The rule allows the Department to advance up to 100 percent of the cost of tire pile cleanups for permittees who lack financial resources to pay their share of the cleanup costs at the time of the cleanup. All permittees are required to contribute some funds to the cleanup of their waste tire piles. The Department would require that a payback agreement be signed between the permittee and the Department specifying terms of the payment of the permittee's share of the cleanup costs.

II. General Public

The general public is not directly affected economically by these rule changes.

Members of the public who also hold waste tire storage permits may be eligible for financial assistance in removing waste tires. If they are unable to advance cash for their share of the cleanup costs, their payment could be made easier by the Department's willingness to advance 100 percent of the cost of tire removal. They could be allowed to repay the Department over time, in effect receiving an interest-free loan.

III. Small Business

Small businesses holding waste tire storage permits and requesting financial assistance for the removal of waste tires would be affected in the same way as members of the general public (above) by the Department's willingness to advance the total cost of the tire cleanup.

IV. Large Business

The same remarks are true for large businesses.

V. Local Governments

The rule establishes criteria for the amount (percentage of the cleanup cost) of financial assistance with waste tire cleanup which a local government waste tire permittee could receive from the Department. The criteria are based on an index, which divides the local government's population by the number of waste tires at the site. This is a proxy for the financial capability of the local government. A local government with small population and a large number of waste tires to be cleaned up would receive a higher percentage of assistance (up to 80%) than a municipality with a larger population and a smaller waste tire pile. The Commission has approved three applications for financial assistance to local governments, using this index as a guideline. The amount of assistance in each case has been 80% of the cost, ranging from a Department contribution of from $77,000 to $480,000. There may be two or three more local governments which could take advantage of this rule.

Another part of the rule revisions allows the reimbursement for use of waste tires in a paving project to go to either a local paving authority (a unit of local government) or a paving contractor. This allows administrative flexibility for a local government implementing a paving project using crumb rubber from waste tires, depending on the local government's bookkeeping procedures. This would have no direct economic impact, but could simplify accounting procedures.

VI. State Agencies

The impact discussed for local government paving projects using rubber from waste tire could also apply to state agencies conducting such projects.

fiscal.del

Oregon Department of Environmental Quality

A CHANCE TO COMMENT ON...

Proposed Rules Relating to Regulating Transportation of Waste Tires; Cleanup of Waste Tire Piles; and Reimbursement of Persons Using Waste Tires

Hearing Date: 9/19/90
Comments Due: 9/24/90

WHO IS AFFECTED: Persons hauling waste tires. Waste tire storage permittees. Persons using rubber from waste tires for highway paving projects. Waste tire processors. Local governments.

WHAT IS PROPOSED: The Department proposes to revise existing administrative rules OAR 340-64-010, 340-64-055, 340-64-063, 340-64-120, 340-64-150, 340-64-155, 340-64-160 and 340-64-165, which establish procedures governing waste tire carrier permits, and procedures for tire pile cleanup and reimbursement to persons using waste tires.

WHAT ARE THE HIGHLIGHTS: Rule revisions will delegate to the Director the authority to approve financial assistance to waste tire permittees to clean up tire piles, will establish an index determining the amount of financial assistance a local government waste tire storage permittee will be eligible for to clean up tire piles, and will allow the Department to advance up to 100 percent of tire pile cleanup costs to a permittee. Rule revisions include other changes the Department has found necessary in administering the program.

HOW TO COMMENT: A public hearing will be held before a hearings officer at:

10:00 a.m.
Wednesday, September 19, 1990
Department of Environmental Quality
Hearing Room 3A
811 S.W. 6th Avenue
Portland, OR

Written or oral comments on the proposed rule changes may be presented at the hearing. Written comments may also be sent to the Department of Environmental Quality, Waste Tire Program, Hazardous and Solid Waste Division, 811 S.W. 6th Avenue, Portland, OR 97402, and must be received no later than 5:00 p.m., Monday, September 24, 1990.

(over)

811 S.W. 6th Avenue
Portland, OR 97204

11/1/86

FOR FURTHER INFORMATION:

Contact the person or division identified in the public notice by calling 229-5696 in the Portland area. To avoid long distance charges from other parts of the state, call 1-800-452-4011.

Copies of the complete proposed rule package may be obtained from the DEQ Hazardous and Solid Waste Division. For further information, contact Deanna Mueller-Crispin at 299-5808, or toll-free at 1-800-452-4011.

WHAT IS THE NEXT STEP: The Environmental Quality Commission may adopt rule revisions identical to the ones proposed, adopt modified rules as a result of testimony received, or may decline to adopt rules. The Commission will consider the proposed rule revisions at its November 2, 1990 meeting.

WT\SK2880

ATTACHMENT E

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: September 19, 1990

TO: Environmental Quality Commission

FROM: Deanna Mueller-Crispin, Hearing Officer

SUBJECT: Public Hearing, Proposed Amendments to Waste Tire Program Rules
Portland, 10 a.m., September 19, 1990

On September 19, 1990, a public hearing regarding proposed revisions to existing rules pertaining to waste tire storage, hauling and cleanup and reimbursement to persons using waste tires (OAR 340-64) was held in Portland, Oregon. Three persons attended (plus another who arrived after the official hearing had been closed), and one testified.

Patrick Vaughn of RMAC International testified that he had no problems with the proposed rule changes.

The hearing was closed at about 10:30 a.m.

ATTACHMENT E

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: September 21, 1990

TO: Environmental Quality Commission

FROM: Deanna Mueller-Crispin, Hearing Officer

SUBJECT: Written Testimony: Proposed Amendments to WAste Tire Program Rules

Written testimony was received by the Department in response to a request for public comment regarding proposed revisions to existing rules pertaining to waste tire storage, hauling and cleanup and reimbursement to persons using waste tires.

A summary of the written testimony follows.

Mark W. Hope of Waste Recovery, Inc. opposed the rule change that would delegate to the Director approval authority for financial assistance to permittees for tire pile cleanups. He expressed a concern that this could result in the Director effecting policy when large capital expenditures are involved. He noted that if funds in the Waste Tire Recycling Account become scarce, spending priorities will have to be balanced between cleanups and other program activities [such as reimbursement to users of waste tires]. He commented that since the program may approve $100,000's of dollars, it was appropriate to keep the process of allocating these public funds open to public purview. He suggested an alternative would be to limit the size of financial assistance requests to be approved by the Director to $20,000 or less, retaining EQC review of larger amounts.

An anonymous comment was received suggesting that storage for waste tires should be provided at places that process the tires.

Copies of the written comments are attached.

Attachments
wrcom.mem

WASTE RECOVERY, INC.
MAKING WASTE A RESOURCE

8501 N. Borthwick
Portland, Oregon 97217
503/283-2261

August 30, 1990

Oregon Department of Environmental Quality
Waste Tire Program, H & SW Division
811 S.W. 6th Avenue
Portland, Oregon 97204.

RE: Comment on Proposed Rule Change to Delegate to the Director Approval Authority for Clean Up Financial Assistance

POSITION: Opposed to rule change which would delegate approval authority to the Director.

EXPLANATION:

Although the DEQ is well meaning in their attempt to expedite the process for approval of funds to assist storage permittees to clean up tire piles, I would recommend that the EQC keep the existing process for the following reason(s):

1) Clean up funds can range from a $1,000 to several $100,000's depending on size, location, recovery process, etc. A question arises as to whether the Director can effect policy in his duties to administer large capital funding. History has shown us, not necessarily within DEQ, that administrators can effect policy through their action to appropriate funds.

   A theoretical example: If funds in the Waste Tire Recycling Account became scarce and there were several competing public interests for these scarce funds, then spending priorities for clean up as well as for other components of the program will have to be evaluated, confirmed and or adjusted within the limits of Oregon Statutes. Rather than the Director making decisions after listening to staff recommendations, which infers singular and final personal judgment, it would be better for the EQC to retain their approval role. Priority adjustments should be made by the Commission as this is a policy issue.

   A practical example: The Waste Tire Program initially approved funds to clean-up projects where tires were simply moved from one pile to another. Once the potential for extended liability and a lack of emphasis on recovery was brought before the policy makers, the policy was shifted, perhaps at a higher cost, in favor of recovery over simple removal. A switch that may not have been made without policy review.

2) The public process by the Commission to act on authorization of funds for clean up projects provides opportunity for comment and due process with a review board on the appropriateness, viability, and/or the fairness of individual financial assistance. The current process is visible with no or little mystique. Since $100,000's of dollars are involved, it best keep the process open. As proposed, the process would then be closed, if not literally at least figuratively, to public purview. This program parallels pollution control tax credits in that money is made available to assist individuals or companies in an effort to benefit the environment while financial liability is incurred by the State. Like tax credits, this allocation of public funds should be reviewed by the Commission.

ALTERNATIVE:

Limit the size of the financial assistance to be approved by the Director to $20,000 or less. This will prevent the EQC from being bogged down with numerous small financial assistance requests, and yet reserve their process for larger expenditures. This approach assumes smaller clean up expenditures would be less controversial and less likely to effect policy than those that are more costly.

Sincerely,

Mark W. Hope
Vice President Northwest Region
& Corporate Environmental Affairs

MWH/el

ATTACHMENT F

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: September 27, 1990

TO: Environmental Quality Commission

FROM: Deanna Mueller-Crispin, Hearing Officer

SUBJECT: Response to Testimony/Comments, Proposed Revisions in Waste Tire Rules

The Department held a public hearing on proposed rule revisions to the waste tire program rules, and accepted written public comment on the rule until September 24, 1990.

The only comments received concerned proposed delegation of approval authority of financial assistance from the Environmental Quality Commission to the Director of the Department.

Comment: Large sums of money may be involved in requests from permittees for financial assistance for tire pile cleanups. This could result in the Director effecting policy through his action to appropriate funds. If funds in the Waste Tire Recycling Account become scarce, spending priorities will have to be balanced between cleanups and other program activities. Priority adjustments should be made by the Commission as this is a policy issue.

Response: Policy has already been adopted in rule (OAR 340-64-090) that available funds shall be used first to reimburse people who use waste tires; and second to clean up permitted and non-permitted waste tire piles. If funds become scarce, the Department will follow that policy in their allocation.

Comment: Since $100,000's of dollars may be involved, it is best to keep the process of their allocation open through the Commission's public process with its opportunity for comment and review. Delegating approval authority to the Director would close the process.

Response: Criteria have been adopted by the Commission into rule to determine how much funding assistance will be given to any permittee. The rules leave little discretion concerning the amount of assistance. Thus the basis for recommending the amount of assistance will not change whether the recommendation is considered by the Commission or by the Director. In addition, nearly all of the permittees with larger waste tire piles have already received cleanup funding approval from the Commission.

Comment: An alternative would be to limit the size of the financial assistance to be approved by the Director to $20,000 or less. This would relieve the Commission of having to review smaller requests, which are less likely to effect policy.

Response: Given that the Commission has approved criteria for determining the amount of financial assistance for permittees, the Department believes it is appropriate to delegate the approval authority for all levels of assistance. The Department does not expect any new policy issues to arise in providing financial assistance to permittees. However, the Department also believes the rule should provide the option of referring such requests to the Commission should cases arise in the future which the Department deems appropriate for the Commission to consider.

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ATTACHMENT G

MAJOR REMAINING WASTE TIRE SITES TO BE CLEANED UP
(10/15/90)

Site	County	Type of Cleanup	Status	No. Tires	Est. Cost	Est.Date Cleanup
Permittees with ECQ Approval: (Cleanup in process)						
R. Mishler	Polk	permit	appr.	200,000	$105,000	9/91
Joe Ney	Coos	permit	appr.	200,000	96,000	1/91
Harpold	Klamath	permit	appr.	750,000	596,800	7/92
C. Haas	Jackson	permit	appr.	85,000	380,000	8/91
S. Wilson	Jackson	permit	appr.	500,000	600,000	8/93
Douglas Co.	Douglas	permit	appr.	25,000	22,300	90
Cleanup Yet to be Determined for:						
Remoir	Yamhill	abate	dev.	60,000(t)	300,000	8/91
Walker	Jackson	abate	dev.	10,000(f)	10,000	91/92
J.C. Allen	Jackson	abate?	dev.	1,500(t.f,)	4,000	90?
5 other fences	Jackson	abate?	dev.	10,000(f)	20,000	90?
Kammer et al	Columbia	abate	dev.	30,000(f)	50,000	91
B&S Auto	Harney	permit	dev.	60,000	100,000	12/91
R. Busk	Josephine	abate	dev.	28,000	78,000	5/91
B. Haynes	Polk	abate	dev.	10,000?	10,000	91
Worre	Clackamas	abate	dev.	10,000	5,000	91
Tri-City	Polk	abate	hold	5,000	5,000	4/91
USFS	Clackamas?	I.A.	hold	10,000	30,000	91
G. Seifert	Lane	permit?	hold	5,000	5,000	91
K. Wilson	Jefferson	abate	hold	1,000	1,000	91
Petefish	Wasco	abate	hold	20,000	25,000	91
E. Benjamin	Multnomah	abate	hold	1,000	1,000	91
Melcher	Clackamas	abate	hold	5,000	7,000	91
M. Esters	Multnomah	abate	hold	2,000	2,000	91
(new site)	Jackson	abate	hold	4,000	8,000	90-91?
Schommer	Multnomah	abate	hold	2,500?	2,000	91?
Dayton A Wrec.	Yamhill	abate?	hold	10,000	9,000	91?
Longyear	Lincoln	abate?	hold	1,000	800	92?
Greenhill AW	Lane	abate?	hold	1,000	800	92?
O'lake Towing	Lincoln	abate?	hold	1,000	800	92?
Les Schwab	Crook	permit	hold	2.5 mil.	?	?
(Plus up to 400 small sites)						

Key: appr. = approved by EQC for financial assistance
t = truck tires
f = tire fence
dev. = under development
I.A. = Intergovernmental Agreement (with local government)

Note: Some sites need to have status and number of waste tires verified.

lstcln

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: November 1, 1990

TO: Environmental Quality Commission

FROM: Deanna Mueller-Crispin, Waste Tire Program Coordinator

SUBJECT: Agenda Item F: Addition to Proposed Waste Tire Rule Changes, Division 64

Following is a possible addition to the proposed Waste Tire rule changes delegating authority to the Director to approve financial assistance. This addition would specify that, in approving requests for financial assistance to clean up waste tire piles, the Director would follow the priority order for use of the Waste Tire Recycling Account as established by OAR 340-64-090. This order is: 1) reimbursement to people who use waste tires; and 2) cleanup of permitted or non-permitted waste tire storage sites.

This would be an additional change to the text on page A - 11 (Attachment A) to the Staff Report:

Use of Waste Tire Cleanup Funds

340-64-150 (1) The Department may use cleanup funds in the Waste Tire Recycling Account, subject to the priorities set in 340-64-090, to:

(etc.)

NEIL GOLDSCHMIDT
GOVERNOR

Environmental Quality Commission

811 SW SIXTH AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

REQUEST FOR EQC ACTION

Meeting Date: November 2, 1990
Agenda Item: G
Division: HSW
Section: Solid Waste

SUBJECT:

Proposed Adoption of rules to implement required surcharge on out-of-state solid waste.

PURPOSE:

To adopt a proposed rule establishing a per-ton surcharge on the disposal of out-of-state solid waste in Oregon. The surcharge was mandated by the 1989 Oregon Legislature, and will go into effect after January 1, 1991.

ACTION REQUESTED:

___ Work Session Discussion
- ___ General Program Background
- ___ Potential Strategy, Policy, or Rules
- ___ Agenda Item ___ for Current Meeting
- ___ Other: (specify)

___ Authorize Rulemaking Hearing
_X_ Adopt Rules
- Proposed Rules — Attachment A
- Rulemaking Statements — Attachment B
- Fiscal and Economic Impact Statement — Attachment C
- Public Notice — Attachment E

___ Issue a Contested Case Order
___ Approve a Stipulated Order
___ Enter an Order
- Proposed Order — Attachment ___

___ Approve Department Recommendation
- ___ Variance Request — Attachment ___
- ___ Exception to Rule — Attachment ___
- ___ Informational Report — Attachment ___
- ___ Other: (specify) — Attachment ___

DESCRIPTION OF REQUESTED ACTION:

House Bill 3515, passed by the 1989 Oregon Legislature, requires the Environmental Quality Commission (EQC) to establish a surcharge on out-of-state solid waste disposed of in Oregon. Key parts of the legislation include:

> "Beginning on January 1, 1991, every person who disposes of solid waste generated out-of-state in a disposal site or regional disposal site shall pay a surcharge as established by the Environmental Quality Commission.." (ORS 459.297).
>
> The moneys collected through the surcharge are to be "continuously appropriated to (DEQ) to meet the costs of the department in administering the solid waste program" (ORS 459.297).
>
> "The amount of the surcharge shall be based on the costs to the State of Oregon and its political subdivisions which are not otherwise paid for through the provisions of ORS 459.235 and ORS 459,292 to 459.298, 459.411 to 459.417 and sections 70 to 73, chapter 833, Oregon Laws 1989." (ORS 459.298)

Oregon is not the first state to deal with the issue of waste being imported from other states. In recent years, many states have adopted or proposed regulations that impose special fees or other regulatory controls on out-of-state waste. A recent report from the National Solid Waste Management Association (NSWMA) identifies 11 states that have adopted such measures, ranging from an Indiana law that imposes the average cost for disposal in the state of origin, to a $1 per ton fee in West Virginia. The highest fee appears to be in Kentucky, where counties may assess a fee 25% higher for out-of-state waste. The lowest appears to be Alabama, where one county has a $.50 per ton differential on out-of-state waste. Many of these laws are currently under court challenge.

The 1989 legislature also created, through Senate Bill 1192, a Solid Waste Regional Policy Commission to study the impacts of accepting out-of-state waste and to recommend policies for addressing any identified problems. Under the chairmanship of Judge Kevin Campbell from Grant County, this commission has met several times, and has released an interim report to the Governor and the Legislature on its deliberations. The Regional Policy Commission's scope is broader and it has made no formal recommendation on the amount of the surcharge. The Regional

Policy Commission has, however, endorsed the present process whereby the EQC set a surcharge on out-of-state waste.

The Department held three public hearings on the proposed rules, and public comment was received on a range of possible surcharge rates from $1.50 per ton to $3.50 per ton. The Department also hired an independent economics consultant, National Economic Research Associates (NERA) to review the Department's methodology in calculating the costs of accepting out-of-state waste, and accepted public testimony on both the draft and final NERA reports.

Based upon the public testimony and the NERA report, the Department has made a number of significant revisions to the methodology used to establish the level of the surcharge. These revisions have been discussed with the Solid Waste Advisory Committee and include:

- Changes to the Assumptions, Definitions, and Methodology section which now includes:
  - * an assumed annual real discount rate (3%);
  - * an assumed level of import during the first four years (600,000 tons/year);
  - * a recommended adjustment for inflation after four years; and
  - * a discussion of why one surcharge rate rather than multiple rates was recommended.
- A more detailed analysis and documentation of how costs were calculated.
- A discounting of cost streams that occur over periods of time, using a 3% annual real discount rate.
- Revisions in methodology to respond to recommendations made by NERA.

The Department also received lengthy public testimony from Oregon Waste Systems, Inc. challenging the legal and constitutional authority of the EQC to establish the proposed surcharge on out-of-state waste. The Department asked the Department of Justice to review this testimony and the attorneys for the Department of Justice have concluded that the proposed surcharge is legally and constitutionally defensible.

Definitions, and Methodology which now includes the following: (see Attachment D for more detail)

1. The surcharge cannot be based upon an accounting of historic costs. Rather, it must be based upon a reasonable estimate of expected costs that take into account a range of possible circumstances. The Department has chosen to estimate a range of potential costs for each category, and to recommend a "reasonable" surcharge within that range.

2. The legislation specifically states that the funds shall go to meet the costs of "administering the solid waste program". However, the costs to be included in determining the amount of the surcharge should **not** be limited to those directly related to solid waste management.

   The statute clearly states that the amount of the surcharge "shall be based on the costs to the State of Oregon and its political subdivisions of disposing of solid waste generated out of state..." The statute further states, " These costs may include <u>but need not be limited to</u> (emphasis added) costs incurred for:

   (1) Solid waste management;

   (2) Issuing new and renewal permits for solid waste disposal sites;

   (3) Environmental monitoring;

   (4) Groundwater monitoring; and

   (5) Site closure and post-closure activities."

3. The amount of the surcharge is to be determined by a reasonable assessment of the costs to Oregon of accepting out-of-state waste. The surcharge amount should <u>not</u> be inflated to discourage importation of waste, nor deflated to encourage importation of waste.

4. Alternative ways to address potential costs through changes in rule or statute were not considered. However, as the NERA report suggests, there may be more efficient ways than the surcharge to address some of the costs.

5. Estimates of the cost of tax credits and other subsidies are based upon eligibility. It is presumed that private companies will generally apply for and receive the maximum subsidy for which they are eligible.

6. The statute (ORS 459.298) identifies specific costs (those already covered under permit fees which pay for technical review and compliance monitoring of specific disposal sites) which should not be included as part of the analysis. In addition, the Department has decided not to include costs that are covered through any other fees or taxes. Other specific fees considered include permit fees, PUC per-mile taxes, and host community fees. There should be no double counting.

7. Because of the administrative complexity of assigning different surcharge amounts to different sites, there will be one surcharge rate for all out-of-state waste disposed of in Oregon. This one per-ton surcharge rate will cover a range of circumstances.

8. Calculations are based upon costs and volumes expected during the next 4 years. However, in some cases looking at the impacts during the next four years requires analysis of a longer-range cost stream. To account for expected inflation, a clause in the proposed rule enables the Environmental Quality Commission to review and adjust the per-ton fee every four years.

9. During the next four years, an average of 600,000 tons per year of solid waste is expected from out-of-state generators.

10. A real discount rate of 3% is used in the Department's calculations.

Using the estimates developed in the revised analysis, the Department has developed a range of estimated costs of accepting out-of-state waste:

$.50	Statewide activities for reducing environmental risk and improving solid waste management, paid for through the per-ton fee on domestic solid waste
$.42	Statewide activities for reducing environmental risk and improving solid waste management, paid for through general funds

$.20 - 1.51	Tax credits and other public subsidies
$.05	Solid waste reduction activities related to the review and certification of waste reduction and recycling plans
$.03 - .72	Increased environmental liability
$.20	Lost disposal capacity
$.33 - .65	Lost tourism or business development revenues due to stigma of accepting out-of-state waste
$.02 - .05	Publicly Supported Infrastructure
$.01 - .03	Nuisance Impacts from transportation
$1.76 - 4.13	Total

The surcharge on out-of-state waste should therefore be within this range of potential costs of $1.76 to $4.13 per ton.

AUTHORITY/NEED FOR ACTION:

X	Required by Statute: ORS 459.297 Enactment Date: July 1989	Attachment F
___	Statutory Authority:	Attachment ___
___	Pursuant to Rule:	Attachment ___
___	Pursuant to Federal Law/Rule:	Attachment ___
___	Other:	Attachment ___
X	Time Constraints: (explain)	

The legislature set January 1, 1991 as the date the surcharge is to go into effect. This requires final approval of the rule by the EQC at its November 2 meeting and authorization by the state Emergency Board at its November 15 meeting.

DEVELOPMENTAL BACKGROUND:

__	Advisory Committee Report/Recommendation	Attachment ___
_X_	Hearing Officer's Report/Recommendations	Attachment _G_
_X_	Response to Testimony/Comments	Attachment _H_
___	Prior EQC Agenda Items: (list)	
	8/10/90 - Item D Hearing Authorization	Attachment ___
_X_	Other Related Reports/Rules/Statutes:	Attachment _I_
_X_	Supplemental Background Information	Attachment _D_

REGULATED/AFFECTED COMMUNITY CONSTRAINTS/CONSIDERATIONS:

At this time, the primary target of this fee will be large regional disposal sites in Gilliam and Morrow counties, and communities in the state of Washington that are considering sending waste to these two sites. During the next biennium, these regional sites are expected to begin importing solid waste from the City of Seattle, Clark County, and several smaller jurisdictions at a rate of about 600,000 tons per year. The Department expects 800,000 tons to be imported during the 1991-1993 biennium.

The other major affected communities will be Morrow and Gilliam counties, who receive benefits from the importation of out-of-state waste in the form of per-ton host fees and thus consider importation of waste a significant form of economic development for these rural counties. Written testimony was received to this effect from Gilliam County, Morrow County, the Arlington Chamber of Commerce, the Port of Morrow, and the Morrow County Planning Commission. (See attachment G) Testimony received from both Oregon Waste Systems, Inc. and Tidewater Barge Lines outlined significant economic benefits that accrue to these communities as a result of importing out-of-state waste, and argued that these benefits should be taken into account when calculating costs.

An attorney for Oregon Waste Systems, Inc. has raised the issue of the constitutionality of this surcharge. He argues that the importation of solid waste is protected by the interstate commerce clause of the U.S. Constitution. The Department agrees that solid waste is covered by the commerce clause of the constitution. However, the Oregon Attorney General's office believes that there is sufficient legal precedent affirming a state's right to charge a fee on out-

of-state waste to recover costs related to accepting out-of-state waste.

The City of Seattle has submitted written testimony which argues that many of the surcharge-related costs in the DEQ analysis were costs that are already borne by the City of Seattle or covered through other fee mechanisms. Examples cited include the portion of the current $.50 per ton fee going to Oregon household hazardous waste programs similar to those already functioning in Seattle, and the extra liability insurance required by the contract between the City of Seattle and Oregon Waste Systems.

Several individuals submitted testimony recommending that the surcharge be high to reflect "worst case" scenarios and to protect the state to the maximum extent possible. This testimony focused especially on environmental liability to the state if "worst case" contamination occurs, and on the potential for unanticipated costs or expenses that have not been included in the analysis.

(Copies of written comments are available from the Department on request.)

PROGRAM CONSIDERATIONS:

The Department hired an independent economic consultant (NERA) to review the assumptions and methodology used to calculate the range of costs of accepting out-of-state waste. The economic consultant review and evaluation was conducted to ensure that the Department's analysis is consistent with standard economic methodology.

The NERA review was completed on October 5, 1990 and contained the following conclusions:

- All but one of the cost categories clearly represent costs to the state which would justify a fee on out-of-state waste. One category, "tax credits", requires an analysis of potential benefits before a similar conclusion can be made.

- The effect of time (discounting) on costs needs to be calculated.

- The Department needs to better demonstrate that some of the costs actually vary by tonnage.

- Cost calculation methodologies, in some instances, needed to be further developed or documented.

. To achieve maximum economic efficiency, other ways of recouping the costs of both in-state and out-of-state waste through changes in law or administrative rule should be explored in the future.

The Department has attempted to address these concerns in its revised analysis of costs (see attachment D).

The Department is bound by statute to expend the funds generated by the surcharge "to meet the cost of the department in administering the solid waste program". The funds generated by the fee would be used to bolster programs in solid waste management for the state, and would reduce reliance on other solid waste fees.

ALTERNATIVES CONSIDERED BY THE DEPARTMENT:

1. Adopt a surcharge based on the lower end of the range of expected costs to the state ($1.76). This lower surcharge rate reflects more optimistic assumptions about the impact of out-of-state waste.

2. Adopt a moderate surcharge based upon the assumptions and analysis presented by the Department in Attachment D. This surcharge rate would reflect a more conservative (protective) view of potential risks to the state from accepting out-of-state waste than option 1.

3. Adopt a surcharge based upon the higher end of the range of expected costs to the state ($4.13 per ton) This higher figure would be the most protective against potential costs, and incorporates pessimistic assumptions about the impacts on the state. The Solid Waste Advisory Committee recommended that the surcharge be set toward this higher figure.

4. Adopt a variable surcharge that takes into account differences in costs to the state at each disposal site.

DEPARTMENT RECOMMENDATION FOR ACTION, WITH RATIONALE:

The Department recommends that the EQC adopt a surcharge based upon the following breakdown of costs:

$.50 Statewide activities for reducing environmental risk and improving solid waste management, paid for through the per-ton fee on domestic solid waste

$.42	Statewide activities for reducing environmental risk and improving solid waste management, paid for through general funds
$.58	Tax credits and other public subsidies
$.05	Solid waste reduction activities related to the review and certification of waste reduction and recycling plans
$.72	Increased environmental liability
$.20	Lost disposal capacity
$.47	Lost tourism or business development revenues due to stigma of accepting out-of-state waste
$.03	Publicly Supported Infrastructure
$.01	Nuisance Impacts from transportation
$2.98	Total

The Department recommends that the EQC adopt a surcharge of $3.00 per ton.

This recommended surcharge represents a moderate approach to protecting the interests of the state. It neither assumes very pessimistic projections (high costs) of future impacts to the state of accepting out-of-state waste, nor optimistic (low cost) projections.

This figure of $3.00 per ton does not take into account potential benefits of accepting out-of-state waste. It does, however, assume a "worst case" for environmental liability in order to ensure the state is protected from the costs of environmental cleanup at landfills accepting out-of-state waste. A 1988 EPA study on cleanup costs at landfills found the average cost to be $13 million, with 4% of landfill cleanups above $30 million. If three landfills in Oregon accept out-of-state waste and have cleanup liabilities of $30 million each, the "worst case" would be $90 million dollars. To protect against this worst case requires a fee of $.72 per ton.

Because the current $.50 per ton fee on domestic solid waste is not charged on out-of-state waste, and because the amount of that fee could change over time, the Department recommends that the EQC word the rule to divide the surcharge into two parts: one of which includes the current per-ton fee on domestic solid waste (currently $.50 per ton), plus one part that is a specific per-ton fee on out-of-state waste only.

The proposed rule reads: "...a per-ton surcharge consisting of the amount of the per-ton fee as specified in Section 5 of this rule (the current $.50 fee on domestic solid waste), plus $2.50". (see attachment A)

The Department also recommends that the rule state that the surcharge be revised for inflation or any other relevant factors at least every four years.

CONSISTENCY WITH STRATEGIC PLAN, AGENCY POLICY, LEGISLATIVE POLICY:

The surcharge is consistent with legislative policy to charge out of state users of Oregon disposal sites, as passed in the 1989 Legislature.

The Department's analysis of costs is also consistent with legislative policy in that it recognizes that every ton of solid waste disposed of in Oregon adds an incremental environmental risk and reduces Oregon's disposal capacity. The surcharge will address the need to reduce the environmental and capacity impacts that any solid waste disposal has on Oregon.

The surcharge is consistent with the interstate commerce clause of the U.S. Constitution, in that it is a charge to compensate for legitimate costs borne by Oregon because of the disposal of out-of-state waste.

ISSUES FOR COMMISSION TO RESOLVE:

1. Should any benefits of taking out-of-state waste be incorporated into the calculations on the "costs" of accepting out-of-state waste?

   The statute states that the surcharge should be based upon "costs" and does not state that benefits should be considered when calculating those costs.

   Although there may be many benefits associated with accepting out-of-state solid wastes, most of these economic benefits are counter-balanced by costs to the state that have been explicitly excluded from the Department's analysis. For example, income taxes are not in themselves a net benefit to the state, since they pay for a variety of services (police, etc.) that are required as a result of increased population.

The Department recommends that the benefits not be included in the calculations for determining the surcharge, but has provided an analysis that both includes and excludes potential benefits under the category of "Tax Credits and other public subsidies". which results in a difference of $.38 per ton.

2. Should the surcharge be based upon best-case or worst case assumptions about the impacts of out-of-state waste? How "risk-averse" should we be?

Because the Department's analysis of costs is based largely upon expectations of future events, the range of potential costs reflects optimistic versus pessimistic assumptions about the probability of those future events (environmental damage, amount of waste imported, etc.) The Solid Waste Advisory Committee did not reach a consensus, but recommended leaning toward "worst case" assumptions in order to protect the interests of the state. The Department has followed this recommendation, particularly for the category of "environmental liability".

3. Should there be one surcharge rate or a variable surcharge rate applied to each disposal site?

The Department recommends one surcharge rate rather than a variable rate, due to the administrative complexity and difficulty in implementing a variable rate.

4. How should inflation be accounted for?

The Department recommends that inflation should be accounted for when the surcharge rate is revised, at least every four years. A set annual escalator, based upon the Consumer Price Index, is much more complex to administer.

5. Should out-of-state generators be exempt from the portions of the per-ton fee that pay for in-state programs, such as planning, recycling, or household hazardous waste?

Even though out-of-state users may pay for similar programs in their own state, they are disposing of waste in Oregon and therefore should pay the same costs for using the disposal system as Oregonians.

INTENDED FOLLOWUP ACTIONS:

The Department will request authorization from the November 15 Emergency Board to implement the EQC-established surcharge on January 1, 1991.

The Department will notify all disposal sites in the state in December that the surcharge will go into effect.

The Department will collect the surcharge quarterly, using forms already provided to disposal sites for the $.50 per ton fee.

Approved:

Section: Steve Greenwood

Division: Stephanie Hallock

Director: Fred Hansen

Report Prepared By: Steve Greenwood

Phone: 229-5782
Date Prepared: October 18, 1990

Greenwood
G:\SW\SB10006
10/18/90

Proposed Amendments to OAR 340-61

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
ADMINISTRATIVE RULES
DIVISION 61 - SOLID WASTE MANAGEMENT
10/23/90

Proposed additions to rule are underlined.
Proposed deletions are in brackets [].

Permit Fees

340-61-115 (1) Beginning July 1, 1984, each person required to have a Solid Waste Disposal Permit shall be subject to a three-part fee consisting of a filing fee, an application processing fee and an annual compliance determination fee as listed in OAR 340-61-120. In addition, each disposal site receiving domestic solid waste shall be subject to an annual recycling program implementation fee as listed in Table 1, and a per-ton fee on domestic solid waste as specified in Section 5 of this rule. In addition, each disposal site or regional disposal site receiving solid waste generated out-of-state shall pay a surcharge as specified in Section 6 of this rule. The amount equal to the filing fee, application processing fee, the first year's annual compliance determination fee and, if applicable, the first year's recycling program implementation fee shall be submitted as a required part of any application for a new permit. The amount equal to the filing fee and application processing fee shall be submitted as a required part of any application for renewal or modification of an existing permit.

(2) As used in this rule unless otherwise specified, the term "domestic solid waste" includes, but is not limited to, residential, commercial and institutional wastes; but the term does not include:

(a) Sewage sludge or septic tank and cesspool pumpings;

(b) Building demolition or construction wastes and land clearing debris, if delivered to disposal sites that are not open to the general public;

(c) Yard debris, if delivered to disposal sites that receive no other residential wastes.

(3) The annual compliance determination fee and, if applicable, the annual recycling program implementation fee must be paid for each year a disposal site is in operation. The fee period shall be the state's fiscal year (July 1 through June 30) and shall be paid annually by July 1. Any annual compliance determination fee and, if applicable, any recycling program implementation fee submitted as part of an application for a new permit shall apply to the fiscal year the permitted disposal site is put into operation. For the first year's operation, the full fee(s) shall apply if the disposal site is placed into operation

on or before April 1. Any new disposal site placed into operation after April 1 shall not owe a compliance determination fee and, if applicable, a recycling program implementation fee until July 1. The Director may alter the due date for the annual compliance determination fee and, if applicable, the recycling program implementation fee upon receipt of a justifiable request from a permittee.

(4) For the purpose of determining appropriate fees, each disposal site shall be assigned to a category in Table 1 based upon the amount of solid waste received and upon the complexity of each disposal site. Each disposal site which falls into more than one category shall pay whichever fee is the basis of estimated annual tonnage or gallonage of solid waste received unless the actual amount received is known. Estimated annual tonnage for domestic waste disposal sites will be based upon 300 pounds per cubic yard of uncompacted waste received, 700 pounds per cubic yard of compacted waste received, or, if yardage is not known, one ton per resident in the service area of the disposal site, unless the permittee demonstrates a more accurate estimate. Loads of solid waste consisting exclusively of soil, rock, concrete, rubble or asphalt shall not be included when calculating the annual amount of solid waste received.

(5) Modifications of existing, unexpired permits which are instituted by the Department 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.

(6) Upon the Department accepting an application for filing, the filing fee shall be non-refundable.

(7) The application processing fee may be refunded in whole or in part when submitted with an application if either of the following conditions exist:

(a) The Department determines that no permit will be required;

(b) The applicant withdraws the application before the Department has granted or denied preliminary approval or, if no preliminary approval has been granted or denied, the Department has approved or denied the application.

(8) All fees shall be made payable to the Department of Environmental Quality.

Permit Fee Schedule

340-61-120 (1) Filing Fee. A filing fee of $50 shall accompany each application for issuance, renewal, modification, or transfer of a Solid Waste Disposal Permit. This fee is non-refundable and is in addition to any application processing fee or annual compliance determination fee which might be imposed.

(2) Application Processing Fee. An application processing fee varying between $100 and $2,000 shall be submitted with each

application. The amount of the fee shall depend on the type of facility and the required action as follows:

(a) A new facility (including substantial expansion of an existing facility):

(A) Major facility[1]	$ 2,000
(B) Intermediate facility[2]	$ 1,000
(C) Minor facility[3]	$ 300

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[1]**Major Facility Qualifying Factors:**

-a- Received more than 25,000 tons of solid waste per year; or
-b- Has a collection/treatment system which,, if not properly constructed, operated and maintained, could have a significant adverse impact on the environment as determined by the Department.

[2]**Intermediate Facility Qualifying Factors:**

-a- Received at least 5,000 but not more than 25,000 tons of solid waste per year; or
-b- Received less than 5,000 tons of solid waste and more than 25,000 gallons of sludge per month.

[3]**Minor Facility Qualifying Factors:**

-a- Received less than 5,000 tons of solid waste per year; and
-b- Received less than 25,000 gallons of sludge per month.

All tonnages based on amount received in the immediately preceding fiscal year, or in a new facility the amount to be received the first fiscal year of operation.

(b) Preliminary feasibility only (Note: the amount of this fee may be deducted from the complete application fee listed above):

(A) Major facility	$ 1,200
(B) Intermediate facility	$ 600
(C) Minor facility	$ 200

(c) Permit renewal (including new operational plan, closure plan or improvements):

(A) Major facility	$ 500
(B) Intermediate facility	$ 250
(C) Minor facility	$ 125

(d) Permit renewal (without significant change):

(A) Major facility	$ 250
(B) Intermediate facility	$ 150
(C) Minor facility	$ 100

(e) Permit modification (including new operational plan, closure plan or improvements):
(A) Major facility ..... $ 500
(B) Intermediate facility ..... $ 250
(C) Minor facility ..... $ 100
(f) Permit modification (without significant change in facility design or operation): All categories ..... $ 100
(g) Permit modification (Department initiated) All categories ..... No fee
(h) Letter authorizations, new or renewal: ..... $ 100
(3) Annual Compliance Determination Fee (In any case where a facility fits into more than one category, the permittee shall pay only the highest fee):
(a) Domestic Waste Facility:
(A) A landfill which received 500,000 tons or more of solid waste per year: $60,000
(B) A landfill which received at least 400,000 but less than 500,000 tons of solid waste per year: $48,000
(C) A landfill which received at least 300,000 but less than 400,000 tons of solid waste per year: $36,000
(D) A landfill which received at least 200,000 but less than 300,000 tons of solid waste per year: $24,000
(E) A landfill which received at least 100,000 but less than 200,000 tons of solid waste per year: $12,000
(F) A landfill which received at least 50,000 but less than 100,000 tons of solid waste per year: ..... $ 6,000
(G) A landfill which received at least 25,000 but less than 50,000 tons of solid waste per year: ..... $ 3,000
(H) A landfill which received at least 10,000 but less than 25,000 tons of solid waste per year: ..... $ 1,500
(I) A landfill which received at least 5,000 but not more than 10,000 tons of solid waste per year: ..... $ 750
(J) A landfill which received at least 1,000 but not more than 5,000 tons of solid waste per year: ..... $ 200
(K) A landfill which received less than 1,000 tons of solid waste per year: ..... $ 100
(L) A transfer station which received more than 10,000 tons of solid waste per year: ..... $ 500
(M) A transfer station which received less than 10,000 tons of solid waste per year: ..... $ 50
(N) An incinerator, resource recovery facility, composting facility and each other facility not specifically classified above which receives more than 100,000 tons of solid waste per year: ..... $ 8,000
(O) An incinerator, resource recovery facility, composting facility and each other facility not specifically classified above which receives at least 50,000 tons but less than 100,000 tons of solid waste per year: ..... $ 4,000
(P) An incinerator, resource recovery facility, composting facility and each other facility not specifically classified above which receives less than 50,000 tons of solid waste per year: ..... $ 2,000
(b) Industrial Waste Facility:

(A) A facility which received 10,000 tons or more of solid waste per year: ..... $ 1,500

(B) A facility which received at least 5,000 tons but less than 10,000 tons of solid waste per year: ..... $ 750

(C) A facility which received less than 5,000 tons of solid waste per year: ..... $ 150

(c) Sludge Disposal Facility:

(A) A facility which received 25,000 gallons or more of sludge per month: ..... $ 150

(B) A facility which received less than 25,000 gallons of sludge per month: ..... $ 100

(d) Closed Disposal Site: Each landfill which closes after July 1, 1984: ..... 10% of fee which would be required, in accordance with subsections (3)(a), (3)(b), and (3)(c) above, if the facility was still in operation or $50 whichever is greater.

(e) Facility with Monitoring Wells: In addition to the fees described above, each facility with one or more wells for monitoring groundwater or methane, surface water sampling points, or any other structures or locations requiring the collection and analysis of samples by the Department, shall be assessed a fee. The amount of the fee shall depend on the number of wells (each well in a multiple completion well is considered to be a separate well) or sampling points as follows: ..... $ 250 for each well or sampling point.

(4) Annual Recycling Program Implementation Fee. An annual recycling program implementation fee shall be submitted by each domestic waste disposal site, except transfer stations and closed landfills. This fee is in addition to any other permit fee which may be assessed by the Department. The amount of the fee shall depend on the amount of solid waste received as follows:

(a) A disposal site which received 500,000 tons or more of solid waste per year $20,000

(b) A disposal site which received at least 400,000 but less than 500,000 tons of solid waste per year: $18,000

(c) A disposal site which received at least 300,000 but less than 400,000 tons of solid waste per year: $14,000

(d) A disposal site which received at least 200,000 but less than 300,000 tons of solid waste per year: ..... $ 9,000

(e) A disposal site which received at least 100,000 but less than 200,000 tons of solid waste per year: ..... $ 4,600

(f) A disposal site which received at least 50,000 but less than 100,000 tons of solid waste per year: ..... $ 2,300

(g) A disposal site which received at least 25,000 but less than 50,000 tons of solid waste per year: ..... $ 1,200

(h) A disposal site which received at least 10,000 but less than 25,000 tons of solid waste per year: ..... $ 450

(i) A disposal site which received at least 5,000 but less than 10,000 tons of solid waste per year: ..... $ 225

(j) A disposal site which received at least 1,000 but less than 5,000 tons of solid waste per year: ..... $ 75

(k) A disposal site which received less than 1,000 tons of solid waste per year: ..... $ 50

(5) Per-ton fee on domestic solid waste. Each solid waste disposal site that receives domestic solid waste, except transfer stations, shall submit to the Department of Environmental Quality a fee of 50 cents per ton of domestic solid waste received at the disposal site.

(a) This per-ton fee shall apply to all domestic solid waste received after June 30, 1990.

(b) Submittal schedule:

(A) This per-ton fee shall be submitted to the Department on the same schedule as the waste volume reports required in the disposal permit, or quarterly, whichever is more frequent. Quarterly remittals shall be due on the 15th day of the month following the end of the calendar quarter.

(B) Disposal sites receiving less than 1,000 tons of solid waste per year shall submit the fee annually on July 1, beginning in 1991. If the disposal site is not required by the Department to monitor and report volumes of solid waste collected, the fee shall be accompanied by an estimate of the population served by the disposal site.

(c) As used in this section, the term "domestic solid waste" does not include:

(A) Sewage sludge or septic tank and cesspool pumpings;

(B) Building demolition or construction wastes and land clearing debris, if delivered to a disposal site that is limited to those purposes;

(C) Source separated recyclable material, or material recovered at the disposal site;

(D) Waste going to an industrial waste facility;

(E) Waste received at an ash monofill from a resource recovery facility; or

(F) Domestic solid waste which is not generated within this state.

(d) For solid waste generated within the boundaries of a metropolitan service district, the 50 cent per ton disposal fee established in this section shall be levied on the district, not on the disposal site.

(6) Surcharge on disposal of solid waste generated out-of-state. Each solid waste disposal site or regional solid waste disposal site that receives solid waste generated out-of-state

shall submit to the Department of Environmental Quality a per-ton surcharge consisting of the amount of the per-ton fee as specified in Section 5 of this rule, plus $2.50. This surcharge shall apply to each ton of out-of-state solid waste received at the disposal site.

(a) This per-ton surcharge shall apply to all solid waste received after January 1, 1991.

(b) Submittal schedule: This per-ton surcharge shall be submitted to the Department on the same schedule as the waste volume reports required in the disposal permit, or quarterly, whichever is more frequent. Quarterly remittals shall be due on the 15th day of the month following the end of the calendar quarter.

(c) This surcharge shall be in addition to any other fee charged for disposal of solid waste at the site.

(d) The Commission shall, in accordance with ORS 459.298, review the amount of the surcharge at least every four years beginning four years from January 1, 1991, and modify the surcharge as necessary to account for inflation and any other factors which the Commission deems relevant.

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ATTACHMENT B

RULEMAKING STATEMENTS
for
Proposed Revisions to Existing Rules
Pertaining to a Surcharge on Out-of-State Solid Waste

OAR Chapter 340, Division 61

Pursuant to ORS 183.335, these statements provide information on the intended action to adopt a rule.

STATEMENT OF NEED:

Legal Authority

ORS 459.045(1) and (3) require the Environmental Quality Commission to adopt reasonable and necessary rules governing the management of solid wastes to prevent pollution of the air, ground and surface waters. The 1989 Oregon Legislature passed House Bill 3515 which requires the Commission to establish by rule the amount of a surcharge to be collected from all persons disposing in Oregon of solid waste generated out-of-state (ORS 459.298).

Need for the Rule

HB 3515 establishes a requirement, beginning on January 1, 1991, that every person who disposes of solid waste generated out-of-state in a disposal site in Oregon shall pay a surcharge. The Commission is to establish the surcharge based on the costs to the State and its political subdivisions of disposing of solid waste generated out-of-state which are not otherwise paid for. The surcharge is to be used by the Department to meet its costs in administering the solid waste program.

The proposed rule will implement the legislation.

Principal Documents Relied Upon

a. Oregon Revised Statutes 459.297, 459.298 and 459.235.
b. 1989 House Bill 3515.
c. Oregon Administrative Rules, Chapter 340, Division 61.
d. July 11, 1990 memo to Oregon Department of Environmental Quality Solid Waste Advisory Committee from Steve Greenwood.
e. Analysis of the Policy Implications of Regional MSW Disposal, Draft Report, June 4, 1990, U.S. Environmental Protection Agency.
f. Final Environmental Impact Statement: Seattle Waste Transport and Disposal Project, Seattle Solid Waste Utility, July 1990.

g. An Evaluation of the True Costs of Sanitary Landfills for the Disposal of Municipal Solid Waste in the Portland Metropolitan Area, Oregon Department of Environmental Quality, April 1986.
h. Taxing the Solid Waste Stream, Matthew Montavon and Paul L. Shinn, Government Finance Officers Association, April 1990.
i. Putting the Lid on Out-Of-State Garbage., J.S. Brown, State Government News, January 1990.
j. Pricing Solid WAste Disposal at Marginal Cost: The New York City Experience, Mark Berkman and Lisa Mancini, Fifth International Conference on Solid Waste Management and Secondary Materials, Philadelphia, Pennsylvania, December 7, 1989.

LAND USE CONSISTENCY STATEMENT:

The proposed rule appears to affect land use and appears to be consistent with Statewide Planning Goals and Guidelines.

Goal 6 (Air, Water and Land Resources Quality): This proposed rule is designed to further the protection of surface and groundwater quality and air quality throughout the state. It is consistent with this Goal.

Goal 11 (Public Facilities and Services): The proposed rule would contribute to the disposal of solid waste in an environmentally sound manner by providing additional resources for management of solid waste, and is consistent with this Goal.

The proposed rule does not appear to conflict with other Goals.

Public comment on any land use issue involved is welcome and may be submitted in the manner described in the accompanying NOTICE OF PUBLIC HEARING.

The Department requests that local, state and federal agencies review the proposed action and comment on possible conflicts with their programs affecting land use and with Statewide Planning goals within their expertise and jurisdiction.

The Department of Environmental Quality intends to ask the Department of Land Conservation and Development to mediate any appropriate conflicts brought to its attention by local, state or federal authorities.

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ATTACHMENT C

FISCAL AND ECONOMIC IMPACT STATEMENT

I. Introduction

ORS 459.297 requires the Environmental Quality Commission to adopt a surcharge to be paid by all persons disposing of out-of-state solid waste in Oregon after January 1, 1991. The amount of the surcharge is to be based on the costs to the State and its political subdivisions of disposing of solid waste generated out-of-state which are not otherwise paid for. The surcharge is in addition to any other fee charged for disposal of solid waste at the site.

This proposed rule puts forward a range of possible surcharge rates on solid waste which is generated out-of-state and disposed of in Oregon: from $1.50 per ton to $3.50 per ton. The final rule will adopt a single surcharge amount, either from among the proposed range, or another amount. The surcharge would be payable at least quarterly to the Department of Environmental Quality.

The moneys collected through the surcharge are to be used by the Department to meet its costs in administering the solid waste program.

Overall Economic Impacts:

The Department estimates that surcharge rates of $1.50 to $3.50 per ton will generate from $600,000 to $1.4 million respectively per year in surcharge funds in the 1991-1993 biennium. Thereafter $900,000 or $2.1 million, respectively, in surcharge funds will be generated annually by this action. These funds are to be deposited into a special account, and used by the Department for the purposes stated above.

II. General Public

The general public in Oregon is not directly affected economically by this rule. Solid waste generated in-state will not be subject to the surcharge. However if the surcharge is set "too low," it could encourage disposal of larger amounts of out-of-state solid waste in Oregon, and diminish the effective life of Oregon landfills. That would result in the lost landfill capacity having to be replaced sooner, with attendant public and private costs. If the surcharge is "too high," it could discourage the disposal of out-of-state solid waste. This might in turn indirectly discourage the establishment of new regional landfills (potentially with improved environmental safeguards) in Oregon, if the landfill developers anticipated that only minimal amounts of

out-of-state solid waste would be disposed of. In-state levels of solid waste generation might not be sufficient to warrant the development of new landfills; or in-state solid waste disposal rates might have to be raised more to cover the cost of new landfills when they eventually become necessary, without the contribution of out-of-state disposal fees to construction and operation costs.

III. Small Business

Small business in Oregon is not likely to be directly affected economically by this rule. Waste generated in-state is not subject to the surcharge, and the financial resources necessary to establish a new solid waste site (that would accept out-of-state waste) require financial resources which are probably beyond the ability of small business. However, small business could be indirectly affected in the same manner as the general public, above.

IV. Large Business

The general universe of large business is not likely to be directly affected economically by this rule.

Large businesses operating or wanting to develop landfills capable of accepting out-of-state waste will be affected. A landfill operator will either have to pass the surcharge on to its out-of-state customers, or will have to decrease its profits to absorb the surcharge itself. If the surcharge is passed on to the customer, the volume of waste to be disposed could decrease, depending on the price elasticity of solid waste disposal.

The Department is not aware of any work that has been done to identify this elasticity, so it is difficult to quantify what the resulting decrease in disposal volume might be. If the elasticity is one, a one percent rise in cost would result in a one percent decrease in volume. A typical per-ton waste disposal charge is $25; a $1.50 surcharge would increase this charge by 6%. Annual volume of waste disposed of is estimated to be about 600,000 tons eventually (total for all Oregon landfills expected to accept out-of-state waste). A 6% decrease in volume would be 36,000 tons, resulting in an annual revenue loss of $900,000 (@ $25/ton) to the landfill operator. A $3.50 surcharge would cause a 14% increase in disposal charges, and, at an elasticity of one, would result in an annual revenue loss of $2.1 million to the site operator.

For the 1991-93 biennium the anticipated volume of out-of-state waste to be disposed of in Oregon is 400,000 tons/year[1]. At a $1.50 surcharge per ton, landfills accepting this waste would be

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[1]This assumes no decrease in anticipated volume of waste disposed of due to imposition of the surcharge.

responsible for collecting and remitting $600,000/year to the Department (or $1.4 million from a $3.50 surcharge). Thereafter, the volume of out-of-state waste is expected to increase to 600,000 tons/year[1], resulting in an annual surcharge collection of $900,000 (or $2.1 million at a $3.50 surcharge rate).

In most cases the funds must be remitted to the Department monthly. The collected funds may in the meantime collect interest which the landfill operator may keep, resulting in a positive economic impact for the operator. Assuming that half of the funds will be available to the operator for any one-year period, and a 7% interest rate, landfill operators would earn a total of $21,000 in annual interest (at the 400,000 ton volume) and $31,500 (at the higher volume). With a $3.50 surcharge, annual interest earned would be $49,000 and $73,500 respectively.

Some increased record-keeping will be required from operators of landfills accepting solid waste from out-of-state. Tonnage of out-of-state solid waste will have to be tracked separately from solid waste generated in Oregon (which is subject to a separate fee) and reported to the Department, together with the collected surcharge. This could amount to five to ten hours a week of extra staff time, or $3,120 to $6,240/year (at $12 per hour) for each operator.

V. Local Governments

Some local governments operate landfills which now or in the future may accept out-of-state waste. They would be affected in the same way as large businesses (above); the surcharge would either contribute to a higher overall fee for landfill out-of-state customers, or would have to be absorbed by the landfill operator (since the surcharge must be paid to the state).

Local governments in which regional landfills accepting out-of-region (including out-of-state) wastes are located will be affected. The local government receives a "host fee" from the regional site. The fee ranges from $.75 to $1.25 per ton of solid waste depending on how much waste is accepted from outside the local community. If the surcharge results in reduced volume of out-of-state waste to the regional landfill as discussed in IV above, the amount of the "host fee" would decline correspondingly.

Local governments needing to ensure that sufficient solid waste disposal facilities are available to serve their constituencies would be subject to the same considerations noted above for the general public. However, a local government operating a landfill generally has the prerogative of establishing fees itself, so presumably the problem of "too low" a fee would not occur.

VI. State Agencies

The legislation stipulates that the surcharge is to go to the Department of Environmental Quality "to meet the costs of the Department in administering the solid waste program" (ORS 459.297), while the basis of the surcharge is broader: it is to be "based on the costs to the State of Oregon and its political subdivisions which are not otherwise paid for" (ORS 459.298). Thus it should be noted that the surcharge is not to be determined on a "cost of service" basis to simply fund the activity (of administering the increased costs of the solid waste program); its basis is rather to transfer the full cost of the out-of-state waste disposal to those that are benefitting from it (i.e. out-of-state generators of solid waste).

The Department will receive a positive fiscal impact of from $1.2 to $2.8 million in the 1991-93 biennium. This will be used to cover the Department's increased workload due to the additional volumes of out-of-state solid waste being disposed of in Oregon, and to fund a variety of programs in solid waste management for the state. These funds could reduce reliance on other solid waste fees.

One additional full-time employee will be required in the Department's Waste Reduction Section of the Hazardous and Solid Waste Division to review waste reduction and recycling plans from out-of-state jurisdictions sending solid waste to Oregon. This will come to about $50,000 annually.

Other tasks in the Solid Waste Permitting and Enforcement Section will increase in proportion to the volume of the additional waste. These tasks include statewide activities for reducing environmental risk and improving solid waste management. A 400,000 ton increase represents a 20% increase in solid waste disposal in Oregon, and therefore a corresponding cost increase for additional solid waste staffing effort.

Other state agencies may be subject to increased costs due to the increased volume of waste, but, pursuant to statute, will not receive any of the surcharge funds to offset these costs. Such agencies could include State Police (emergency services for road accidents involving garbage trucks) and the State Highway Division for increased highway repairs due to garbage hauling or additional transportation planning costs.

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Attachment D
Agenda Item G
11/2/90 EQC Meeting

AN ANALYSIS OF THE COSTS OF ACCEPTING OUT-OF-STATE WASTE IN OREGON

October 16, 1990

Steve Greenwood
Hazardous and Solid Waste Division
Oregon Department of Environmental Quality

On August 10 the Environmental Quality Commission authorized public hearings on a proposed surcharge on out-of-state waste, with the surcharge amount in the range of $1.50 to $3.50 per ton. The Department held public hearings in Portland, Arlington, and Medford, and has received written testimony from a number of parties.

In addition, the Department hired an independent consultant, National Economics Research Associates (NERA) to review the Department's methodology in calculating the costs to the state from accepting out-of-state waste. The September 17 NERA preliminary report recommended a number of changes from the methodology included in the July 25 memorandum to the Solid Waste Advisory Committee.

This report significantly revises the calculations and methodology for determining a surcharge on out-of-state waste, based upon the testimony and consultant's report. Most importantly, it provides more detailed documentation to substantiate the costs to be addressed by the surcharge.

I. BACKGROUND

House Bill 3515, passed by the 1989 Oregon Legislature, requires the Environmental Quality Commission (EQC) to establish a surcharge on out-of-state solid waste disposed of in Oregon. Key parts of the legislation include:

> "Beginning on January 1, 1991, every person who disposes of solid waste generated out-of-state in a disposal site or regional disposal site shall pay a surcharge as established by the Environmental Quality Commission.." (ORS 459.297).

The moneys collected through the surcharge are to be "continuously appropriated to (DEQ) to meet the costs of the department in administering the solid waste program" (ORS 459.297).

"The amount of the surcharge shall be based on the costs to the State of Oregon and its political subdivisions which are not otherwise paid for.." (ORS 459.298)

Oregon is not the first state to deal with the issue of waste being imported from other states. In recent years, many states have adopted or proposed regulations that impose special fees or other regulatory controls on out-of-state waste. A recent report from the National Solid Waste Management Association (NSWMA) identifies 11 states that have adopted such measures, ranging from an Indiana law that imposes the average cost for disposal in the state of origin, to a $1 per ton fee in West Virginia. The highest fee appears to be in Kentucky, where counties may assess a fee 25% higher for out-of-state waste. The lowest appears to be Alabama, where one county has a $.50 per ton differential on out-of-state waste. Many of these laws are currently under court challenge.

II. BASIC ASSUMPTIONS, DEFINITIONS, AND METHODOLOGY

In developing a surcharge that would be based upon "the costs to the State of Oregon and its political subdivisions", there are a number of important definitions and assumptions that need to be outlined.

1. The surcharge cannot be based upon an accounting of historic costs. Rather, it must be based upon a reasonable estimate of expected costs that take into account a range of possible circumstances.

   The legislature did not intend for the Department to make an after-the-fact accounting of costs to the state resulting from past acceptance of out-of-state waste. The surcharge was clearly intended to be anticipatory, that is, to go into effect before large volumes of out-of-state waste arrive in Oregon, and therefore based upon estimates of future, uncertain events.

   In attempting to gauge the impact of future importation of out-of-state waste, there are far too many uncertainties to make precise estimates of the cost to Oregonians. How much waste can we expect to receive and what will the waste characteristics be? Will it be transported by truck, barge, or rail? Will it go to a privately-owned or publicly owned

3

disposal site? What is the size of the disposal site, and what will the environmental controls be? Landfill or incinerator?

The answers to these questions are subject to a great deal of uncertainty at the present time, and will likely be different for each load of waste. Therefore, the Department has chosen to estimate a range of costs for each category, and to recommend a "reasonable" surcharge within that range.

2. The estimate of "costs to the State of Oregon and its political subdivisions" is a distinct policy question from the decision on how the funds generated from the surcharge should be spent.

   The legislation specifically states that the funds shall go to meet the costs of "administering the solid waste program". However, the costs to be included in determining the amount of the surcharge should **not** be limited to those directly related to solid waste management.

   This is not meant to imply that DEQ solid waste management programs do not directly or indirectly address many of the costs associated with accepting out-of-state waste. Indeed, the costs of accepting out-of-state waste should be one of the prime considerations in determining how the surcharge revenue should be spent.

3. The amount of the surcharge is to be determined by a reasonable assessment of the costs to Oregon of accepting out-of-state waste. The surcharge amount should <u>not</u> be inflated to discourage importation of waste, nor deflated to encourage importation of waste.

4. Alternative ways to address potential costs through changes in rule or statute were not considered. However, as the NERA report suggests, there may be more efficient ways than the surcharge to address some of the costs.

5. Estimates of the cost of tax credits and other subsidies are based upon eligibility. It is presumed that private companies will generally apply for and receive the maximum subsidy for which they are eligible.

6. The statute (ORS 459.298) identifies specific costs (those already covered under permit fees) which should not be included as part of the analysis. In addition, the Department has decided not to include costs that are covered through any other fees or taxes. Other specific fees considered include permit fees, PUC per-mile taxes, and host community fees. There should be no double counting.

7. Because of the administrative complexity and difficulty of assigning different surcharge amounts to different sites, there will be one surcharge rate for all out-of-state waste disposed of in Oregon. This one per-ton surcharge rate will attempt to reasonably cover a range of circumstances.

8. Calculations are based upon costs and volumes expected during the next 4 years. (However, in some cases looking at the impacts during the next four years requires analysis of a longer-range cost stream) To account for expected inflation, a clause in the proposed rule enables the Environmental Quality Commission to review and adjust the per-ton fee every four years.

9. During the next four years, an average of 600,000 tons per year of solid waste is expected from out-of-state generators.

10. A real discount rate of 3% is used in the Department's calculations.

Sources. The following sources of information were used in developing the calculations and methodology for establishing the surcharge:

1. Analysis of the Policy Implications of Regional MSW Disposal, Draft Report, June 4, 1990, U.S. Environmental Protection Agency.

2. Final Environmental Impact Statement: Seattle Waste Transport and Disposal Project, Seattle Solid Waste Utility, July 1990.

3. An Evaluation of the True Costs of Sanitary Landfills For the Disposal of Municipal Solid Waste in the Portland Metropolitan Area, Oregon Department of Environmental Quality, April 1986.

4. Taxing the Solid Waste Stream, Matthew Montavon and Paul L. Shinn, Government Finance Officers Association, April 1990.

5. Putting the Lid on Out-Of-State Garbage, J.S. Brown, State Government News, January 1990.

6. Pricing Solid Waste Disposal At Marginal Cost: The New York City Experience, Mark Berkman and Lisa Mancini, Fifth International Conference on Solid Waste Management and Secondary Materials, Philadelphia, Pennsylvania, December 7, 1989.

5

7. The Socioeconomic Impacts of Landfills, Carla Dickstein and Greg Sayre, Institute for Public Affairs, West Virginia University, Morgantown, West Virginia, June 1989.

8. The Solid Waste Advisory committee meeting in May included a panel discussion on the out-of-state waste surcharge. Speaking at that meeting were:

   . Bill Ross, Ross and Associates Consultants

   . Ray Bartlett, ECO Northwest economics consultants

   . Dennis Illingsworth, Wasco County

   . Doris Bjorn, Oregon Waste Systems

   . Joel Ario, OSPIRG

III. COSTS CATEGORIES

For the purposes of this report, the costs of accepting out-of-state waste to Oregon and its political subdivisions shall be calculated within the following categories:

1. Statewide activities for reducing environmental risk and improving solid waste management, paid for through the per-ton fee on domestic solid waste.

2. Statewide activities for reducing environmental risk and improving solid waste management, paid for through general funds.

3. The value of tax credits or other state subsidies related to solid waste management.

4. Solid waste reduction activities related to reviewing and certifying out-of-state waste reduction and recycling plans.

5. Increased environmental liability.

6. Lost disposal capacity.

7. Lost tourism or business development revenues due to stigma of accepting out-of-state waste.

8. Publicly supported infrastructure.

9. Nuisance impacts from transportation.

1. STATEWIDE ACTIVITIES FOR REDUCING ENVIRONMENTAL RISK AND IMPROVING SOLID WASTE MANAGEMENT, PAID FOR THROUGH THE PER-TON FEE ON DOMESTIC SOLID WASTE.

Oregon citizens finance some statewide solid waste management activities through a 50 cents per ton fee on domestic solid waste. These groups of activities are not currently supported by out-of-state users of Oregon disposal facilities.

These costs and activities include:

* Statewide solid waste management planning

* Programs to enhance statewide waste reduction and recycling, including data collection, performance measurement, education and promotion, and demonstration projects.

* Programs for management of Household Hazardous Waste and improving management of Hazardous Waste from very small generators who are conditionally exempt from hazardous waste disposal regulations.

* Establishment of a statewide groundwater monitoring data management system.

* Planning grants for local governments to use for regional and local solid waste management planning.

The per-ton fee is a cost of solid waste management not otherwise paid for by out-of-state generators. The Oregon Legislature has determined that the required level of these activities is generally related to the volume of waste which must be disposed of, i.e., the more waste received the greater the level of activity required. The receipt of out-of-state waste will require an increase in these activities by adding to the overall level of environmental risk. Out-of-state users should therefore share these costs proportionately with in-state users.

Some have argued that the funding for household hazardous waste programs and recycling programs should not be automatically included in the costs used to calculate the out-of-state waste surcharge because some sending jurisdictions may already be paying for, and implementing programs to reduce waste and separate household hazardous waste from the municipal waste stream. However, these are statewide programs designed to improve the management and reduce the impact of waste disposal in Oregon. Waste received from an out-of-state jurisdiction with a similar program still adds an environmental impact to the state of

Oregon, and if out-of-state generators do not pay their fair share, there is a direct cost to in-state generators who must pay more.

Currently, the costs involved in these activities total $.50 per ton.

Estimated cost: $.50 per ton.

2. STATEWIDE ACTIVITIES FOR REDUCING ENVIRONMENTAL RISK AND IMPROVING SOLID WASTE MANAGEMENT, PAID FOR THROUGH THE GENERAL FUND.

Oregon citizens also finance general statewide solid waste management activities through general funds, generated by income tax revenue. To the extent that out-of-state generators use Oregon's solid waste disposal system, they are adding to the need for these costs without paying for them. These activities include:

* Rulemaking and development of statewide policy
* DEQ costs in administering the state solid waste regulatory program.
* Statewide solid waste management planning

Step 1
There is a direct relationship between the amount of waste disposed of and the amount of general fund support required for regulation of solid waste management. This relationship is not clear if analyzed simply from a historical perspective in Oregon. The amount of general fund support for solid waste has fluctuated in response to specific priorities and other funding options. However, the relationship between state funding and waste volumes can be seen by looking at state funding around the country. A 1984 report by the Association of State and Territorial Solid Waste Management Officials presents the state budgets for Municipal Solid Waste programs, clearly showing a relationship between budget dollars and volumes (populations).

Step 2
Currently, the general fund support for these activities totals approximately $1 million per biennium. However, that amount is expected to change during the next biennium to a minimum of $2.2 million for solid waste, and will be adjusted upward annually for inflation. If this figure is divided by the number of tons expected (4 million in-state plus 1.2 million out-of-state per biennium), the cost per ton is a minimum of $.42 per ton.

Estimated cost: $.42 per ton.

3. TAX CREDITS AND OTHER PUBLIC SUBSIDIES

Any Oregon tax expenditures in the form of tax credits or other subsidies to support transport or disposal of solid waste represents a "cost" to the state of Oregon to the extent that other states benefit from those expenditures.

In the case of Pollution Control Tax Credits, up to 50% of the cost of equipment or measures to prevent air pollution, prevent water pollution, or enhance waste reduction or recycling can be taken off Oregon income taxes for those private companies constructing landfills. Activities that qualify for tax credits include such things as liner construction, leak detection systems, leachate collection and treatment, groundwater monitoring, gas controls, and surface water controls.

Some landfills, of course, are publicly owned and therefore not eligible for any tax credits. Other than the pollution control tax credits, Oregon has no other public subsidy at this time.

The cost per ton of these tax credits will vary by the amount and cost of pollution control facilities required by DEQ and by the size of the disposal site. Generally, the larger the site, the more garbage per acre that can be disposed of and the lower the cost per ton of the tax credits.

Step 1 in calculation:
Most of the costs of environmental protection at landfills is included in the construction of each "cell" or waste area. A landfill cost model developed for DEQ by ECO Northwest economic consultants estimates the cost of environmental protection facilities for a small, double-lined landfill cell at approximately 83% of the cell development costs of $3.71 per ton. This comes to $3.07 per ton. Adjusted for 4% annual inflation, this comes to $3.57 in present dollars. For a larger cell, with an average depth of 120 feet, the cost of those environmental protection facilities is $1.36 per ton. Adjusted for a 4% annual inflation rate since 1986, this comes to $1.57 per ton. For an even larger cell, with an average depth of 250 feet, and all clay from on-site, the eligible costs would be $.63 per ton in present dollars. Given the characteristics of the landfills expected to receive the majority of out-of-state waste during the next four years, the most likely estimate would be $1.57 per ton.

Step 2 in calculation:
At a tax credit of 50%, spread equally over ten years, this translates into the most likely eligible tax credit of $.078 per ton per year for ten years.

9

Step 3 in calculation:
At a 3% real discount rate, this comes to a total expected tax credit in present dollars of $.58 per ton. Using the higher and lower estimates would result in a range of tax credit costs of $.26 per ton to $1.51 per ton.

Step 4 in calculation:
If we want to calculate the "net costs" rather than the costs of these tax credits, we then subtract from the costs identified in step 3 any net benefits that accrue from receiving out-of-state waste.

Public testimony received on behalf of Oregon Waste Systems,Inc. and Tidewater Barge Lines suggests many benefits, including host fees, real and personal property taxes, corporate income taxes, payroll taxes, and similar benefits. However, host fees, income taxes, and property taxes are revenue sources designed to address costs that have been explicitly excluded from this analysis. For example, expected fees to the Port of Morrow ($275,000 per year) are designed to offset costs to the Port of Morrow to process loads through the Port facilities.

To calculate net benefits, any benefits must first be reduced to those attributable to out-of-state waste. Second, those "benefits" in the form of taxes or other payments that are specifically designed to offset other costs should be eliminated from the analysis. Third, what is left should be carefully evaluated to ensure that "net" benefits (minus any costs) are identified. Last, those benefits which are not attributable to the tax credit program should be eliminated.

Using the testimony from Tidewater Barge Lines, we can calculate what the potential net benefits might be. Tidewater identified the following economic benefits:

New jobs (payroll)	$750,000
Port Fees	$275,000
Host Fees	$100,000
Road fees	$.25 per ton
Post-closure trust	$.15 per ton
Property taxes	$100,000
Capital investment	$8 million

First, assuming these figures are accurate, we must calculate the incremental "benefits" that accrue from out-of-state waste by subtracting any of the benefits resulting from in-state waste.

For most categories, this will mean reducing the "benefits" .

New jobs (payroll)	$750,000 (x .33)
Port Fees	$275,000 (x .66)
Host Fees	$100,000 (x .66)
Road fees	$.25 per ton
Post-closure trust	$.15 per ton
Property taxes	$100,000 (x .50)
Capital investment	$8 million (x .50)

Second, the "benefits" which are either double counted or are taxes designed to offset other costs are eliminated. This leaves:

New jobs (payroll)	$750,000 (x .33)
Port Fees	$275,000 (x .66)

Third, we examine each of the remaining categories to determine if there are other costs offsetting the potential benefits. In the case of Port Fees, these are offset by costs to the Port totaling at least 80% of the fees, so the real benefit is only 20%. In the case of new jobs, the number of new jobs is the upper bound of the positive economic impact, and could be lower depending upon how many net new jobs are created and who fills them.

New jobs (payroll)	$750,000 (x .33)
Port Fees	$275,000 (x .66) (x .20)

Fourth, we then need to calculate how many of these benefits accrue from the tax credit itself. Assuming a $.58 per ton tax credit, we can predict that this lowers the cost of disposal enough to attract some out-of-state users who would otherwise not send their waste. If we assume an increase in out-of-state waste of 20% due to the tax credit (probably high), the total net benefit would be:

New jobs (payroll)	$250,000 (x .20)
Port Fees	$36,300 (x .20)

or,

New jobs (payroll)	$50,000
Port Fees	$ 7,260
Total Net benefit	$57,260

Dividing this figure by an assumed 150,000 tons per year of out-of-state waste, the annual net benefit would be $.38 per ton. Subtracting this number from the expected cost of $.58 per ton results in a net cost of $.20 per ton.

Range: $.26 to $1.51 per ton. Expected cost is $.58 per ton. If you subtract potential net benefits of up to $.38 per ton, the expected net cost is $.20 per ton.

4. SOLID WASTE REDUCTION ACTIVITIES RELATED TO THE REVIEW AND CERTIFICATION OF WASTE REDUCTION AND RECYCLING PLANS

Any out-of-state jurisdiction wishing to send waste to a disposal site in Oregon must, under state law, be certified as providing the opportunity to recycle commensurate with that required of Oregon citizens. In addition, those communities sending more than 75,000 tons per year to a disposal site located on Exclusive Farm Use land must submit a comprehensive solid waste reduction plan, to be reviewed by the Department.

Waste reduction plan review and certification for the opportunity to recycle is a direct cost to the DEQ Solid Waste Reduction program. The work involves initial review of waste reduction and recycling plans, as well as annual review of performance. Assuming 3 major communities (over 75,000 population) export to Oregon, and an additional 5 smaller communities export to Oregon, we estimate the costs of accepting out-of state waste in the following manner:

Step 1
To estimate costs for review and certification of waste reduction and recycling plans, we first looked at costs for three different activities: a) initial certification or approval, b) on-going review of performance, and c) review of future submittals related to changes in Oregon's recycling laws.

Step 2
A weighted average of 180,000 tons per year for each of three communities, and an average of 10,000 tons per year for each of 5 additional communities was assumed during the first four years.

Step 3
For the larger communities, the time involved was estimated to average: 12 weeks for initial review, 2 weeks annually for on-going review, and 4 weeks for changes in the law.

For the smaller communities, the time involved was estimated to average: 4 weeks for initial review, 1 week annually for on-going review, and 2 weeks for changes in the law.

Step 4
A cost stream is calculated for the first four years. One large community and two smaller communities are assumed to be reviewed in the first year. Two larger communities and 3 smaller communities are assumed to be reviewed in the 2nd year. A change in law is assumed in year 3.

Step 5
The cost stream results in the following FTE for an Environmental Specialist 3 during the first 4 years:

Year 1	.40
Year 2	.82
Year 3	.66
Year 4	.22

Step 6
The 1990 cost for an Environmental Specialist 3 is $2465 per month. Using a 3% real discount rate, a 23.1% indirect cost, a 35% cost for OPE, and a 28% cost for Services and Supplies, the total present value of the cost stream in the first four years is $107,933. When divided by the total out-of-state tonnage expected during the first four years, discounted at a 3% annual rate, the cost per ton is $.048394.

Estimated cost per ton: $.05

5. INCREASED ENVIRONMENTAL LIABILITY

The recent EPA report lists "Environmental Risk, if systems fail" as one of the possible negative impacts of importing solid waste. There are currently mechanisms in place to reduce the risk of such a failure, and to pay for cleanup in case there is one. However, there is a "window" of potential liability that is not covered by present programs, and importing states add to the liability by adding to the volume of waste. In addition, importing states can potentially escape some of the costs of cleanup. Oregonians cannot.

Currently, regional disposal sites are required to have financial assurance to cover closure and limited environmental liability up to $1 million. Sites that are not designated as "Regional Disposal Sites" under Oregon law do not have this requirement. (At least two sites currently accepting out-of-state waste are not "regional sites")

In addition to the required financial assurance, Oregon recently passed a law that requires (when needed) all disposal sites to pay $.50 per ton on all solid waste toward a bond fund to finance groundwater cleanups at disposal sites that cannot afford cleanup. This fee also applies to out-of-state waste.

The window of unfunded liability occurs when a disposal site accepting out-of-state waste faces a major cleanup (over $5 million) that it cannot afford. If the $.50 per ton charge must be raised statewide to, say $3.00 per ton to cover the cost of this cleanup, out-of-state users of the site may choose to take their garbage elsewhere, escaping their share of the cost of cleanup.

In addition, when a local government is responsible for cleanup, its citizens, under Oregon law, are subject to a charge of up to $60 per person to cover the cost of a cleanup. This charge cannot be applied to out-of-state users under Oregon law.

Given the financial assurance mechanisms in place, and the environmental protection requirements for disposal sites in Oregon, the "expected" uncovered liability contributed by out-of-state waste is low. The problem is, of course, that if a $100 million cleanup were to occur, the "expected" liability doesn't mean much. Therefore, the range of costs has been calculated by taking an "expected" amount of uncovered liability and a "worst case" that would conservatively protect Oregon ratepayers.

Step 1
Because the calculation here is for uncovered environmental liability, the first step is to estimate the total amount of environmental cleanup expected to be covered by the Orphan Site Account for landfills during the next 20 years.

There are over 150 solid waste landfills under permit in Oregon, of which 2% have state-of-the-art environmental protection, an additional 8% have some engineered protection, and 90% have no engineered protection at all. Most of these landfills can be expected to impact ground or surface waters during the next 20 years, requiring some remedial action.

A 1988 EPA report on landfills involved in Superfund cleanups estimated an average cleanup cost of $13.1 million per landfill. Four percent of the landfills had cleanups costing more than $30 million.

Although cleanup activities at many of Oregon's landfills will be financed by other means, the expected demand on the Orphan site account during the next 20 years will be as follows:

$100,000,000	40% probability
50,000,000	40% probability
10,000,000	20% probability
0	0% probability

Step 2
These probabilities can be converted into an expected per-ton surcharge to pay for bonds to finance the Orphan Site cleanups.

$100,000,000	($4 per ton)	40% probability
50,000,000	($2 per ton)	40% probability
10,000,000	($.40 per ton)	20% probability
0	($0 per ton)	0% probability

Step 3
For each potential per-ton surcharge, a probability can be estimated that out-of-state generators disposing in Oregon would seek less expensive disposal options in their own or another state.

$4 per ton	80% probability of leaving
$2 per ton	40% probability of leaving
$.40 per ton	10% probability of leaving

Step 4
We can now calculate the probabilities of out-of-state users avoiding responsibility for paying for liabilities they have contributed to. The next step is to calculate the environmental liability incurred from disposal of out-of-state waste. It is expected that out-of-state waste will be distributed among Oregon disposal sites as follows:

75%	Disposal sites with state-of-the art environmental protection technology (double-liners, etc.)
15%	Disposal sites with limited environmental protection technology.
10%	Disposal sites with no engineered environmental protection

Step 5
For landfills accepting out-of-state waste, the following probabilities are assigned to potential <u>unfunded</u> environmental liability:

<u>Landfills with State-of-the-Art Technology</u>

$50 million	.1%
$20 million	.4%
$10 million	4.5%
$0	95%

<u>Landfills with Limited Environmental Protection</u>

$50 million	1%
$20 million	10%
$10 million	59%
$0	30%

Landfills with no Engineered Environmental Protection

$50 million	10%
$20 million	35%
$10 million	52%
$0	3%

Step 6
Assuming that out-of-state waste will generally constitute 23% of the waste coming to these landfills, the expected unfunded liability at each of the categories of landfills is therefore calculated by multiplying the potential liabilities (times 23%) by the probabilities listed above. The results are:

$133,400	Landfills with state-of-the-art technology
$1,932,000	Landfills with limited technology
$3,956,000	Landfills with no technology

Step 7
These figures are then multiplied by the distribution probabilities to get an expected unfunded liability caused by out-of-state waste:

$133,400 x .75	Landfills with state-of-the-art technology
$1,932,000 x .15	Landfills with limited technology
$3,956,000 x .10	Landfills with no technology

Step 8
This totals $785,450. This figure can now be multiplied by the probabilities that out-of-state users will go somewhere else. (see Step 1 and Step 2 above)

$785,450 x .40 x .80 =	$251,344
$785,450 x .40 x .40 =	$125,672
$785,450 x .20 x .10 =	$15,709

Step 9
This totals up to $392,725. When this figure is then divided by the number of out-of-state tons expected during the next 20 years (12 million), the cost per ton comes to $.03.

Step 10
A worst case analysis, designed to conservatively protect Oregon ratepayers against the highest potential unfunded liability, would calculate the costs using a 100% probability of a $90 million cleanup charge to the Orphan Site Account. This $90 million figure comes from an assumption, based upon the 1988 EPA report, that the "worst case" would involve three landfills with a $30 million cleanup bill. This results in a total expected unfunded liability of .72 per ton. Some have argued that Oregon should protect itself against a potential worst case liability of $100 million. This would result in a cost of $.80 per ton.

Estimated cost: $.03 - $.72 per ton.

6. LOST DISPOSAL CAPACITY

Every ton of solid waste accepted from out-of-state uses disposal capacity which cannot be used for Oregon waste, and which therefore must ultimately be replaced.

Some would argue that privately owned landfill or incinerator capacity is a private good, and is no more a state resource than the widgets produced by a privately-owned factory. However, there are some significant differences between widgets and disposal capacity:

* First, as the draft EPA report points out, solid waste disposal is a necessary public service, similar to sewer and water.

* Second, Oregon law (ORS 459.015) states clearly that "extending the useful life of existing solid waste disposal sites" is in the public interest of Oregon.

* Third, Oregon law (ORS 459.015) states clearly that it is the **policy of the State of Oregon** (emphasis added) to "encourage utilization of the capabilities and expertise of private industry" to accomplish the public need of solid waste management. This suggests that the use of **private** facilities does not change the public need or interest in preserving disposal capacity.

* Fourth, Oregon law (ORS 459.017) states, "The planning location, acquisition, development and operation of landfill disposal sites is a matter of state-wide concern". This, of course, includes privately owned landfill sites.

* Last, Oregon law (ORS 459.293) states that " The disposal in Oregon of domestic solid waste generated both **outside** (emphasis added) and within Oregon will reduce the total capacity available for disposal of domestic solid waste generated in this state;".

The real cost to Oregonians of losing the disposal capacity is actually in replacing that capacity. The replacement can be accomplished in one of two ways: either replacing the capacity through siting of a new facility, or conserving capacity through recycling or other waste reduction efforts.

Both the public and private costs (if private companies are involved) of siting new disposal facilities are eventually borne by the public. If the new capacity (replacement facilities) is utilized by out-of-state waste generators at the same rate as the existing disposal facilities, then direct siting costs will be shared by in-state and out-of-state users proportionately. However, if present out-of-state generators go elsewhere, then Oregonians will pay the total bill for replacement of used capacity.

Step 1
The per-ton cost of replacing(siting) landfill capacity varies by the size of the landfill being sited. For the purposes of this analysis, we will assume that 50% of the capacity lost to out-of-state waste will be replaced by landfills with a 30 million-ton capacity; 35% of the capacity will be replaced by landfills with a 9 million-ton capacity, and 15 % will be replaced by landfills with a 100,000 ton capacity.

Step 2
Using the 1986 model by ECO Northwest on the true cost of sanitary landfills, the estimate for what ECO calls "predevelopment" costs for a new landfill total $.12 per ton for a landfill with 30 million tons of capacity; $.36 per ton for a landfill with a 9 million ton capacity, and $4.06 per ton for a landfill with a 100,000 ton capacity (the last category has a total predevelopment cost of $300,000).

Step 3
The expected cost of replacement for landfill capacity lost is therefore the sum of:

50% x $.12
35% x $.36
15% x $4.06

This equals $.80 per ton.

Step 4
With no out-of-state waste, the disposal sites are likely to have the following expected lifetimes (for a total expected capacity of 40 years):

60 years	50%
25 years	25%
15 years	25%

This means that, without out-of-state waste, the $.80 per ton predevelopment costs will be, on average, experienced in year 40.

Step 5
With out of state waste, the disposal sites will have their life shortened to the following:

30 years	50%
12.5 years	25%
7.5 years	25%

This means that, with out-of-state waste, the $.80 per ton predevelopment costs will be, on average, experienced 20 years earlier, in year 20.

Step 6
The discounted value of $.80 per ton, at 3% real discount rate, at year 40 is $.24.

The discounted value of $.80 per ton at year 20 is $.44.

Therefore, the difference is the real cost of lost disposal capacity from accepting out-of-state waste is the difference between those two waste streams: $.20 per ton.

Success in siting efforts is not guaranteed, the recent success in siting regional landfills in Gilliam and Morrow counties notwithstanding. In the case of the Portland metropolitan area, it took at least 4 attempts at siting new facilities (2 public and 2 private) at a direct cost of over $5 million before facilities were developed. Therefore, direct siting costs may involve the costs of regional planning for replacing or developing multi-county solid waste disposal sites.

Potential costs per ton: $.20

7. LOST TOURISM OR BUSINESS DEVELOPMENT REVENUES DUE TO STIGMA OF ACCEPTING OUT-OF-STATE WASTE.

A recent EPA draft report on regional solid waste disposal lists "Public perception of state as a waste state, hurting business development and tourism" as one of the costs to states importing waste for disposal. The potential impact is a tangible loss of jobs and tourism income due to a reduction in the "clean" image that Oregon markets. Some economists in the state have argued that this clean image has significant economic value to Oregon as the state attempts to lure tourists and capital investment to the state.

A recent report from West Virginia University cites a large body of research in the area of environmental stigma. Stigma refers to the "perception that an individual or group is discredited because of certain characteristics involving an undesired differentness from what we had anticipated" (Goffman 1963:5). The West Virginia study notes that "naturally beautiful areas which are seeking to attract tourists, agricultural areas known for wholesome products, or family residential areas are all vulnerable to the devaluing of image."

A 1987 study by Edelstein (1987:24) finds that environmental stigma is associated with waste disposal facilities, both hazardous and solid. He states, "a region becomes marked because of its potential for, rather than the actuality of contamination".

This environmental stigma is heightened by the acceptance of out-of-state waste. The West Virginia University study noted that there is a particular stigma attached to receiving out-of-state waste. "By its very nature, garbage is perceived as the dregs of society", the researchers write. "Many believe nothing is more demeaning than to take someone else's garbage."

The West Virginia study goes on to discuss the potential impacts of environmental stigma on tourism. It states that environmental quality is considered an important factor in attracting tourists. The study cites the 1988 incidents of garbage washing up on a part of the New Jersey shore. The publicity from that incident created a stigma that caused a decline in tourism all along the New Jersey shore, including areas far from the incident.

Step 1
The Oregon Economic Development Department estimates that tourism brings in more than $2 billion annually to Oregon's economy. A significant part of that tourist economy ($100 million annually) is based upon the tourist attractions and pristine beauty of the Columbia Gorge Scenic Area. If tourism were to decline by as little as .1%, the economic impact on Oregon would be $2 million. If the decline were .05%, the impact would be $1 million dollars.

On a localized basis, a decline of 1% in tourism revenues within the Columbia Gorge would cost Oregon $1 million.

The Oregon Economic Development Department actively recruits industrial business locations in Oregon. Last year more than 250 firms were actively recruited. EDD staff feel that the stigma from importation of out-of-state waste could negatively influence business location decisions, although the impact would be difficult to document or quantify.

Step 2
Even if there were no accidents or environmental problems associated with out-of-state waste, the stigma of Oregon and the Columbia Gorge area as a repository for other states' garbage would have some impact on the state's tourism economy. This impact will be conservatively estimated at a .01% decline (or 1 ten-thousandth), for an annual impact of $200,000.

Step 3
If there were a significant environmental incident involving out-of-state waste, the amount of publicity on the incident can be expected to greatly increase the impact on the area's and the state's image and therefore on the state's tourist economy. If there were such an incident, the impact on the economy can be conservatively estimated at a .1% decline for that year, for an annual impact of $2 million.

Step 4
The assigned probabilities for the potential outcomes are:

44%	No major incident in first 20 years
50%	One major transport-related incident in 20 years
6%	One major landfill incident in first 20 years

Step 5
The impact of environmental stigma with no major incident is $200,000 per year, or $.33 per ton.

Step 6
The impact of environmental stigma with one major transport accident assumed during the first twenty years is $200,000 annually plus the cost associated with the probability of an incident.

The Association of American Railroads Fact Book (1989) notes that there are 5 rail accidents per million train miles. Assuming that at least half of the out-of-state waste expected will be arriving by train, we can assume 100,000 train miles per year, suggesting a 50% chance that an accident will happen each year. Assuming conservatively that one out of every twenty (5%) accidents would generate significant publicity either regionally or nationally, we

can assume a 50% chance of a transport-related accident that would affect tourism during the first twenty years.

We therefore can calculate the expected annual costs of environmental stigma with a transport accident as $200,000 (the impact without an accident) plus 5% of $2 million. This calculates to $300,000 per year. The 50% probability of this outcome results in an expected cost of $150,000 annually; divided by the expected 600,000 tons equals $.25 per ton.

Step 7
The probability of a significant (more than $20 million) environmental incident at a landfill accepting out-of-state waste during the next 20 years is: (see "unfunded liability" above) 6%, calculated as follows:

.75 x .005	Landfills with state-of-art technology
.15 x .11	Landfills with limited technology
.10 x .45	Landfills with no technology

If there is an environmental incident at landfills accepting out-of-state waste, it is equally likely to happen at any time during the first 20 years. Therefore, we will assume for the purposes of calculation that an incident (or incidents) will occur at year 10, and that the impacts of stigma will occur for a five year period. It will be further assumed that the real discount rate is 3% during this period.

The annual impacts from an environmental incident at the landfill are therefore the probability of an incident (.06) at year 10 times the potential impact ($2 million per year) in the 10th through the 14th year of a 20-year period. This equals $408,927. Dividing this number by the total discounted number of tons during the 20-year period gives us $.0458 per ton. Adding this to the $200,000 expected even with no incident provides a total per-ton cost for this expected outcome of $.07 per ton.

Step 8
Adding the expected impact with no incident ($.15 per ton - $200,000 divided by 600,000 multiplied by a 44% probability), the expected impact with a transport incident ($.25 per ton), and the expected impact with a landfill incident ($.07 per ton) results in a total expected cost of $.47 per ton.

Step 9
Even if no incidents are assumed in the analysis, the cost would be a minimum of $.33 per ton. If either the probability of an incident is increased or the estimated impact on tourism and economic development is increased, the cost per ton could be much higher.

Estimate of potential costs: $.33 per ton to $.65 per ton.

8. PUBLICLY SUPPORTED INFRASTRUCTURE

To the extent that importation of solid waste for disposal uses physical or administrative infrastructure in Oregon that is paid for only by Oregonians, there is an extra cost to Oregonians that should be shared by the exporting state(s).

The Solid Waste Section at DEQ has looked at publicly supported infrastructure in both transport of waste and disposal of waste.

Under transport, DEQ looked at the following categories of infrastructure:

- spill response capability
- maintenance of roadways not covered by P.U.C.
- Extra rail crossings
- State or local planning costs related to interstate transport (e.g. P.U.C. hearings, local planning activities)
- Extra traffic patrolling and safety problems

No specific figures on these costs are currently available; however, most of these costs are likely to be relatively small, given that any transport using truck will pay P.U.C. milage tax. In addition, cost of local road maintenance in the vicinity of the sites will, in many cases, be addressed through local "host fees".

Very little publicly supported infrastructure for disposal was identified that did not already fall into the category of "solid waste management" discussed above. This could change if Oregon experiences some of the safety and illegal hauling problems the state of Pennsylvania has experienced because of interstate transport of solid waste.

The much larger potential for costs related to transport was brought up during the July 17, 1990 of the Solid Waste Advisory Committee. The committee identified a need, brought on by the potential for large shipments of hazardous materials, for transportation planning in the Columbia Gorge corridor. Such planning is likely to be needed because of the concerns generated by transport of out-of-state into Oregon, and the need to address potential policy questions regarding safety, recreational compatibility, and tourism. This type of planning is costly, perhaps in the hundreds of thousands of dollars, and reflects the type of indirect local and state planning costs that may be borne by Oregonians because of the importation of out-of-state waste.

Step 1
The cost of a planning effort to study the transport of hazardous materials through the Columbia Gorge corridor is estimated to cost $1 million, spread equally across three years starting two years from now.

Step 2
Using a real discount rate of 3%, the present value of the study cost is $887,857.

Step 3
To assign the portion of that cost attributable to out-of-state waste, it is assumed that out-of-state waste represents 10% of the total transport of hazardous substances through the Columbia Gorge corridor. This results in an out-of-state waste share of $88786.

Step 4
Dividing this figure by the total number of tons from out-of-state during the next 5 years (3 million tons). This results in a cost of $.03 per ton. This figure may increase or decrease slightly, based upon changes in the assumptions. However, it will not vary by more than a few cents.

Potential costs: $.02 - $.05 per ton

9. NUISANCE IMPACTS FROM TRANSPORTATION

The Draft EPA report identifies a potential for negative "nuisance" impacts to both the importing jurisdiction and the transit jurisdiction. These potential nuisance impacts include noise, litter, traffic, and visual impacts.

Virtually all nuisance impacts related to disposal are paid for through the host community fee of regional sites (though not at non-regional sites). Therefore any measure of loss of "quiet enjoyment" is likely to be felt as part of transit (truck, rail, or barge).

The loss of this "quiet enjoyment" is difficult to quantify, and is likely to be relatively small, given that the incremental increase in barge, rail, or truck traffic will be minimal. However, some minor loss of "quiet enjoyment" can be expected. The draft EPA report has stated that this loss can be quantified through "political valuation", underscoring the difficulty of quantifying these impacts.

Step 1
One way to quantify the nuisance impacts of increased traffic is to look at the potential for out-of-state transport to increase traffic accidents. Figures from the Oregon Public Utility

Commission show that the 1989 accident rate for large trucks was 1.02 accidents per million miles.

Step 2
Assuming that half of the 600,000 tons per year of out-of-state waste will come by truck, an additional 1,500,000 miles are assumed to be driven in Oregon. This results in a 150% chance that each year there will be an additional accident involving a truck carrying out-of-state waste. Assuming that each accident results in a cost (in terms of damage to other vehicles, damage to property, and police and/or fire costs) of $5000, the cost to the state is approximately $.01 per ton.

Potential costs: $.01 - $.03 per ton.

V. SUMMARY AND RECOMMENDATIONS

Using the estimates developed in the preceding analysis, the Department has developed a range of figures for the out-of-state waste surcharge:

$.50	Statewide activities for reducing environmental risk and improving solid waste management, paid for through the per-ton fee on domestic solid waste.
$.42	Statewide activities for reducing environmental risk and improving solid waste management, paid for through general funds.
$.20 - $1.51	Tax credits and other public subsidies
$.05	Solid waste reduction activities related to the review and certification of waste reduction and recycling plans
$.03 - .72	Increased environmental liability
$.20	Lost disposal capacity
$.33 - .65	Lost tourism or business development revenues due to stigma of accepting out-of-state waste.
$.02 - .05	Publicly Supported Infrastructure
$.01 - .03	Nuisance Impacts from transportation
$1.76 - $4.13	Total

The range of potential total costs of accepting out-of-state waste in Oregon is therefore $1.76 to $4.13 per ton. The actual surcharge chosen within that range will be largely determined by whether or not net benefits are included in the calculation on tax credits, and by the perceived need to protect against increased environmental liability.

The Department recommends the fee be reviewed not later than January 1995 and revised to include inflation and other relevant information.

The EQC should word the rule to divide the surcharge into two parts: part of which includes any per-ton fee on in-state users (such as the current $.50 per ton fee), plus one part that applies only to out-of-state waste.

ATTACHMENT E

Oregon Department of Environmental Quality

A CHANCE TO COMMENT ON...

Proposed Rules Relating to a Surcharge
on Out-of-State Solid Waste Disposed of in Oregon

Hearing Dates: September 24, 1990
September 25, 1990

Comments Due: October 1, 1990

WHO IS AFFECTED: Owners and operators of solid waste landfills now disposing of solid waste generated out-of-state or who may accept such solid waste for disposal in the future. Out-of-state generators of solid waste disposing of solid waste in Oregon. Local governments, garbage haulers.

WHAT IS PROPOSED: The Department proposes to adopt a new surcharge on solid waste generated out-of-state and disposed of in Oregon. The surcharge will be used to meet the costs of the Department in administering the solid waste program. The Department is requesting public comment on a range of surcharge options from $1.50 per ton to $3.50 per ton of out-of-state solid waste.

An economic consultant has been hired to review the Department's methodology for establishing the amount of the surcharge. The Department would also like to receive public comment on the consultant's report. The consultant's draft report is due on September 11. The report will be available for review no later than September 17 at all DEQ Regional and Branch Offices (Portland, Bend, Pendleton, Medford, Coos Bay and Roseburg), and at the Arlington Public Library, 1st and Locust Street in Arlington (open Monday and Tuesday 9 a.m.-12 noon and Wednesday afternoon from 1-5).

WHAT ARE THE HIGHLIGHTS: The proposed amendments would:

- o establish a surcharge on solid waste generated out-of-state and disposed of in Oregon;
- o require that the surcharge be submitted at least quarterly.

(over)

811 S.W. 6th Avenue
Portland, OR 97204

11/1/86

FOR FURTHER INFORMATION:

Contact the person or division identified in the public notice by calling 229-5696 in the Portland area. To avoid long distance charges from other parts of the state, call 1-800-452-4011.

HOW TO COMMENT:

A public hearing will be held before a hearings officer at:

7:00 p.m.
September 24, 1990
Hearing Room
Portland Building, Second Floor
1120 SW Fifth Avenue
Portland, OR

7:00 p.m.
September 25, 1990
Arlington High School
Arlington, OR

7:00 p.m.
September 25, 1990
Jackson County Courthouse Auditorium
Main and Oakdale
Medford, OR

(The Medford hearing will be preceded by a public information session from 5:00 p.m. to 6:00 p.m. in the same location.)

Written or oral comments may be presented at the hearings. Written comments may also be sent to the Department of Environmental Quality, Solid Waste Permits and Compliance Section, Hazardous and Solid Waste Division, 811 S.W. 6th Avenue, Portland OR 97204, and must be received no later than 12:00 noon, Monday, October 1, 1990.

Copies of the complete proposed rule package and summaries of the economic consultant's draft report may be obtained from Terence Hollins, (503) 229-6922, at the DEQ Hazardous and Solid Waste Division. For further information on the rule, contact Steve Greenwood at 229-5782. You may also call DEQ toll-free at 1-800-452-4011.

WHAT IS THE NEXT STEP:

The Environmental Quality Commission may adopt new rules identical to the ones proposed, adopt modified rules as a result of testimony received, or may decline to adopt rules. The Commission will consider the proposed rule revisions at its meeting on November 2, 1990.

WT\SK2907

(e) Grants to local government units for recycling and solid waste planning activities.

(f) To pay administrative costs incurred by the department in accomplishing the purposes set forth in this section, the amount allocated under this subsection shall not exceed 10 percent of the fees generated under ORS 459.294. [1989 c.833 §153]

Note: See note under 459.292.

459.297 Surcharge on solid waste generated out-of-state. (1) Beginning on January 1, 1991, every person who disposes of solid waste generated out-of-state in a disposal site or regional disposal site shall pay a surcharge as established by the Environmental Quality Commission under ORS 459.298. The surcharge shall be in addition to any other fee charged for disposal of solid waste at the site.

(2) The surcharge collected under this section shall be deposited in the State Treasury to the credit of an account of the Department of Environmental Quality. Such moneys are continuously appropriated to the department to meet the costs of the department in administering the solid waste program under ORS 459.005 to 459.426. [1989 c.833 §155]

Note: 459.297 and 459.298 were added to and made a part of ORS 459.005 to 459.426 by legislative action but were not added to any smaller series therein. See Preface to Oregon Revised Statutes for further explanation.

459.298 Amount of surcharge on solid waste generated out-of-state. Subject to approval by the Joint Committee on Ways and Means during the legislative sessions or the Emergency Board during the interim between sessions, the Environmental Quality Commission shall establish by rule the amount of the surcharge to be collected under ORS 459.297. The amount of the surcharge shall be based on the costs to the State of Oregon and its political subdivisions of disposing of solid waste generated out-of-state which are not otherwise paid for under the provisions of ORS 459.235 and 459.292 to 459.298, 459.411 to 459.417 and sections 70 to 73, chapter 833, Oregon Laws 1989. These costs may include but need not be limited to costs incurred for:

(1) Solid waste management;

(2) Issuing new and renewal permits for solid waste disposal sites;

(3) Environmental monitoring;

(4) Ground water monitoring; and

(5) Site closure and post-closure activities. [1989 c.833 §156]

Note: See note under 459.297.

459.300 Metropolitan service district site selection. (1) The metropolitan service district may provide for the disposal of solid waste from Clackamas, Multnomah or Washington County at a disposal site or sites other than the site selected by the Environmental Quality Commission under section 5, chapter 679, Oregon Laws 1985.

(2) The Department of Environmental Quality shall not use the selection of a disposal site under chapter 679, Oregon Laws 1985, to find that there is not a clearly demonstrated need for a site or sites selected by the metropolitan service district for disposal of waste under subsection (1) of this section. [1987 c.876 §5]

459.305 Certification that government unit has implemented opportunity to recycle; rules; fee; special provisions for metropolitan service district. (1) Except as otherwise provided by rules adopted by the Environmental Quality Commission under subsection (3) of this section, after July 1, 1988, a regional disposal site may not accept solid waste generated from any local or regional government unit within or outside the State of Oregon unless the Department of Environmental Quality certifies that the government unit has implemented an opportunity to recycle that meets the requirements of ORS 459.165 to 459.200 and 459.250.

(2) The Environmental Quality Commission shall adopt rules to establish a program for certification of recycling programs established by local or regional governments in order to comply with the requirement of subsection (1) of this section. No contract or agreement between an owner or operator of a disposal site and a local government unit shall affect the authority of the commission to establish or modify the requirements of an acceptable opportunity to recycle under ORS 459.165 to 459.200 and 459.250.

(3) Not later than July 1, 1988, the commission shall establish by rule the amount of solid waste that may be accepted from an out-of-state local or regional government before the local or regional government must comply with the requirement set forth in subsection (1) of this section. Such rule shall not become effective until July 1, 1990.

(4) Subject to review of the Executive Department and the prior approval of the appropriate legislative review agency, the department may establish a certification fee in accordance with ORS 468.065.

(5) After July 1, 1988, if the metropolitan service district sends solid waste generated within the boundary of the metropolitan service district to a regional disposal site, the metropolitan service district shall:

(a) At least semiannually operate or cause to be operated a collection system or site for receiving household hazardous waste;

ATTACHMENT G

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: October 1, 1990

TO: Environmental Quality Commission

FROM: Robert L. Danko, Hearing Officer

SUBJECT: Public Hearing, Proposed Amendments to Solid Waste Rules, Portland, 7:00 p.m., September 24, 1990

On September 24, 1990, a public hearing regarding proposed revisions to rules relating to a surcharge on out-of-state solid waste disposed of in Oregon (OAR 340-61) was held in Portland, Oregon. Testimony was also received on a draft report by the Department's consultant, National Economic Research Associates, Inc. (NERA). Fifteen people attended, and eight testified.

A summary of the testimony follows:

Doris Bjorn of Oregon Waste Systems, Inc. testified that her company is not opposed to an out-of-state surcharge if it is based on known and measurable costs. It appears that the recommended surcharge was based on DEQ's funding needs rather than on the costs to the state of importation of solid waste. She pointed out that Oregon Waste Systems' contract with Seattle makes the City partly responsible for any surcharges; and it will be the City that decides whether its waste will continue to come to Oregon in the future. She supported most of the NERA report's conclusions, namely that 1) Several cost categories were identified which affect all landfills and not just those accepting out-of-state solid waste; 2) More research needs to be done on some costs; and 3) Where costs have been identified, they should be reduced to reflect offsetting benefits.

Lawrence Schall, a professor at the University of Washington and consultant to Oregon Waste Systems, Inc., concluded that the NERA report presented valid criticisms of the Department's methodology for calculating the surcharge, and that the DEQ proposal for the surcharge (a range between $1.50 and $3.50/ton) was excessive. He said DEQ should use the NERA report to greatly refine and improve its cost computation. He also suggested that the per ton charge was likely to be much

less than the DEQ proposal; in fact, the economic benefits of out-of-state solid waste may exceed the costs to the state. He cited problems with the Department's methodology which are identified by NERA:

1) Benefits produced by out-of-state waste are ignored. He mentioned the ECO Northwest report which said that out-of-state waste represents a $6.50/ton benefit to the state from host fees and incremental taxes.

2) Charges are computed incorrectly. DEQ assumes that costs of disposal are proportional to tonnage, which is often not the case. The method of establishing unfunded liability is incorrect and double counts costs, not giving credit for self-insurance. This gives no incentive to landfills which use more environmentally sound disposal practices. The DEQ methodology overcharges regional landfills, and undercharges small local ones. Each landfill should have to provide financial assurance to cover its risks. Other examples of double counting are costs for noise and nuisance, which are covered in the host fee; and damage to Oregon's image. Charges are included which do not relate to out-of-state waste such as for the Oregon household hazardous waste program.

3) DEQ has failed to demonstrate some costs. For the tax credit, DEQ must do a net cost analysis, as suggested by NERA. DEQ must better demonstrate that out-of-state waste would damage Oregon's image.

John DiLorenzo of O'Connell, Goyak & DiLorenzo representing Tidewater Barge Lines and Finley Buttes Landfill Co. summarized written comments that he submitted. Commented on the following cost components from the Greenwood memo:

1) Under costs associated with "Statewide Activities...," the assumption is that the $.50/ton fee for domestic solid waste is used by DEQ to reduce environmental risks associated with landfills. This is not the case; it is also used to reduce the solid waste generated in Oregon. NERA failed to take into account that this finances Oregon recycling. Because out-of-state generators must bring their own area into compliance with Oregon recycling laws, requiring them to pay this fee also is unfair and discriminatory.

2) Tidewater is not taking issue right now with the

$.25/ton from the General Fund; but they want to see how much of this is used for unfunded liability.

3) Concerning pollution control tax credits: he sees nothing in this statute that allows the Commission to take back the benefits allowed by the tax credit statute for encouraging state of the art technology. It is also unfair to assume that every operator will take advantage of the tax credit; small ones may not.

4) Concerning costs of certifying out-of-state recycling programs: the charge bears no real relationship to tonnages. Under the proposed charge, DEQ would pay itself $400,000 for certifying the Clark Co. recycling activities. A $.01/ton charge would be more reasonable.

5) Concerning unfunded environmental liability: this is really for "excess environmental risk." It should be $0 at regional state-of-the-art facilities. The ECO Northwest report discusses the potential environmental liability from siting new landfills, and states that it is possible to eliminate environmental hazards for these new facilities, and that external costs are highly improbable. Since this cost is really an excess insurance policy, it should focus on probabilities of the state having to absorb excess costs after both financial assurance and the special environmental hazard fund (self-insurance) had been exhausted.

6) Concerning loss of disposal capacity: this cost is spurious. DEQ assumes a finite amount of landfill capacity; in reality the supply of landfill space depends on the number of acres DEQ is willing to permit. DEQ might incur costs in siting a new landfill; but those costs are covered in permit fees.

7) Concerning "image, etc.": the attempt to assign number costs to "image" is speculative. To include infrastructure costs is double counting. "Lack of quiet enjoyment" assumes there are people who would be disturbed; but the nearest house is 3 miles away from Finley Buttes. He quoted the ECO Northwest report which stated that a properly designed landfill should not cause a lack of amenity.

Mr. DiLorenzo also noted that the DEQ methodology failed to account for the positive benefits of Finley Buttes landfill (payroll, court and host fees, taxes). He suggested that DEQ

review the way costs are calculated, keeping in mind demand elasticity for waste disposal. DEQ should guard against disrupting the economies of the host communities.

Lisa Zavala, staff to the Joint Legislative Committee on Environment, Energy and Hazardous Materials, read a statement from Committee co-chairs Sen. Dick Springer and Rep. Ron Cease. They commented that the options presented by DEQ were appropriate. The $1.50 per ton is too low; but the $3.50 may be too high. Their concern was that the fee must be high enough to cover damage from a worst-case scenario to all landfills. More stringent Federal rules may be some time away; in the meanwhile, any landfill can take out-of-state waste. They requested that EQC examine a worst-case scenario for contamination, and noted that it would be apparent that a high fee (from $2.50 to $3.50) is necessary.

Jim Benedict, an attorney for Oregon Waste Systems, Inc., commented that the surcharge should be based on measurable costs, and comply with state law and the U.S. constitution. He suggested that the proposed fees may well violate both of the latter. He noted that the Commerce Clause makes discriminating solely on the basis of place of origin unconstitutional. Oregon is proposing a surcharge based solely on origin of the solid waste. He suggested that the costs discussed in sections B through G of the Greenwood memo are unconstitutional, as they are based solely on origin. Mr. Benedict mentioned a four-pronged test which was applied to taxes (or fees). He noted that several of DEQ's proposed cost categories would not meet the test (e.g. the $.50 equalization fee would not be "fairly apportioned" or "fairly related to benefit the taxing entity"). He noted that the statute requires the surcharge to be based on the "costs to dispose of solid waste," and many of DEQ's proposed cost components don't fit this, as they are solely for the benefit of in-state programs. Furthermore, the statute specifically excludes some costs from the surcharge; Mr. Benedict believes that the $.50/ton fee (on domestic solid waste) was specifically meant not to be imposed on out-of-state solid waste. Fees recovered by DEQ (such as for monitoring and annual compliance) are also specifically excluded. DEQ has not demonstrated that their monitoring costs exceed their permit fees for monitoring.

Brian Johnson of Finley Buttes Landfill Co. testified that DEQ has not developed the data to support even a $1.50/ton fee. He noted that the statute required "costs not otherwise paid for" to be the basis of the surcharge. The range of costs put forward by DEQ is inappropriate, and testimony should not be

limited to that range. Finley Buttes is willing to pay a reasonable and justifiable surcharge.

John Frewing, Chair of the Solid Waste Advisory Committee, wanted to put the Committee's record of decision on the official record. The Committee tended towards the higher end of the surcharge range rather than the lower. Some individuals on the Committee felt some costs were higher than in the DEQ report. Specifically, under unfunded liability, there was a concern that a company importing wastes could escape some of the costs if they stop bringing these wastes, since Oregon laws require Oregon cities to fund environmental problems after the fact. Mr. Frewing personally felt that the cost to Oregon's image should be higher, stating that a reasonable calculation of this cost could be obtained by looking at the dollars expended to attract recreationists, etc.

Mike Conway of the City of Washougal noted that his city had spent a lot of time evaluating various options for waste disposal, and they didn't mind paying the true costs of disposal. He noted that part of the fee his community will pay goes into a trust fund to take care of environmental problems. He wondered when the two states were going to "stop taxing each other."

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMO

TO: Environmental Quality Commission DATE: October 5, 1990

FROM: Ernest A. Schmidt, Hearing Officer

SUBJECT: Public Hearing - Proposed Rule Establishing a Per-Ton Surcharge on the Disposal of Out-of-State Solid Waste in Oregon

A public hearing was conducted by the Department of Environmental Quality:

7:00 p.m.
September 25, 1990
Arlington High School Library
Arlington, Oregon

to receive testimony regarding proposed revisions to solid waste rules establishing a surcharge on out-of-state solid waste, and on an economic consultant's report (National Economic Research Associates, Inc.) reviewing the Department's methodology in developing that surcharge.

Twenty people attended the hearing. Eleven people testified as follows:

1. Doris Bjorn (Oregon Waste Systems) opposed the magnitude of the proposed range of surcharge. Landfill is constructed to high level environmental standards. Surcharge exceeds real costs to Oregon of importation. Surcharge will make Columbia Ridge Landfill noncompetitive in the Northwest regional disposal market. Waste Management must build a landfill in state of Washington by 1995 as condition of contract with City of Seattle. Local community and state will conservatively lose $40 million because surcharge is too high and waste flow will revert to Washington. Suggested surcharge is intended primarily for financing Oregon recycling and waste reduction programs.

2. Cal Giesler (Arlington Chamber of Commerce) read written testimony in opposition to differential fees and submitted it for the record.

3. Judge Laura Pryor (Gilliam County Court) orally summarized written testimony in opposition to inequitable surcharge and submitted it for the record.

4. Lawrence F. Lear (resident near Condon) spoke in opposition to any surcharge. Feels Oregon statutes outdated for consideration of regional landfill concept. Giving Seattle folks impression of an Oregon "rip-off." Little economic development opportunity in Eastern Oregon. Regional landfills are greatly benefiting Western Oregon by taking "their" waste. Surcharge is discriminatory against Eastern Oregon economic enterprise. DEQ is taking a "Don't Trash Oregon" position.

5. Ed Glenn (resident of Boardman) spoke in opposition to surcharge. Providing a service to Western Oregon. Have greater affinity for Washington neighbors. Fees should be equitable and equal for all. Tax credits are already paid for by Oregon residents, therefore, constitute an "otherwise covered" cost. Seattle is being asked to pay for cost of Oregon recycling.

6. Gary Neal (Port of Morrow) read a written statement in opposition to any surcharge and submitted it for the record.

7. Irvin Rauch (Morrow County Court) read a written statement in opposition, proposing a maximum of 75¢ surcharge, and submitted it for the record.

8. Joe Miller (resident of Heppner) spoke in opposition to a surcharge, stating the solid waste disposal companies are a welcome private business enterprise which shouldn't be interfered with.

9. Alfred Clough (Gilliam County Commissioner speaking as resident of Arlington) spoke in opposition to a surcharge. Regional landfills are a successful public/private enterprise not attainable in Western Oregon. Believes surcharge will cost local economy millions of dollars.

10. Arnie Hedman (Heppner City Council) read a written statement by Mayor Cara Costa in opposition to any surcharge and submitted it for the record.

11. Les Ruark (resident of Gilliam County) spoke in support of a surcharge and indicated a written statement would be submitted by himself and perhaps four others.

On September 28, 1990, a letter was received from Ronald and Gloria Davis, property owners adjacent to Columbia Ridge Landfill, in support of a surcharge on the high side of the proposed range.

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STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: September 28, 1990

TO: Environmental Quality Commission

FROM: Bradford D. Price, Hearing Officer

SUBJECT: Public Hearing, Proposed Adoption of a New Surcharge on Solid Waste Generated Out-of-State and Disposed of in Oregon.

On September 25, 1990, a public hearing regarding proposed adoption of a new surcharge on solid waste generated out-of-state and disposed of in Oregon was held at the Jackson County Courthouse Auditorium in Medford, Oregon. Six individuals attended the hearing and no one provided testimony.

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: October 18, 1990

TO: Environmental Quality Commission

FROM: Bob Danko, Hearing Officer

SUBJECT: Written Testimony: Proposed Amendments to Solid Waste Rules

Written testimony was received by the Department in response to a request for public comment regarding proposed revisions to solid waste rules establishing a surcharge on out-of-state waste, and an economic consultant's report reviewing the Department's methodology in developing that surcharge.

A summary of the written testimony follows.

Bryan Johnson of Finley Buttes Landfill Co. noted that the statutory direction that "the amount of the surcharge shall be based on the costs to the State of Oregon and its political subdivisions which are not otherwise paid for" should be followed. He felt that the Department's proposed range of amounts for the surcharge was premature. He pointed out that the need for quality landfill space was being met by private enterprise rather than governmental groups, and the local people in sparsely populated counties who are willing to accept these new landfills. DEQ should not adopt a surcharge which would jeopardize the economic future of these landfills.

Sen. Dick Springer and Rep. Ron Cease, Co-Chairs of the Joint Interim Legislative Committee on Environment, Energy & Hazardous Materials, stressed the importance that the surcharge be high enough to cover any worst case environmental contamination scenario that might occur to any landfill in the state. They requested that EQC examine the worst case of potential contamination before setting the fee level.

Judge Laura Pryor submitted a Position Paper from Gilliam County. Policy I recommends that both solid and hazardous wastes be considered together to make policy choices which are to Oregon's advantage. She noted that alternative disposal options will be available in Washington State in a few years. Less funding is available for Oregon waste disposal since we have a lower population and generate less waste. A private company investing in a state-of-the-art landfill will need a certain volume of solid waste in order to make a return on investment; this volume may be available only through accepting out-of-state waste. She mentioned Oregon Waste Systems' contract with Seattle, which requires the company to reimburse the City for its share of Oregon surcharges if the company does not build a solid waste facility in

Washington by 1995. They now are negotiating to build such a facility. She pointed out that the revenue to Oregon from a "reasonable fee" on out-of-state waste disposal could have been used to assist local governments to meet new EPA requirements.

Judge Pryor's Policy II concerns the per-ton surcharge on out-of-state waste. She notes that this is a policy question which should be decided after bi-state or regional discussions on how all waste streams are handled on both sides of the Oregon-Washington border. She warns that by acting unilaterally Oregon could be setting itself up for [fee] retaliation in the future if we lose our in-state disposal options and have to send our waste to Washington. She also had specific comments on the DEQ staff report and consultant's draft report. She commented that the $.50/ton fee (for domestic solid waste) and the $.25/ton (general fund) are "revenue offsets to existing funding sources," and wondered whether in-state revenues would have to be raised in the future to offset the loss of the out-of-state charge (when out-of-state waste stops coming to Oregon.) She said that the "only true cost" identified by DEQ was the review and certification of waste reduction plans for out-of-state jurisdictions (identified as $50,000). She suggests raising the permit fee by $50,000 rather than including recycling program certification costs in the surcharge. She also questions whether an increase in tonnage disposed of will result in proportional additional DEQ administrative costs. She notes that DEQ permit fees include the cost of site regulation by DEQ; so DEQ's costs are already covered. She also recommends that DEQ set regulations to prevent out-of-state wastes from going to non-regional sites rather than increasing unfunded liability (via the surcharge) to cover possible contamination at these sites. Concerning lost disposal capacity, she believes that few cities or counties will want to use the Gilliam or Morrow Co. facilities, so depletion by out-of-state waste is not an issue. She suggests that including the cost of a transportation study under Publicly Supported Infrastructure constitutes double counting, as PUC fees cover transportation impact. Finally, she expresses regret that a cooperative process was not used to develop the surcharge.

Cal Giesler submitted comments from the Arlington Chamber of Commerce. They oppose a surcharge on out-of-state solid waste, and feel that any fee proposed to meet DEQ's costs of administering the solid waste program should be levied in an equitable manner against all waste, both internal and external. Collecting a fee solely on imported waste will cause out-of-state generators to stop using the Arlington facility, and the company offering the service will suffer, adversely affecting the local economy.

Cara Costa submitted comments for the City of Heppner in opposition to the out-of-state surcharge. They feel that the surcharge is unnecessary, and imposes an undue burden on out-of-state users and on Morrow County residents.

Irvin Rauch, Morrow County Commissioner, commented for the Morrow County Court on specific cost categories. He said that the $.50/ton for reducing environmental risk and the $.25/ton offsetting General Fund costs are fair if applied to all waste deposited in Oregon. He felt that there should be no unfunded environmental liability if DEQ is doing its job, so the surcharge should contain no cost for that. Some other cost categories did not have sufficient information to justify them (tax credit, solid waste reduction activities). He said the state has no right to assess an amount for lost disposal capacity, as the counties have already addressed this by granting franchises to landfill companies. He suggested $.75/ton was sufficient to cover "solid waste management" costs. He felt that the "other" cost categories were not legitimate costs.

Gary Neal, General Manager of the Port of Morrow, commented that the County Court had already addressed the issue of road impacts in Morrow County. He asked that a surcharge not be set; this would keep the counties from benefitting from having a regional landfill by causing out-of-state waste to go elsewhere.

Kent Goodyear, Chairman of the Morrow County Planning Commission, submitted a letter stating the Morrow County Planning Commission unanimously opposed the imposition of a surcharge on out-of-state solid waste. A business helping to establish a sound economic base in the county should not be penalized.

Delores Miller of Aloha, Oregon submitted comments in favor of a surcharge on out-of-state waste to ensure that all out-of-state cities sending garbage to Oregon have the same rules for recycling as Oregon cities do. She supported a "high" surcharge as out-of-state waste will cause Oregon's landfills to fill up faster.

Sen. Jeannette Hamby stated that Oregonians must be protected from the costs that will accompany the importation of solid waste. She noted that the EQC will not be able to predict what those actual costs will be. She recommends the $3.50 option, as best supported by the evidence, and which will protect the state against future environmental cleanup costs. She points out that not all imported waste will go to state-of-the-art landfills.

Sen. Dick Springer stated that the intent of the surcharge was that no Oregonian, present or future, would have to bear any expense because of out-of-state solid waste. He expressed a concern that there may be costs which we cannot yet anticipate. He believes the $3.50/ton surcharge is justifiable and supportable.

Rep. Ron Cease wrote that it is time for the state to set certain standards as a basis for our solid waste management policy. He suggested that one of the standards should be that the importation of solid waste shall not place a financial burden on Oregon's citizens. He urges the EQC to consider the

long-term costs of solid waste, rapidly increasing cost of environmental cleanup, and to consider that there may be unknown costs. He does not suggest a specific dollar figure, but recommends it be on the higher end of the options.

John DiLorenzo of O'Connell, Goyak & DiLorenzo, submitted testimony on behalf of Tidewater Barge Lines and Finley Buttes Landfill Co. His letter presents a critique of the surcharge cost components identified by DEQ, and gives some "other considerations." DEQ's first cost category includes a fee of $.50/ton on domestic solid waste, on the basis that out-of-state waste should pay the same fee as domestic waste towards reducing environmental risk and improving solid waste management. He points out that some (unknown) part of that fee pays for in-state recycling programs (which is not recognized in the draft NERA report), and comments that this taxes the out-of-state generator twice for recycling: once because the generators must meet Oregon recycling guidelines, and again to support in-state recycling programs. Concerning DEQ's second cost category ($.25/ton of General Fund monies), he suggests that any of these funds spent on risk reduction should be factored into DEQ's assessment for unfunded environmental liability.

Mr. DiLorenzo commented on the tax credit cost category. He said that there is no legislation allowing the EQC to take away by administrative rule the tax credit benefits conferred by ORS 468. Therefore the EQC has no authority to impose a charge in this category. Further, it is unfair to assume, as DEQ does, that every operator will take this credit. The cost category for certification of out-of-state waste reduction plans should not be based on tonnage, as the cost of this review has no real relation to tonnage. Concerning the unfunded environmental liability cost category, he suggests that the cost should be zero when waste is shipped to a state-of-the-art regional landfill, whose environmental risk is remote. He cites other resources which would be available for environmental cleanup before state funds would have to be tapped. Regional landfills are required to provide a $1 million bond to the State of Oregon, and exporting jurisdictions require self-insurance for pollution. The probability of any costs for unfunded environmental liability should only be calculated assuming those other resources are first consumed. He further comments that assigning a cost for lost disposal capacity is spurious, as there is ample land available for expansion around the two new regional landfills. Any permitting costs to DEQ should be recovered through permitting fees, not the surcharge. In any case, any costs incurred are not incurred uniformly on a ton-for-ton basis. He says that the other costs DEQ identifies are too speculative or constitute double counting. Mr. DiLorenzo notes that DEQ's cost analysis fails to account for the considerable economic benefits to the State of the solid waste coming to Finley Buttes Landfill.

Senator Shirley Gold noted that management and tax credits are two of the costs incurred if Oregon accepts out-of-state waste. She expressed

particular concern about potential future liabilities, and pointed out that a large part of Washington's "poison tax" (into which Oregon pays $10 million/year) goes toward cleaning up groundwater from old landfills. She suggests that most landfills that are now superfund sites were also once "state-of-the-art." To ensure sufficient funds in the future, she recommends adopting a "high-end" surcharge of $3.81/ton.

Diana Gale, Director of the Seattle Solid Waste Utility, commented that nearly all of the costs of regulating out-of-state waste are already included in the permit fees and in the host fee to the receiving jurisdiction. Out of the $.50/ton fee on domestic solid waste, she notes that only 20% or $.10 (for statewide groundwater monitoring) is appropriately applied to out-of-state waste. The rest of the $.50 fee goes to planning grants to local governments, household hazardous waste and recycling (all directed only at in-state waste). She says that the $.25/ton (from the General Fund) for DEQ administrative costs is appropriately shared by out-of-state waste (although it would be more equitable to capture this in permit fees). She feels that the benefits of the tax credit exceed the costs, so no cost is appropriate here. The cost of reviewing out-of-state waste reduction plans should be captured through a plan review fee, not the surcharge. There should be no cost for unfunded environmental liability, since Seattle has negotiated its contract to provide triple security to cover these costs (at the Columbia Ridge Landfill). Finally, there should be no cost for siting new landfills; DEQ charges permit review fees to cover its review costs. In Seattle's analysis the true cost of out-of-state waste is $.35/ton.

Lawrence Schall, an economic consultant for Waste Management of North America, submitted written comments on the proposed rule and the draft NERA report. He generally agrees with the draft NERA report's comments concerning the assumptions used by the Department in calculating the range of fees. He states that the benefits produced by out-of-state waste are ignored. Items such as added taxes and fees and the personal income gains from the importation of solid waste should be included in the cost calculations. If this is done, the per ton benefit may exceed the high end of the range of costs proposed by the Department. Also, existing charges on out-of-state waste are in some cases ignored, resulting in the double counting of those costs.

Mr. Schall comments that some computational approaches used by the Department are analytically incorrect. Assuming that costs are proportional to tonnage received is often not accurate. Computational approaches for unfunded liability and lost disposal capacity are also incorrect. Each company should be forced to assume responsibility for the hazards it creates. The Department proposal fails to account for the state-of-the-art technologies and special financial assurance arrangements used at the regional landfills which are likely to receive most of the out-of-state

waste. Only incremental predevelopment costs due to out-of-state waste should be counted under lost disposal capacity.

Also, the Department proposes to charge out-of-state waste for costs not associated with that waste. In-state solid waste fee monies are spent on waste reduction and management of household hazardous waste, which are not programs to cover costs created by out-of-state waste. It is not clear that all solid waste management costs supported by the General Fund are associated with out-of-state solid waste. Finally, Mr. Schall states that the Department has not adequately demonstrated that certain costs exist and has not done an adequate job of measuring the costs. A great deal of work remains to be done by the Department.

Jim Benedict, an attorney for Oregon Waste Systems, Inc. submitted a legal memorandum on the proposed surcharge, focusing on the U.S. Constitution Commerce Clause and statutory limitations. The Environmental Quality Commission must take into consideration the limitations placed on its authority by the Commerce Clause; only fees that are consistent with this clause may be imposed. A higher fee on out-of-state than in-state waste is per se invalid because it discriminates against the interstate movement and disposal of waste on the basis of origin. Such a fee would impose a heavier tax burden on out-of-state waste based solely on the jurisdiction in which the waste originated. This provides an economic advantage to persons disposing in-state waste and is an overt attempt to discourage the free flow of interstate commerce. Any fee on out-of-state waste must also satisfy limitations imposed by the Supreme Court on revenue measures; a state tax on interstate trade is invalid if it fails the "four prong" analysis. The Department proposal fails the test because it imposes a tax that reflects more than the value of the in-state activity [?] and because many of the costs are related to programs and activities that benefit only Oregon residents.

Mr. Benedict states the fee must be based upon actual out-of-pocket costs directly related to disposal of out-of-state waste. The Department is wrong when it attributes the costs of disposal of out-of-state waste to the implementation of all of Oregon's solid waste programs. The Department is also wrong because it is asking out-of-state waste to pay some of the costs of the Oregon pollution control tax credits given to operators of sites that take out-of-state waste. Persons disposing of in-state waste will not be required to pay these costs but will receive the same benefits. The proposed surcharge to cover the cost of certifying waste reduction plans of communities that send waste to Oregon is also inappropriate because no similar charge is made to communities within Oregon. The proposed surcharge components tied to environmental liability, lost disposal capacity and "other costs" discriminate against out-of-state waste and therefore are per se violations of the Commerce Clause. The proposed surcharge tied to waste reduction, recycling and household hazardous waste management costs and tied

to statewide solid waste management costs is invalid because it does not specifically relate to costs of disposing of out-of-state waste.

Finally, Mr. Benedict argues that the proposed surcharge includes costs which the statute specifically excluded from consideration. These costs are those tied to the activities or programs supported by the in-state disposal fee of fifty cents per ton and those now supported by disposal permit fees.

Alice Weatherford-Harper of the Circle W Ranch in Ione submitted comments in support of a surcharge, as it will prolong the life of the landfill by conserving space.

Gloria and Ron Davis of the LD Ranch in Arlington commented that they were in favor of the surcharge to cover costs; they recommend a surcharge "on the high side."

Quincy Sugarman submitted comments for the Oregon State Public Interest Research Group supporting a $3.50/ton surcharge. She cited four areas that justify the high surcharge: unanticipated cost of major environmental cleanup; infrastructure activities, such as planning, currently paid for by Oregonians; image problems; and lost disposal capacity. She commented that one of the best ways to overcome a "dumpsite" image problem is to improve Oregon's own solid waste management programs and publicize Oregon's environmental planning record. She also noted that landfill capacity and siting are still issues in Oregon, with some counties unable to site landfills.

Brent Thompson, member of the Ashland Planning Commission, commented that all recyclable materials should be removed from garbage before it is accepted in the state.

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ATTACHMENT H

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: October 23, 1990

TO: Environmental Quality Commission

FROM: Bob Danko, Hearing Officer

SUBJECT: Response to Testimony/Comments, Proposed Revisions in Solid Waste Rules

The Department held three public hearings on the proposed revisions to the solid waste rules, and accepted written public comment on the rule and the consultant's report reviewing the Department's methodology, until October 26, 1990.

Comments generally fell into six categories:

- Amount of surcharge;
- Principles on which the surcharge should be based;
- Problems with the DEQ methodology identified in the NERA draft report;
- Comments on the draft NERA report itself;
- Comments on the way the Department calculated costs;
- Legal issues.

1. Amount of Surcharge.

o Comment: The amount of the surcharge should be much less than the DEQ range ($1.50 - $3.50/ton).

o Response: DEQ has revised its calculation of the surcharge cost components taking into consideration its consultant's report and comments from the public, and arrived at a figure that falls within its original cost range.

o Comment: $.75/ton ($.50/ton for reducing environmental

risk and $.25/ton for the General Fund offset) is sufficient to cover "solid waste management" costs.

o Response: The statute directs a surcharge to be established equal to the cost to the state of accepting solid waste from out-of-state.

o Comment: A "high" surcharge should be adopted, as out-of-state waste will cause Oregon's landfills to fill up faster.

o Response: One of DEQ's cost categories is for lost landfill capacity.

o Comment: The $3.50 option is best supported by the evidence, and will protect the state against future environmental cleanup costs, and/or against costs which cannot yet be anticipated.

o Response: DEQ has reviewed its assumptions for environmental liability. It has determined that it is prudent to assume a "higher risk" rather than a "most likely" scenario to calculate the likelihood of future environmental damage. This assumption better serves the State of Oregon.

o Comment: The surcharge should be $.35/ton ($.10 for statewide groundwater monitoring, and $.25 for the General Fund offset).

o Response: This would omit important costs to the State. See preceding comments and DEQ Cost Analysis, Attachment D to Staff Report, EQC Agenda Item G, 11/2/90 EQC meeting (hereafter "DEQ Cost Analysis").

o Comment: The unanticipated cost of a major environmental cleanup, infrastructure costs to Oregon (including a transportation study), potentially huge costs of [negative] public perception, and lost disposal capacity justify a $3.50 surcharge.

o Response: The Department believes that these are important cost categories and has included them in its calculations.

2. Principles on Which Surcharge Should be Based.

o Comment: The intent of the surcharge was that no Oregonian, present or future, would have to bear any expense because of out-of-state solid waste.

o Response: DEQ has attempted to base the surcharge on all identifiable costs to the State.

o Comment: The surcharge should be based on known and measurable costs.

o Response: Not all costs are known and measurable. By their nature, indirect costs are difficult to determine. DEQ has attempted to establish a methodology that would measure them as accurately as possible. Just because costs are not yet known or entirely measurable does not mean that they are not real.

o Comment: The long-term cost of solid waste should be considered in setting the surcharge.

o Response: Several of DEQ's cost categories are intended to consider that long-term cost (e.g. cost of lost landfill capacity, unfunded environmental liability, etc.).

o Comment: In establishing a surcharge, DEQ should keep in mind the demand elasticity of waste disposal.

o Response: One of DEQ's assumptions is that the surcharge should neither encourage nor discourage the importation of solid waste. The elasticity of demand is therefore irrelevant to the establishment of the surcharge.

o Comment: The surcharge should promote economic efficiency and be equitable.

o Response: To the extent possible under existing statutes and rules, DEQ agrees. See preceding response.

o Comment: The surcharge should be high enough to cover damage from a worst-case scenario of environmental contamination from all landfills.

o Response: DEQ reviewed its assumptions for unfunded environmental liability, and has included a "higher risk" as well as a "most likely" scenario in calculating the likelihood of future environmental damage. "Worst case" is difficult to define.

o Comment: DEQ should avoid disrupting the economies of the host communities.

o Response: The EQC is required by statute to adopt a surcharge on the importation of solid waste. The statute also specifies that the surcharge shall be based on the costs to the State of disposing of such waste. One of DEQ's assumptions in recommending a surcharge amount is that it neither encourage nor discourage the disposal of out-of-state solid waste. The statute does not direct DEQ to consider the economic impact of the surcharge on host counties or landfill operators.

o Comment: DEQ should not adopt a surcharge which would penalize or jeopardize the economic future of the new regional landfills.

o Response: See preceding response.

o Comment: A company importing solid waste into the state could escape some of the costs for unfunded liability if they stop bringing in these waste, since Oregon laws require Oregon jurisdictions to fund cleanup of environmental problems after the fact.

o Response: DEQ's methodology for establishing the cost for environmental liability takes this into consideration. However, disposal site owners are fully liable for any environmental cleanup required.

o Comment: Treatment of solid and hazardous wastes should be considered together to make policy choices advantageous to Oregon; the surcharge is a policy question

which should be decided after bi-state discussions on how to handle all waste categories.

o Response: The Oregon Solid Waste Regional Policy Commission is charged with examining regional solid waste issues, and making recommendations to the Governor and the 1991 Legislature for state and regional policy toward regional solid waste issues. The Policy Commission made a distinction between regional fees and out-of-region fees; it felt that the approach taken by the Legislature for adopting regional fees was correct. The Policy Commission is recommending the establishing of a bi-state effort to examine regional solid waste issues.

o Comment: Any solid waste coming into the state for disposal should have all recyclable materials removed.

o Response: Out-of-state jurisdictions sending solid waste to Oregon are required to meet Oregon waste reduction and/or recycling program requirements.

3. Problems with DEQ Methodology Identified in Draft NERA Report.

o Comment: The method of establishing unfunded liability is incorrect.

o Response: DEQ has revised its methodology following recommendations from the NERA report. See DEQ Cost Analysis.

o Comment: The cost for unfunded environmental liability is really for "excess environmental risk." This should be $0 at regional state-of-the-art facilities. This cost should focus on probabilities of the state having to absorb excess costs after both financial assurance and the special environmental hazard fund (self-insurance) have been exhausted.

o Response: DEQ's revised methodology assumes a low probability of environmental risk at state-of-the-art landfills. However, the risk is higher than $0.

o Comment: The cost for "loss of disposal capacity" is spurious. It assumes a finite amount of landfill capacity, which is not the case (there is as much capacity as DEQ chooses to permit).

o Response: Out-of-state solid waste will cause Oregon landfill capacity to be used up faster. Because there are public costs involved with siting landfills and siting landfills can be very difficult, it is appropriate to recover in the surcharge the present value of such costs which are caused by more rapid depletion of landfill capacity due to out-of-state solid waste.

o Comment: It is unfair to assume that every landfill operator will take advantage of the tax credit; small ones may not.

o Response: Since all private landfills are eligible for the tax credit, DEQ believes that it is more valid to assume that all eligible landfills will take advantage of the credit than to attempt to predict who will and who won't use the credit.

o Comment: DEQ should incorporate anticipated changes in laws and regulations in setting the surcharge.

o Response: There is no way for DEQ to anticipate what changes may be made in the law. To base the surcharge on "anticipated changes" would be pure speculation. The EQC may review the rule whenever necessary to incorporate any future changes.

o Comment: The "other" cost categories (image, etc.) are not legitimate costs.

o Response: Although they may be difficult to quantify, indirect costs are real costs to the state. As such, DEQ believes it appropriate to include indirect as well as direct costs in calculating the surcharge.

4. Comments on the NERA Draft Report.

o Comment: NERA failed to take into account that the $.50 fee on domestic solid waste is used by DEQ not only

to reduce environmental risks of landfills, but also for recycling programs.

o Response: This was brought to NERA's attention but did not affect its recommendations.

o Comment: NERA did not directly address the issue that DEQ gives no credit (under "unfunded environmental liability") to regional landfills for their requirements for self-insurance and state-of-the-art technology.

o Response: This comment has been forwarded to NERA; the Department's methodology has been revised to take this into account. Note that the state now requires financial assurance of $1 million at regional landfills.

5. The Department's Calculation of Costs.

o Comment: More research needs to be done or information presented to justify some costs (tax credit, solid waste reduction activities, image, etc.).

o Response: The Department has refined its calculation of the costs associated with tax credits, solid waste reduction activities, image, etc. See DEQ Cost Analysis.

o Comment: DEQ assumes that costs generated by disposal are proportional to tonnage, which is often not the case, e.g. in certifying out-of-state recycling programs, planning grants to local governments, DEQ's costs of overseeing landfill operations, its costs of siting new landfills, the tax credit, and costs of unfunded environmental liability. A more accurate analysis of the behavior of the relevant costs is required.

o Response: The Department has refined its cost calculations, where possible to reflect instances where costs are not proportional to tonnage. As a general rule, we think the costs of managing all solid waste and the costs of disposing of out-of-state solid waste are proportional to tonnage.

o Comment: Where costs have been identified, they should be reduced to reflect offsetting benefits, such as from

the tax credit and economic benefits to the local community and state from disposal of out-of-state solid waste. (The ECO Northwest report noted that solid waste represents a $6.50/ton benefit to the state from host fees and incremental taxes.)

o Response: The statute does not require that "net costs" be considered. The Legislature assumed that there are additional regulatory, infrastructure and other costs related to the importation of solid wastes, and there was no intent to offset these costs with income which may be derived from importation of solid waste. In determining its fees for management of solid waste, the Department does not take into account any benefits which might accrue to the State from the disposal of domestic solid waste; there is no reason to do so for out-of-state solid waste.

o Comment: Much of the $.50/ton fee (charged to domestic solid waste) goes to programs which are not related to the costs of disposal of out-of-state waste, such as the household hazardous waste program, recycling and waste reduction, and planning grants to local governments. Only $.10/ton (the statewide groundwater monitoring) can be legitimately included in the surcharge.

o Response: DEQ believes that these programs are related to the costs of disposal of out-of-state waste and the $.50/ton fee is a cost that is not otherwise paid for by out-of-state solid waste. The receipt of out-of-state waste will require an increase in these activities by adding to the overall level of environmental risk and lessening the state's overall solid waste capacity. Waste received from an out-of-state jurisdiction adds an incremental environmental risk that should be offset by increasing all of the Department's solid waste management programs.

o Comment: Including costs of domestic waste reduction programs in the surcharge is double charging the out-of-state generators; they must already meet Oregon recycling program guidelines.

o Response: In-state jurisdictions must meet the same recycling program guidelines as well as paying the $.50/ton fee for solid waste which further supports recycling efforts.

o Comment: Several cost categories (e.g. $.25/ton General Fund offset) used by DEQ affect all landfills in the state and not just those accepting out-of-state solid waste. That should be adjusted to include only those costs created by out-of-state waste.

o Response: The $.25/ton was derived by dividing all General Fund monies by the annual tonnage of solid waste disposed of in the state. Applying that figure to out-of-state waste tonnage charges imported waste incrementally for its contribution to solid waste management requirements. System-wide costs should be shared proportionately by out-of-state wastes.

o Comment: DEQ's $.25/ton General Fund cost category should be reviewed for any funds spent on risk reduction; any such funds should be factored into DEQ's assessment for unfunded environmental liability.

o Response: DEQ's assessment of environmental liability is for risks over and above any risk reduction activities undertaken with General Fund spending.

o Comment: Any DEQ administrative costs now covered by the General Fund should be captured by increased permit fees rather than through the surcharge.

o Response: Should the permit fees be adjusted in the future to pay for these costs, the out-of-state waste surcharge can be revised accordingly.

o Comment: Any fee proposed to meet DEQ's costs of administering the solid waste program should be levied equally against internal and external waste.

o Response: A $.50/ton fee (partially covering costs of solid waste management) is paid by in-state solid waste. It is equitable that out-of-state waste pay the same fee, and is a cost not otherwise paid for by out-of-state solid waste. The Department has included this $.50/ton in its calculations. (See DEQ Cost Analysis.)

o Comment: The only true cost identified by DEQ is for review of waste reduction programs for out-of-state jurisdictions.

o Response: The Department does not agree. There are numerous additional costs. See DEQ Cost Analysis.

o Comment: The cost of reviewing out-of-state waste reduction programs should be covered through a plan review fee, not the surcharge.

o Response: Existing administrative rules do not give the Department the authority to impose a plan review fee for the review of these programs, either for in-state or out-of-state programs. Note that there are on-going oversight costs as well.

o Comment: DEQ must review and certify solid waste reduction plans for all jurisdictions. Costs of so doing must be included in DEQ's activities paid for through the General Fund; a separate surcharge component for certification of out-of-state programs would be double counting.

o Response: Staff costs for certification of out-of-state recycling programs are not budgeted to come from the General Fund; DEQ was not given additional resources to implement this certification requirement for out-of-state solid waste.

o Comment: DEQ's method of establishing unfunded liability double counts costs, not giving credit for self-insurance (trust fund) for environmental problems. This overcharges regional landfills and undercharges small local ones. Each landfill should have to provide financial assurance to cover the risks it creates, depending on its technology.

o Response: The state requires $1 million of financial assurance. ORS 759.298 lists other fees and taxes which address solid waste disposal costs and should not be counted for this surcharge.

o Comment: To address the unfunded environmental liability issue, DEQ should set regulations preventing out-of-state wastes from going to non-regional sites rather than increasing the surcharge to cover this potential cost.

o Response: DEQ has no authority to do this.

o Comment: There should be no cost for unfunded environmental liability if DEQ is doing its job.

o Response: No amount of regulation and oversight can completely eliminate the risk of contamination of the environment. The Legislature recognized this in setting up the "orphan site" funding mechanism addressing environmental liability for all solid waste disposal sites.

o Comment: There should be no cost for lost disposal capacity due to depletion by out-of-state waste, since few additional Oregon jurisdictions will want to use the regional landfills.

o Response: There is a cost to replacing capacity used by out-of-state solid waste. Whether additional jurisdictions choose to use the new regional landfills is irrelevant to the cost, since several Oregon jurisdictions are already using these facilities.

o Comment: Although Oregon appears to have a lot of disposal capacity, the fact that some counties are unable to site landfills within or close to their borders shows that landfill capacity and siting are issues in Oregon.

o Response: The Department agrees that there is a cost for lost disposal capacity.

o Comment: There should be no cost for lost disposal capacity because the counties have already addressed this by granting franchises to landfill companies.

o Response: The cost for lost disposal capacity is the cost of replacing the lost capacity. Out-of-state waste

will reduce the total capacity faster than would otherwise be the case, and thus increase capacity replacement costs.

o Comment: A private landfill must pay for the land it uses, with the land's price reflecting its scarcity. It is incorrect to charge the landfill again for the same land through a surcharge fee for "lost landfill capacity."

o Response: It is not the landfill that is being charged, it is the out-of-state solid waste. It is not cost to the private developer, but rather the cost to the State for replacing the landfill capacity that should be included in the surcharge.

o Comment: Concerning costs of lost disposal capacity, any costs to DEQ of siting new landfills should be recovered through permit fees, not the surcharge. Only incremental predevelopment costs due to the acceptance of out-of-state solid waste not otherwise recaptured by the State should be included in the surcharge.

o Response: DEQ has refined its methodology for determining lost capacity costs. It now compares the cost of landfill capacity without out-of-state solid waste to that cost if out-of-state solid waste is accepted. See DEQ Cost Analysis.

o Comment: Predevelopment costs for siting new landfills should be recovered from the landfill's customers (through a disposal charge), not through the surcharge for "lost disposal capacity."

o Response: Some costs will not be recovered at the landfill.

o Comment: Including infrastructure costs (and costs for a transportation study) is double counting; they are covered by PUC fees and host fees. To include a cost for "infrastructure" in the surcharge, DEQ must demonstrate the nature and magnitude of any such incremental costs, and show that they are not already being paid through other fees.

o Response: The Department excluded costs covered by PUC fees and host fees and recalculated infrastructure costs.

o Comment: There are costs to using the State's infrastructure costs that the State is paying (including funding a transportation corridor study). The surcharge should cover these costs.

o Response: One of DEQ's cost categories takes these costs into consideration.

o Comment: Costs for "loss of quiet enjoyment" assume that someone is there to be disturbed; in fact, the nearest homes are miles away from some of the regional landfills. Moreover, a properly designed landfill should not cause a lack of amenity, according to the ECO Northwest report.

o Response: This category includes transportation routes (i.e. the busy Columbia Gorge). DEQ has refined its cost estimate for nuisance costs in general, basing these on the estimated increase in truck traffic and accident rates caused by importation of solid waste.

o Comment: Costs for noise and nuisance and loss of quiet enjoyment are double counted; they are covered in the host fee.

o Response: DEQ's methodology now assumes that all these costs, except for the increased accident rate discussed in the preceding response, are covered by host fees.

o Comment: The cost to Oregon's image should be larger, and could be based on the dollars the state spends to attract tourists, recreationists, etc.

o Response: DEQ has revised its methodology for determining the cost to Oregon's image, including costs attributed to loss of tourism. See DEQ Cost Analysis.

o Comment: Any cost to Oregon's image should be based only on any promotional expense needed to counter image damage due to out-of-state solid waste. Damage to image

likely arises because of potential pollution; since most out-of-state waste goes to state-of-the-art landfills, the image cost may be very low.

o Response: DEQ believes that the stigma associated with importation of solid waste will have more direct costs to tourism and Oregon's ability to attract industry. In addition, receiving out-of-state solid waste will cause increased traffic with some probability of increased accidents. Attention in the press to such incidents will discourage some tourists from visiting the state, and is likely to have some negative effect on industrial attraction.

o Comment: Two good ways to counter a perception of Oregon as a giant dumpsite is to improve Oregon's solid waste programs, and to publicize Oregon's record on environmental planning.

o Response: DEQ's revised methodology includes substantial costs associated with the stigma caused by accepting out-of-state solid waste. The surcharge is to be used to improve the administration of solid waste management programs.

6. Legal Issues.

o Comment: The statute does not allow the EQC to "take back" the benefits statutorily allowed by the tax credit law for encouraging state-of-the-art technology. DEQ has no authority to impose this charge.

o Response: Including costs for the tax credit in the surcharge does not "take back" the tax credit benefit from the landfill operator. It does, however, take back any cost savings from out-of-state disposers.

o Comment: DEQ may not attempt to include in the surcharge a cost for tax credits simply because Oregon taxpayers pay for these tax credits (if in-state waste disposal fees do not include this cost); the Commerce Clause does not permit compensatory measures for the disparities that result from each state's choice of tax measures.

o Response: Tax credits for pollution control facilities represent tax revenues lost to Oregon's General Fund. In-state generators of solid waste (i.e. all Oregon taxpayers) pay additional taxes to make up for that lost revenue. Out-of-state generators of solid waste do not pay into the General Fund, so the credit constitutes a cost to the State which is not otherwise paid for.

o Comment: The Commerce Clause makes discriminating solely on the basis of place of origin unconstitutional. This surcharge is based solely on origin of the solid waste, and thus may violate the U.S. Constitution.

o Response: The Department is responding to a state statute. The Attorney General's office has advised the Department that states may charge fees on out-of-state wastes to compensate for the costs to the state of disposing of that solid waste.

o Comment: The imposition of a higher fee (e.g. to pay for pollution control tax credits, unfunded environmental liability, administering the solid waste program, etc.) on the disposal of waste generated outside of Oregon than is imposed on the disposal of waste generated inside Oregon is per se invalid under the Commerce Clause. The costs DEQ attempts to attribute to disposal of out-of-state wastes do not distinguish out-of-state from in-state waste. If costs are incurred, they will result equally from the disposal of both waste streams, and a higher fee for the former is invalid.

o Response: In passing ORS 459.298 the Legislature apparently assumed that disposal of out-of-state solid wastes creates costs that are not otherwise paid for. Again, the Attorney General's office has advised us that a state may recover its costs related to the disposal of out-of-state waste.

o Comment: Taxes (or fees) must meet a four-prong test for constitutionality under the Commerce Clause. Several of DEQ's proposed cost categories would not meet the test (e.g. the $.50/ton equalization fee would not be "fairly apportioned to the value of the activity occurring within the state" [waste disposal] or "fairly related to the

services provided by the state" that would benefit the person disposing of the waste).

o Response: In-state waste is paying a $.50/ton fee not now paid by out-of-state solid waste. This is prima facie a cost not otherwise paid for, and meets the statutory direction for establishing the amount of the surcharge.

o Comment: The statute requires the surcharge to be based on the "costs to dispose of solid waste," and many of DEQ's proposed cost components are not, as they are solely for the benefit of in-state programs such as recycling.

o Response: DEQ believes that disposal of out-of-state waste imposes costs on the whole gamut of solid waste management and reduction programs.

o Comment: The statutory language indicates that the word "costs" refers to actual out-of-pocket costs to the State and its political subdivisions. DEQ attempts to charge general costs of the implementation of Oregon solid waste programs to out-of-state solid waste, as well as intangible or hypothetical costs that the State will not actually incur.

o Response: DEQ believes that Legislative intent was to calculate all (both the direct and indirect) costs to Oregon of disposing of out-of-state solid waste.

o Comment: The statute specifically excludes some costs from the surcharge; the $.50/ton fee (on domestic solid waste) was specifically meant not to be imposed on out-of-state solid waste. In addition, fees recovered by DEQ (such as for monitoring and annual compliance) are also specifically excluded. DEQ interprets ORS 459.298 incorrectly.

o Response: DEQ believes that its interpretation is correct. Because out-of-state solid waste is not now paying the $.50/ton fee, it is "not otherwise paid for" and should be included in the surcharge. The same is true for costs to the General Fund.

n/e/r/a
National Economic Research Associates, Inc.
Consulting Economists

EVALUATION OF OUT-OF-STATE WASTE SURCHARGE PROPOSAL

Prepared for

Oregon Department of Environmental Quality

By

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October 5, 1990

I. INTRODUCTION AND SUMMARY

The Oregon Environmental Quality Commission is required by state law to establish a surcharge on out-of-state waste by January 1, 1991.[1] To meet this requirement, the Oregon Department of Environmental Quality (DEQ) has identified several cost categories and calculated a cost or range of costs for each category. The Department must now recommend a specific surcharge to the Environmental Quality Commission. To help establish the appropriate fee, the DEQ has asked National Economic Research Associates, Inc. (NERA) to critique the assumptions and methods behind its proposed solid waste fees on out-of-state waste. The DEQ will use this critique to develop its final proposal. This report presents our findings.

Based on our review, we have determined that the Department of Environmental Quality, in meeting the out-of-state surcharge mandate, has shown that solid waste landfill disposal is currently underpriced in Oregon. This underpricing will lead to an economically inefficient allocation of resources -- too much waste will be delivered to landfills. The Oregon Legislature's interest in rectifying the pricing problem is consistent with the goal of economic efficiency.

The DEQ's proposal correctly identifies six cost categories which can be attributed to out-of-state waste which would justify a fee on such waste. Several of these cost categories represent costs imposed on the state from all waste sources which would justify a fee on all waste disposed in the state regardless of origin. Consequently, an out-of-state surcharge would move the state closer to setting what economists would define as efficient fees, but not all the way. A seventh cost category, involving tax credits, has not yet been sufficiently demonstrated. Finally, we found several cost categories which might not be justified because they either

[1] The 1989 Oregon Legislature passed H.B. 3515 establishing this requirement.

constituted double counting (depending on the calculation method), are difficult to quantify, and/or are likely to be quite small. We also determined that the methods proposed for calculating costs categories were sound in some, but not all, instances. In those instances where the methods were unsatisfactory, we have recommended alternatives.

To conduct our review we obtained several DEQ documents and discussed the proposal with DEQ staff. We have also referred to recent academic and government reports and studies.

The remainder of this report is organized as follows. Section II reviews the assumptions behind the Department's surcharge proposal. Section III discusses the cost categories identified by the DEQ and comments on the costing methodologies employed. Section IV presents our conclusions.

II. REVIEW OF DEQ ASSUMPTIONS

The DEQ made seven assumptions in preparing its preliminary fee proposal. These assumptions are summarized below:

1. The surcharge cannot be based upon an actual accounting of costs. It must be based on a reasonable estimate of potential costs that take into account a range of possible circumstances.
2. The estimate of costs to the state and its political subdivisions is a distinct policy question from the decision on how the funds generated from the surcharge should be spent.
3. The amount of the surcharge is to be determined by a reasonable assessment of the costs to Oregon of accepting out-of-state waste. The amount shall not be inflated to discourage importation, nor deflated to encourage importation of waste.

4. Current laws and statutes are presumed to exist.

5. Estimates of the cost of tax credits and other subsidies are based on eligibility. It is presumed that private companies will receive the maximum subsidy available.

6. There should be no double counting.

7. Future cost increases should be anticipated, but are not calculated directly into cost estimates.[2]

While these are described as assumptions, they are perhaps more accurately characterized as either definitions to be used in establishing the surcharge or assumptions made in order to calculate the surcharge. Assumptions 1, 2, 3, 6 and 7 serve to define the costs which can be recovered by the surcharge. Assumptions 4 and 5 explain conditions that are assumed for the purpose of calculating specific values. This is a useful distinction for evaluating the DEQ's surcharge methodology, which will become evident below.

A. Evaluating the DEQ's Definitions

Assumptions 1, 2, 3, 6 and 7 are all efforts to define costs that the DEQ should include in a surcharge on out-of-state waste. Assumption 1 makes a distinction between actual and potential costs. The DEQ states that costs should reflect potential rather than actual costs. This definition is not very clear. DEQ should be concerned with actual costs. Note, however, that actual costs should include what the Department considers potential costs. Actual costs in addition to current costs which should be considered include depletion costs, social costs not already accounted for and costs associated with risk. Some of these costs are, in fact, based on future events, but nonetheless are incurred today. Depletion and insurance

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[2] Memo from Steve Greenwood, DEQ, to Solid Waste Advisory Committee, "Out-of-State Surcharge," July 25, 1990.

against future environmental damage are examples of costs determined by future expectations. Other actual costs may be incurred but not currently paid for. Environmental damage is an example.

Note that Assumption 7, which states that future costs are not included in the proposed surcharge, may not, as presently worded, be consistent with Assumption 1. Discussions with DEQ staff clarified that Assumption 7 primarily concerned expected cost increases in new landfill capacity. Again, current actual costs may be dependent on future conditions. Thus, the DEQ's fees should account for expected future costs. For example, environmental insurance costs reflect expected future events. This will be accomplished by adherence to Assumption 1. Assumption 7, however, also addresses the fact that costs to Oregon will increase with inflation. The DEQ should also consider ways to adjust fees over time to account for inflation.

Assumption 2 makes a distinction between the costs incurred and how revenues from the surcharge are spent. This is an appropriate distinction. So long as the surcharge correctly reflects the costs imposed by out-of-state waste, how the funds are spent is irrelevant from an economics perspective.

Assumption 3 further defines the costs to be covered by the surcharge. The DEQ limits the costs to those which it can attribute to out-of-state waste. This limitation is designed to guarantee that out-of-state waste is neither subsidized nor penalized. This is an important objective. By meeting it, the DEQ will establish an efficient price -- a price that reflects the cost of the service provided. Note, however, that if some of the costs identified by the DEQ are imposed on the state by all waste generators regardless of origin, then to fully achieve economic efficiency the DEQ should impose the appropriate fees on all generators. To the extent that current law limits the Department to charging out-of-state

waste for these costs, a second best outcome will result. Out-of-state waste generators will pay the efficient price, but in-state generators will not. Consequently, in-state waste generation will be greater than it would be if the efficient fees were charged.

Assumption 6 also further defines the costs to be included in the surcharge by directing that costs covered by other state fees or taxes be excluded. This avoids double counting and is an important definition.

B. Evaluating the DEQ's Assumptions

Among the DEQ's assumptions, only 4 and 5 are truly assumptions. Assumption 4 limits the methods the Department can employ and Assumption 5 affects how to calculate specific components of the surcharge. Assumption 4 directs that current laws apply. As a result, the DEQ must propose surcharges consistent with existing laws and regulations. Although this is a necessary assumption in view of the DEQ's mandate, it is a restrictive assumption and could lead to a less than fully efficient outcome. The DEQ should consider future changes in law and regulation to achieve a more efficient outcome. The discussion of Assumption 3 above illustrates the problem. Assumption 5 directs that the calculation of tax credits and other subsidies reflect maximum benefits. This is a reasonable working assumption.

III. EVALUATING THE DEQ'S SURCHARGE PROPOSAL

Applying the assumptions described above, the DEQ identified seven cost categories which should be covered by the surcharge. These categories are as follows:

1. Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management, paid for through the per-ton fee on domestic solid waste;
2. Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management, paid for through the General Fund;

3. Tax Credits and Other Public Subsidies;

4. Solid Waste Reduction Activities Related to the Review and Certification of Waste Reduction and Recycling Plans;

5. Unfunded Environmental Liability;

6. Lost Disposal Capacity; and

7. Other Costs (image, public infrastructure, nuisance).

The range of costs assigned to these components is summarized in Table 1.

We have reviewed these cost categories in the context of the DEQ's assumptions and from an economics perspective.

A. Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management Funded by Domestic Fee (Cost Category 1)

The DEQ identified state costs associated with government programs designed to manage solid waste and protect the environment. The Department distinguishes the costs of these programs by funding source. Some programs are financed through a $.50/ton surcharge on domestic or in-state waste. Other programs are financed out of the state's general fund. Based on discussions with DEQ staff, it appears that these programs are in response to the overall demand for waste management and concern for the environment. Programs, for example, monitor all landfill sites regardless of the origin of the waste. Consequently, out-of-state waste poses equivalent demands as in-state waste. Therefore, the DEQ argues that Oregon residents currently subsidize out-of-state waste. Under the circumstances described, out-of-state waste does appear subsidized and the imposition of a fee would be justified. All users or beneficiaries of the state's programs should pay for them. The Department can confirm that these costs are associated with out-of-state as well as in-state waste by comparing the estimated program costs with out-of-state waste to the estimated program costs assuming

no out-of-state waste. This comparison will isolate any costs which do not vary with out-of-state tonnage. These costs, if they exist, should be excluded from the out-of-state fee.

Apart from making the above comparison, the DEQ's method for calculating the surcharge for these state activities is reasonable.[3] The DEQ proposes to assess a charge equivalent to the domestic fee for the same state services. This is appropriate.

B. Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management Funded by General Fund (Cost Category 2)

The DEQ proposes to charge for risk reduction and waste management services funded out of the general fund based on several approaches. The correct approach is the following calculation:

$$\frac{\text{State Expenses}}{\text{Total Tons Disposed}}$$

where the total tons equal both in-state and out-of-state waste. Note that both expenses and tons will vary over time requiring the surcharge to vary as well. This approach is appropriate with one important qualification. This approach assumes the costs are simply proportional to tonnage. Costs, however, may vary by other factors. The DEQ should better establish the linkage between tonnage and costs, especially since the Department is limited by current law to charge by the ton.

C. Tax Credits and Other Public Subsidies (Cost Category 3)

The DEQ proposes to charge landfills which accept out-of-state waste to account for an Oregon income tax credit available to landfill operators in the state regardless of where the waste they accept originates. The Department argues that this credit for investing in certain environmental control measures constitutes a subsidy to out-of-state disposers. State

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[3] Memo from Steve Greenwood, DEQ, to Mark Berkman, NERA, Re: Back-up Documentation for Out-of-State Waste Cost Analysis, September 6, 1990

residents may enjoy lower landfill charges because of the subsidy, but they pay for the low rates through lost tax revenues. Out-of-state disposers avoid this payment. While this is true, states frequently provide tax credits to encourage certain business activities or consumer behavior. These tax credits do not depend on whether the business enterprise serves in-state or out-of-state residents. More importantly, the state does not tax goods going out-of-state differently than in-state to offset the tax credit. Say, for example, that Nike receives an industrial development bond to encourage expansion in-state. The state will not impose a tax or surcharge on shoes shipped out of state. Presumably, the state has determined that the tax loss is more than offset by the employment and income associated with Nike's expansion. The benefits exceed the cost of the tax.

The DEQ determines the value of the tax credit assuming that private operators take full advantage (see Assumption 5). As discussed above, this assumption makes sense. The dollar value is calculated by determining the value of the investments eligible for the tax credit for three landfill capacities (depths). This value is calculated on a per ton basis using the Eco Northwest Landfill costing model.[4] This results in a range of costs from $0.31 per ton for a large landfill to $1.75 per ton for a small landfill. This is a generalized, but perhaps reasonable, approach. Note that the tax credit is spread over 10 years and that the landfill operator will make investments on a cell-by-cell basis. As a result, there will be a stream of tax credits dependent on the age of the operator's landfill cells. Because of this, a more accurate calculation of the tax loss would be to estimate the tax revenue stream over time from all private landfills (public landfills receive no tax credit). The per ton surcharge would be based on the following calculation:

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[4] Eco Northwest, "An Evaluation of the True Costs of Sanitary Landfills for the Disposal of Municipal Solid Waste in the Portland Metropolitan Area," prepared for the Oregon Department of Environmental Quality, April 1986.

$$\frac{\text{Present Value of Net Tax Credits}}{\text{Present Value of Tons Disposed}}$$

Note the cost of the tax credit net of benefits should be used. A surcharge will result only if there are net costs rather than net benefits. Benefits might include lower cost, safer and more accessible landfills, as well as increased employment and tax revenues. A real discount rate should be applied.

D. Solid Waste Reduction Activities Related to the Review and Certification of Waste Reduction and Recycling Plans (Cost Category 4)

Under Oregon law, all out-of-state jurisdictions planning to send waste to landfills operating in Oregon must be certified to have recycling programs equivalent to those required of Oregon jurisdictions. This certification is conducted by the DEQ and imposes a cost on the state. According to DEQ staff this effort is not covered by the state's solid waste management costs described above. This cost then clearly can be attributed to out-of-state waste.

DEQ estimates the cost of certification based on the requirement for one full-time equivalent (FTE) state government employee. This requirement is based on the expectation that three major and five smaller out-of-state communities will require certification over the next three years. To assess a charge to these communities, the DEQ simply divides the cost of this FTE ($50,000) by the number of out-of-state tons expected. Note, however, that costs may not vary only with tonnage. Thus, the large communities will pay a larger share of this cost even though the cost of certifying larger communities may be the same or even less than for small communities. According to DEQ staff, the certification requirements do vary according to community size. Communities with waste in excess of 75,000 tons per year undergo more comprehensive review. Larger communities then should pay higher fees. However, it is not clear that costs for communities larger than 75,000 tons increase directly

with tonnage. In addition, there will be variations in this cost over time. Initial certification expenses will exceed ongoing review expenses. DEQ should consider this variation in establishing the fee.

E. Unfunded Environmental Liability (Cost Category 5)

Despite the existence of both federal (Superfund) and state insurance requirements for landfills, the DEQ has identified several sources of unfunded liability at landfills operating in the state which represent potential costs should environmental damage occur. First, landfills which are not designated as regional disposal sites are not required to have financial assurances for final cover or environmental liability insurance. According to the DEQ, some of these landfills accept out-of-state waste. Second, although Oregon has established a $.50 surcharge on all waste regardless of origin to cover environmental liability, the DEQ does not believe this will be sufficient to cover expected costs. The Department expects the fee to increase over time. Third, the surcharge will not be imposed unless an environmental damage claim arises. Because of this, the state may not be able to collect fees after the fact from waste generators who elect to leave the state. Note that while this exposure will be affected by the state-wide activities for reducing environmental risk (categories 1 and 2), the cost associated with the remaining unfunded liability is a separate expense. There is no double counting.

The Department staff observes that out-of-state waste generators may no longer be shipping waste to Oregon when an environmental problem arises and therefore Oregon will be unable to collect cleanup costs. In addition, according to DEQ staff, current law limits the state's ability to seek payment from waste generators.

The Department considered two approaches to estimating the cost of the unfunded liability. Both approaches rely on expected value techniques. While this is an appropriate technique, neither of the approaches is correct as presented.

The first approach (referred to as Case 1 by DEQ)[5] is termed an expected value analysis of liability at landfills accepting out-of-state waste. This analysis first accounts for the probability that an environmental problem occurs at these landfills over the next 20 years. (A probability of 75 percent is assigned to this event.) Next, it accounts for the probability that damage could range from $100,000 to $100 million. The probabilities for these damages are as follows:

Damage	Probability (Percent)
$ 100,000	10.0%
1,000,000	70.0
10,000,000	15.0
20,000,000	4.4
50,000,000	0.5
100,000,000	0.1

Applying these damage and probability assumptions results in an expected value of $2.58 million. Assuming that 50 percent of the waste delivered to landfills accepting out-of-state waste is out of state, 50 percent of this expected value, or $1.29 million, is attributed to out-of-state waste. This figure is divided by out-of-state waste projected over the 20-year period (600,000 x 20 = 12 million) to arrive at a fee of $0.10 per ton ($1.29 million + 12 million).

There are several problems with this approach. First, it does not directly address the issue of unfunded liability. The damages used here are not net of the funds which will

[5] Memo from Steve Greenwood, DEQ, to Mark Berkman, NERA, September 6, 1990. This memo describes two cases, referred to here as Case 1 and Case 2.

be available to cover environmental problems. Second, the structure of the probabilities is unnecessarily complicated. The first probability regarding whether an event will take place can be incorporated directly into the probability of a specific damage level. This will simplify the analysis. (In the DEQ's Case 1, all the probabilities would be adjusted downward by multiplying through by 75 percent.) Third, the importance of time is not accounted for. For example, the probability of an event may grow over time as landfills age and subsidence or leaching occurs. Events in the future, however, are not as expensive as events today, so that the costs of future events must be discounted. Fourth, the probabilities may be affected by the specific landfill. For example, according to the DEQ, certain landfills are not required to have financial assurance for clean up or environmental liability insurance. These landfills may pose higher probabilities. The costs attributable to out-of-state waste should account for this distinction if possible.

The DEQ's second approach (referred to as Case 2) was designed to address unfunded liability. Under this approach, the DEQ assumes that all users of the system should share equally in the cost of liability. The DEQ estimates this cost by assigning a probability to events of various magnitudes. Unlike Case 1, however, in which the DEQ assigned total dollar costs to the events, in Case 2 the DEQ assigns the surcharge necessary to cover the costs of the event. The following distribution of probabilities and costs results:

Probability (Percent)	Surcharge Required to Cover Cost ($/Ton)
20.0%	$0.50
40.0	1.00
24.0	2.00
10.0	3.00
5.0	4.00
1.0	5.00

The lowest value is the current surcharge for environmental liability. Thus, this schedule suggests that there is an 80 percent chance that the existing fee ($0.50), if imposed, will be insufficient to cover environmental problems.

The DEQ refines the approach, however, by observing that as rates increase, out-of-state waste generators will elect to go elsewhere. A second set of probabilities are assigned to reflect the likelihood that out-of-state waste generators will in fact leave. As the rate increases, the probability that out-of-state generators leave is increased. The notion here is that the share of unfunded liability paid by the state goes up as generators leave the system because Oregon can no longer collect a surcharge.

This approach more accurately addresses the cost of unfunded liability to the state, but is still not quite correct. Correctly assessing this cost, however, is a difficult task. First, the Case 2 approach does not adequately define the cost associated with out-of-state waste having the ability to leave the system. This cost is best defined by comparing the unfunded liability the state will pay if no out-of-state waste leaves to the unfunded liability the state will pay if out-of-state waste does elect to leave. Second, the approach also does not account for the fact that out-of-state waste should not be made responsible for liabilities to which it does not contribute. Third, the approach does not fully take into account the effect of time (the approach relies on present dollars averaged over 20 years). Time should enter the calculation in several ways: (1) the probabilities and costs of events may change over time; and (2) the

time value of money must be addressed. This can be accomplished by present value techniques. Fourth, while the approach correctly identifies that there is a cost associated with the right to leave the system, the DEQ should better define system users who enjoy this right.

To correct these problems, several modifications should be made to the DEQ's Case 2 approach. First, estimates of unfunded liability and their associated tonnages should be used rather than potential fee increases. This can be accomplished in several steps. First, the expected value of the unfunded liability must be calculated adjusted to exclude liability from landfills which do not or did not accept out-of-state waste. Second, the fee required to cover the expected value of the liability estimates should be calculated assuming no out-of-state waste leaves. Third, the out-of-state waste losses should be estimated assuming this fee is imposed. Fourth, using the estimates of unfunded liability and out-of-state losses, an expected value of a required fee can be calculated. Fifth, by taking the difference between the resulting overall expected value of this required fee and the expected value of the required fee assuming no out-of-state waste leaves yields the cost imposed by out-of-state waste because of its ability to leave. In other words, how much should out-of-state waste pay for the right to leave the system. A second modification is required because the time value of money must be accounted for. This modification can be accomplished by discounting the expected liabilities. If the liability is expected to change over time, then it will be necessary to estimate the required fee over time as well.

To see how these modifications work, consider the following simple example. Assume that Oregon receives 100 tons of waste per year, 20 tons from out-of-state. In addition, an unfunded liability (adjusted for public landfills not accepting out-of-state waste) of $100 is assigned a probability of 0.4. Thus, to cover the expected value of the liability equally all waste should be charged $0.40 per ton. This charge is calculated as:

$$\frac{.4 \times \$100}{100 \text{ tons}} = \$0.40 \text{ per ton}$$

However, it is also determined that there is a 30 percent chance that 30 percent of the out-of-state waste will leave Oregon if this fee is imposed. This will mean that fewer tons will be available to cover the liability. Figure 1 describes this problem using a decision tree diagram. The first fork represents the probability of the unfunded liability occurring. As assumed above, there is a 40 percent chance the state will be faced with this cleanup cost. The second fork represents the likelihood that out-of-state waste will leave if the surcharge is increased to $0.40 per ton. Note that the upper fork reflects the 30 percent chance of the loss of 4 tons (.30% x 20 tons = 4 tons). The surcharge under this circumstance is $1.04 per ton ($100 ÷ 96 tons = $1.04 per ton). The lower branch represents the probability that no out-of-state waste leaves (1 - .3 = .7). The surcharge under this circumstance could be $1.00 per ton ($100 ÷ 100 tons = $1 per ton). On an expected value basis, this diagram shows that the cost of the unfunded liability accounting for out-of-state waste leaving is $0.408 per ton. Therefore, the cost of leaving the system is $.008 per ton ($0.408 - $0.400 = $.008). This is the surcharge for out-of-state waste before accounting for the time value of money. Because the event is expected in the future, the state will collect this surcharge and set it aside. To account for this, the surcharge should be discounted by a rate reflecting the state's cost of capital for a period consistent with the liability period.

In order to correctly calculate an unfunded liability surcharge, the DEQ must determine what the potential level of exposure is. This should be calculated noting the following relationship:

Unfunded Liability = Total Liability - Funded Liability.

The first step should be to determine the value of total liability. The DEQ's first attempt at this is the expected value determined in Case 1. This is not an easy value to estimate and the values presented were not documented. The total liability should be based on data on

previous environmental clean-ups and on the likelihood of such an event. Total liability should also be adjusted to account for the fact that out-of-state waste is not accepted at all public landfills. The second step is to calculate funds available to cover the liability. In making this determination, the state must account for the amount of funds which will be available to cover clean-ups from both federal and state superfund and related programs. Both of these steps will be difficult to complete, but some suggested sources include: the U.S. EPA's Record of Decision Annual Summary Reports which identify landfill clean-ups under the federal Superfund including cost information; the U.S. EPA National Priorities List which may be useful in assessing the probability of an environmental accident (although any estimate will be based on a population of older landfills which pose higher risks than modern landfills); and the Center for Hazardous Waste Management, "Coalition on Superfund Report," which should provide some estimates of the potential unfunded claims against the federal Superfund.

Determining the probabilities that out-of-state waste will leave is also difficult. This requires establishing how sensitive out-of-state waste demand is to changes in price. To estimate this sensitivity, the DEQ will have to review historic changes in demand as prices change or simulate the decisionmaking of out-of-state waste generators faced with a price increase by considering the costs of the alternatives they face.

F. Lost Disposal Capacity (Cost Category 6)

The DEQ has identified a cost to the state associated with lost disposal capacity. This cost is based on the need for the state to participate in landfill siting efforts more frequently and sooner than would be the case if there were no out-of-state waste.

The DEQ has calculated a lost disposal capacity charge based on the predevelopment costs associated with a new landfill. These costs are obtained from the Eco Northwest Landfill costing model. These costs are presented on a cost per ton of capacity

basis. Although the model costs reflect the costs to a private developer, this seems a reasonable approximation for state costs.

Because the DEQ expects it will be required to review sites sooner and more often with out-of-state waste than without, the cost should be determined by comparing the stream of expected costs assumed with out-of-state waste to the stream of expected costs without out-of-state waste. By comparing costs over time, both the timing and frequency difference are accounted for. Note that this also avoids any double counting. The costs are associated with the accelerated timetable, not with the predevelopment costs *per se*, which will be incurred at some point in any event.

Also, note that this is another instance where costs may vary because of other factors, in addition to tonnage. The siting of a 600,000 ton landfill may not cost the state three times the cost of siting a 200,000 ton landfill. The DEQ should more carefully establish the linkage between tonnage and cost.

G. Other Costs (Cost Category 7)

The DEQ has identified three additional costs which should be charged against out-of-state waste:

- Image
- Publicly Supported Infrastructure
- Nuisance and Loss of "Quiet Enjoyment".

The Department suggests that by becoming known as a depository for out-of-state waste the state will tarnish its image as an attractive place to live and conduct business. If it can be shown that this reputation does affect the public's attitude toward Oregon then there is a cost associated with out-of-state waste. However, as discussed below, this will be difficult to measure.

DEQ also observes that increased truck and rail traffic from out-of-state waste will impose burdens on the state's infrastructure. The Department noted that at a minimum additional planning efforts were likely which would impose a cost to the state. This would also be a cost associated with out-of-state waste, but may be difficult to distinguish from in-state waste shipments and other traffic.

The Department also indicates that increased noise and other nuisances associated with landfills and waste transport impose costs on the state. Noise and other nuisances generally do impose a cost. Oregon, however, already provides for a local host fee which is imposed by local jurisdictions and is intended, in part, to cover such costs. Therefore, it seems unlikely that there are substantial costs in excess of those already covered.

The DEQ has proposed methods to calculate the values for all three "other" cost categories. To estimate image costs, the DEQ proposes to rely on either the cost of guaranteeing that Oregon is viewed as an environmentally responsible state based on the costs of its existing efforts or on the costs of promoting its environmental record. The former approach would represent double counting unless the costs were associated with additional state efforts such as emergency response planning designed to protect Oregon's image. The state's costs to alleviate environmental risk and promote recycling are already captured in other components of the surcharge. The second approach holds some promise. The DEQ could, for example, study the costs incurred by other states and jurisdictions for promotional campaigns designed in response to some environmental or other disaster. New Jersey, the communities near Three Mile Island, and San Francisco (after the earthquake) might be good sources. Although they all appear more extreme than the waste concern, they could provide an upperbound to the estimate. Before conducting such a study, however, DEQ would need

to first better demonstrate that out-of-state waste does tarnish the state's reputation and discourage economic activity.

Infrastructure costs are more straightforward to calculate. Determining the cost of any required planning study should be possible. The problem here is to remember that this is a one-time cost which must be spread over a number of years. In addition, to the extent that fuel and road taxes already cover such planning efforts, another charge would be double counting.

Establishing the value of lost enjoyment, unfortunately, is not so straightforward. A careful estimate would require a study of the projected noise and odor levels and the size of the affected population. Economists have frequently studied the impact of noise and odor on property values as well as the impacts of pollution on visibility and quality of recreation. These studies might provide useful data for estimating lost enjoyment. (A list of suggested studies is attached as Table 3.) The DEQ must more fully develop its cost estimate in this category.

IV. CONCLUSION

The DEQ has demonstrated that not all costs associated with solid waste disposal in Oregon are currently charged. This results in an in-state subsidy of disposal price which leads to more waste disposal than should be desired. Oregon will move toward a more economically efficient allocation of its resources by charging out-of-state generators to cover costs associated with waste disposal in Oregon. Many of these costs are not currently charged to either in-state or out-of-state waste generators.

Table 2 summarizes our findings on the cost categories and the methodologies used to calculate specific costs. As shown, we found that six of the seven cost categories represent clearly legitimate costs to Oregon for which the state is not currently compensated. The

seventh category, the tax credit, would only represent a real cost to the state to the extent that the cost of the credit in terms of revenue losses exceeds benefits. This comparison should be made before assigning a cost.

Some problems were found in the proposed methodologies for calculating costs. These problems generally fell into several categories. First, in several cases, the effect of time on costs needs to be calculated. When costs are incurred affects how much the state is owed. Second, in several cases costs were charged on a per ton basis, but it was not clear whether costs actually varied only by tonnage. Third, in a few instances variations in costs over time should be accounted for. Fourth, for several categories, including the unfunded liability and the "other" costs category, the cost methodologies were not fully developed. In large part, this is due to the difficult nature of estimating what are complex costs.

Finally, some of the DEQ identified costs are imposed by waste generators from all sources for which the state currently receives no compensation. These categories include: the unfunded liability, the lost disposal capacity, and the other costs category. An efficient resource allocation requires that all consumers pay the full price. Modifying the law to correct the charges to all users would enable the state to set fully efficient disposal fees.

TABLE 1

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
OUT-OF-STATE WASTE SURCHARGE PROPOSAL
BY COST CATEGORY

	Cost Categories	Dollars Per Ton
1.	Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management Funded by Domestic Fee	$0.50
2.	Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management Funded by General Fund	0.25
3.	Tax Credits and Other Public Subsidies	0.31 - 0.75
4.	Solid Waste Reduction Activities Related to the Review and Certification of Waste Reduction and Recycling Plans	0.05 - 0.15
5.	Unfunded Environmental Liability	0.10 - 0.50
6.	Lost Disposal Capacity	0.07 - 0.42
7.	Other Costs	
	a. Image	0.05 - 0.35
	b. Publicly supported infrastructure	0.02 - 0.50
	c. Nuisance and Loss of "quiet enjoyment"	0.02 - 0.10
8	Subtotal	$1.37 - $3.52
9.	Bond Fund	0.50
10.	Total	$1.87 - $4.02

Sources and Notes

Source: Memo from Steve Greenwood, DEQ, to Solid Waste Advisory Committee, "Out-of-State Waste Surcharge," July 25, 1990.

SUMMARY OF NERA COMMENTS ON OREGON DEQ SURCHARGE METHODOLOGY

TABLE 2

Cost Category	Legitimate Cost (1)	Comment (2)	Methodology Requires Revision (3)	Comment (4)
1. Statewide Activities for Reducing Environmental Risk Paid Through Fee	Yes		No	
2. Statewide Activities for Reducing Environmental Risk Paid Through General Fund	Yes		No	Costs may not be strictly proportional to tonnage.
3. Tax Credits and Other Public Subsidies	Maybe	A cost is incurred only if the costs of the credit exceed the benefits. This cost would be incurred by all waste disposers.	Yes	Proposed approach does not reflect that the tax credit is applied over time.
4. Solid Waste Reduction Activities	Yes		Yes	Proposed approach charges on a per ton basis continually, but costs may vary over time. Also, costs may not vary proportionately with tonnage.
5. Unfunded Liability	Yes	This cost is also incurred by some in-state waste disposers.	Yes	Proposed approach does not correctly account for cost of waste leaving the system. Fees are not adjusted for tonnage losses before calculating expected value and the time value of money is ignored.
6. Lost Disposal Capacity	Yes	This cost is also incurred by in-state waste disposers.	Yes	Proposed approach bases cost on private developer costs not on state costs. The time value of money is also ignored.
7. Other Costs (image, infrastructure, nuisance)	Yes	This cost is also incurred by in-state waste disposers.	Yes	Proposed methods are not yet fully developed, but some costs will be difficult to quantify. One method proposed for image would result in double counting.

SELECTED SOURCES FOR EVALUATING ENVIRONMENTAL DAMAGES

Baker, Brian. Perception of Hazardous Waste Disposal Facilities and Residential Real Property Values. Ithaca: Department of Agricultural Economics, Cornell University, July 1987.

Cook, Zena L., et al. The Benefits of Regulating Hazardous Waste Disposal: Land Values as an Estimator. Prepared for Office of Policy Analysis, U.S. Environmental Protection Agency, Washington, D.C.: Public Interest Economic Foundation, June 1984.

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McClelland, Gary H., William D. Schulze, and Brian Hurd. The Effect of Risk Beliefs of Property Values: A Case Study of a Hazardous Waste Site. Boulder: University of Colorado, March 27, 1989.

Nelson, J. P. "Highway Noise and Property Values: A Survey of Recent Evidence." Journal of Transport Economics and Policy XVI (1982): 117-130.

Nelson, Jon P. "Three Mile Island and Residential Property Values: Empirical Analysis and Policy Implications." Land Economics 57 (August 1981): 363-372.

Organization for Economic Co-Operation and Development. "Environmental Policy Benefits: Monetary Evaluation." Paris: 1989.

Price, Joe R. A Study of The Impact of Resource Recovery Facilities on Surrounding Residential Properties. Prepared for The Palm Beach County Solid Waste Authority, Fort Pierce, FL: Callaway & Price, March 10, 1986.

Ridker, Ronald G. and John A. Henning. "The Determinants of Residential Property Values With Special Reference to Air Pollution." The Review of Economics and Statistics 49 (1967): 246-257.

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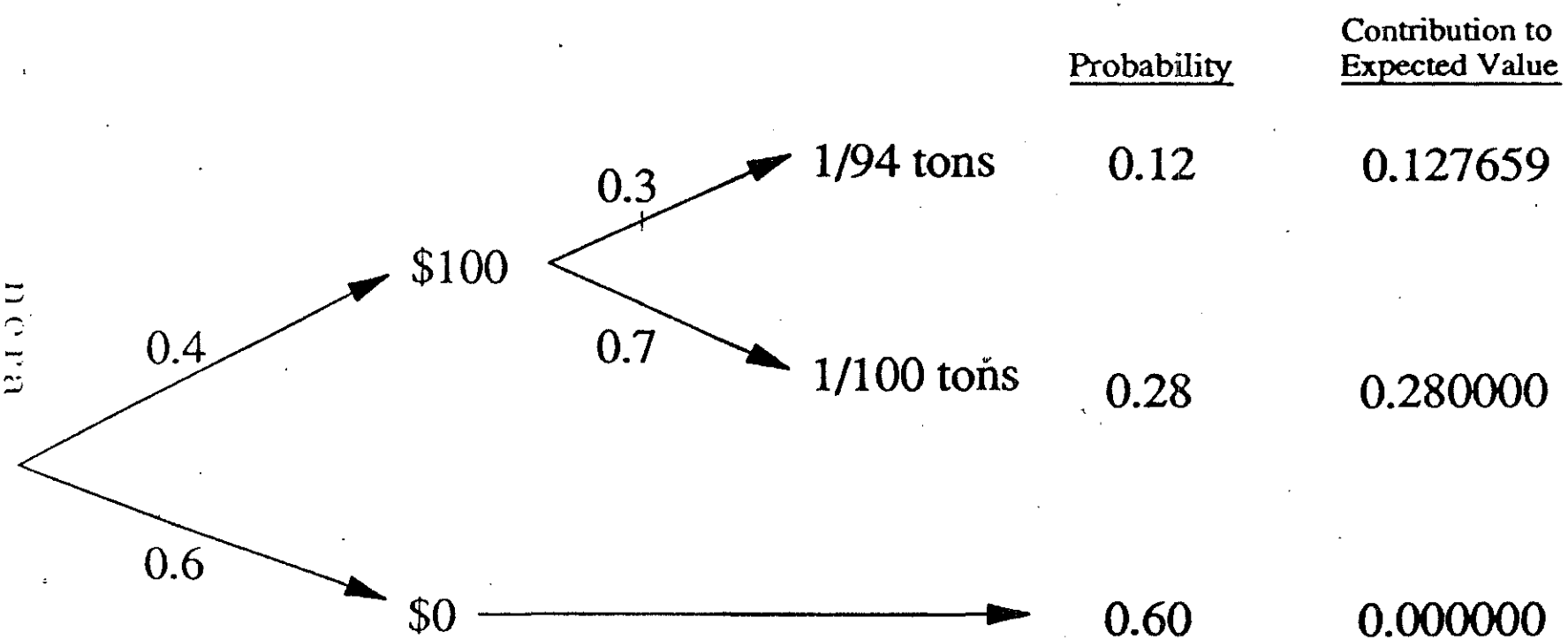
Smith, V. Kerry and William H. Desvousges. "The Value of Avoiding A LULU: Hazardous Waste Disposal Sites." The Review of Economics and Statistics 68 (May 1986): 293-299.

Wise, Kenneth T. Testimony Regarding Property Value Impacts. Before the State of New York Department of Environmental Conservation, Application No. 90-85-0551, November 1988a.

Wise, Kenneth T. Testimony Regarding Tourism Impacts. Before the State of New York Department of Environmental Conservation, Application No. 90-85-0551, November 1988b.

Expected Value of Unfunded Liability



	Probability	Contribution to Expected Value
1/94 tons	0.12	0.127659
1/100 tons	0.28	0.280000
$0	0.60	0.000000
Total Expected Value / Ton		0.407659

FIGURE 1

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: November 1, 1990

TO: Environmental Quality Commission

FROM: Steve Greenwood

SUBJECT: Agenda Item G: Proposed Adoption of Rules to Implement Required Surcharge on Out-of-state Solid Waste. Additional Public Comment.

Attached are copies of additional written public comments on the proposed surcharge rule and on the final report by the Department's economic consultant. These comments were submitted during the Department's extended public comment period (to October 26, 1990), and are in addition to written comments in Attachment J to the Staff Report.

They are part of the official hearing record.

Attachments

OREGON ENVIRONMENTAL COUNCIL

2637 S.W. Water Avenue, Portland, Oregon 97201
Phone: 503/222-1963

COMMENTS SUBMITTED BY THE OREGON ENVIRONMENTAL COUNCIL REGARDING PROPOSED AMENDMENTS TO OAR 340-61

The Oregon Environmental Council (OEC) recommends that OAR 340-61-120 (6) read as follows:

> "...Each solid waste disposal site or regional solid waste disposal site that receives solid waste generated out-of-state shall submit to the Department of Environmental Quality a per-ton surcharge consisting of the amount of the per-ton fee as specified in Section 5 of this rule, plus $3.31. This surcharge shall apply to each ton of out-of-state solid waste received at the disposal site."

Like the Solid Waste Advisory Committee, OEC supports setting the fee at the high end of the range. The figure suggested above reflects the latest figures in the Department's memo to the Solid Waste Advisory Committee dated 10/2/90.

We believe that this is necessary in order to protect Oregon's environmental integrity through current waste reduction activities and efforts to protect groundwater, as well as through site remediation efforts as needed in the future.

We cannot, in good conscience, assume anything less than a worst case scenario in this effort. It would be a tragedy to leave future generations of Oregonians with a huge environmental clean-up liability in addition to limited disposal capacity because we were unwilling to take a tough stand at the outset.

As we acquire more information on the costs of accepting out-of-state wastes the figures can be adjusted; it may be possible to reduce them if data supports that action. But it may also be necessary to increase them, and it would be easier to increase them by a narrow margin than by a larger margin as would be necessitated if we set the rate too low now.

Thank you for this opportunity to comment.

Joan R. Cameron
Policy Director
October 23, 1990

MORROW COUNTY

P. O. Box 788 -:- Heppner, Oregon 97836
(503) 676-9061

COUNTY COURT

LOUIS A. CARLSON, Judge
Heppner, Oregon
IRVIN E. RAUCH, Commissioner
Lexington, Oregon
G.W. "Jerry" PECK, Commissioner
Boardman, Oregon
LO RAYNE M. BOWMAN
Administrative Assistant

October 15, 1990

Fred Hanson, Director
Department of Environmental Quality
811 SW Sixth Avenue
Portland, OR 97204-1390

Dear Fred:

This letter is a response to your notice of second extension to Proposed Rules relating to a Surcharge on Out-of-State Solid Waste.

Obviously, much has been said about the proposed fee schedule in public hearings and in letter form. I simply want to continue to emphasize that these regional landfills are being built by private dollars to alleviate the problems that you were having in the Willamette Valley not more than about three years ago.

At that time, your concern was only with how to cope with the contamination of the ground water in the Valley and how to find a solution to the problem of continuing build up of metropolitan landfill material.

Waste Management came to your rescue at Gilliam County as did Tidewater in Morrow County. The residents of those counties accepted the concept of Valley garbage in their communities with the idea of it being envionmentally correct. Further, with the idea that there would not be any meddling by State bureaucrats in the management of that facility once the environmental concerns had been met.

Now it is apparent that a whole new empire is being set up on the Department of Environmental Quality at the expense of those who generate the garbage. If the cost of that Empire is beyond what the generators can afford, the flow will simply stop and be diverted to an alternative site, probably into the State of Washington.

It is clear to me that an excessive surcharge on out-of-state solid waste would be a threat to the existance of our regional landfills and that any outside influence of excessive rate setting by DEQ for purposes other than strictly applicable to the landfill would cause Morrow County to seek some type of recovery of those opportunities.

Sincerely,

Louis A. Carlson

Louis A. Carlson
Judge, Morrow County Court

LAC/lmb
cc: Tidewater

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SUSAN S. FORD
JOSEPH W. WEST

DAVID K. McADAMS
OF COUNSEL

October 26, 1990

VIA HAND-DELIVERY

Mr. Steve Greenwood
Hazardous and Solid Waste Division
Department of Environmental Quality
811 SW Sixth Avenue
Portland, Oregon 97204

Dear Steve:

Attached are our final comments on the NERA Report and revised methodology.

We do not see all of NERA's recommendations, nor many of ours, reflected in the DEQ draft rule. Our concerns with the Report center around the fact that you do not have adequate documentation to support your costs assumptions and that you have narrowly construed the statute to exclude all benefits of disposal of out-of-state waste.

Very truly yours,

James E. Benedict

JEB:dmm
cc: Robert Danko
Larry Edelman

October 25, 1990

EVALUATION OF DEQ REVISED METHODOLOGY FOR OUT-OF-STATE WASTE SURCHARGE DATED OCTOBER 2, 1990

Prepared by Lawrence D. Schall, Ph.D.

I have been asked by Oregon Waste Systems, Inc. to review the Oregon Department of Environmental Quality (DEQ) memo dated October 2, 1990 which describes its revised calculations and methodology for determining a surcharge on out-of-state waste. This is an evaluation of that memo.

I am currently Chairman of the Department of Finance and Business Economics, and Professor of Finance and Business Economics, at the School of Business Administration, University of Washington, in Seattle, Washington. My resume appears with my October 2, 1990 evaluation of the DEQ Proposal dated July 25, 1990. My comments below will allude to the analysis I presented in my October 2, 1990 report. As a general matter, the observations I made in that earlier report will not be repeated here.

The perspective taken here will be the same as that in my October 2, 1990 report, specifically, that the charge on out-of-state-waste should promote economic efficiency and be equitable. To achieve this, the method of charging out-of-state waste should promote the use of environmentally sound and economically efficient approaches by landfill operators.

I. DEQ'S ASSUMPTIONS

DEQ has introduced new assumptions 7 through 10. Assumption 7 precludes introducing a charge to cover unfunded liability which depends on the methods used by the specific landfill operator to prevent environmental damage. This is a very serious flaw in the DEQ proposal.

Assumption 10 specifies a 3% real discount rate for the calculations. This rate is inappropriately low given the high degree of uncertainty associated with many of the costs being

discounted. A risk-adjusted rate should be used. The annual real rate of return on common stocks averages approximately 6.7% per year, and the annual real rate of return on small stocks averages approximately 8.9%. A 3% rate assumes a very low level of risk and biases the DEQ cost estimates in an upward direction. As will also be noted in Section II, DEQ uses a real rate in its computations when a nominal rate should be used. This error causes the DEQ cost estimates to be too large.

II. EVALUATION OF DEQ'S COST ANALYSIS

DEQ lists nine cost categories that it states are imposed on Oregon by the importation of out-of-state waste. The DEQ analysis of each of these cost categories is considered below.

A. Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management, Paid for Through the Per-Ton Fee on Domestic Solid Waste DEQ has still failed to show that the cost of programs to enhance statewide waste reduction and recycling and the cost of programs for management of household hazardous waste are dependent on out-of-state waste. DEQ's arguments that these costs do depend on the volume of out-of-state waste are simply claims that they do, not an explanation of how or why they do.

B. Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management Funded by the General Fund DEQ states that the $2.2 million from the general fund goes to cover costs that should be shared by in-state waste and out-of-state waste in proportion to tons of in-state waste and out-of-state waste. For this to be valid, a ton of in-state waste and a ton of out-of-state waste must be equally responsible in causing these costs, and all the costs covered by the $2.2 million must result from in-state and out-of-state waste. DEQ has failed to show that these assumptions hold. DEQ states that the activities under this category include the three costs mentioned on page 7 of the DEQ memo, but does not state that other items are not also included.

C. Tax Credits and Other Public Subsidies. There are two problems with the DEQ approach. First, benefits produced for the State of Oregon are ignored in computing the tax credit. DEQ's argument that the benefits are not due to the credit and therefore should be ignored is fallacious. The correct economic approach is to net the benefits created for Oregon by out-of-state waste against all

costs (tax credits and the other eight costs noted by DEQ) created for Oregon by out-of-state waste. Whether or not the tax credits "cause" the benefits is irrelevant.

Second, the method used by DEQ to compute the charge is incorrect. The correct approach is first to compute the following two present values: (a) the present value of the tax credits (at a nominal, not real, discount rate given that the tax credits to be received are nominal dollar amounts); and (b) the present value of the proposed charge on out-of-state waste needed to recapture the credit (if the charge is to remain constant in nominal (dollar) terms over the life of the landfill, then a nominal discount rate must be used). The second step is to set the present value in (a) equal to the present value in (b) and then solve for the proposed per ton charge on out-of-state waste.

D. Solid Waste Reduction Activities Related to the Review and Certification of Waste Reduction and Recycling Plans DEQ assumes an expected inflation rate of 10% per annum and then uses a real discount rate of 3% in its computations. There are three problems with this. First, if inflation adjusted numbers (i.e., nominal dollar amounts that are now expected to occur in the future) are to be used, it is incorrect to employ a real discount rate for discounting; a nominal discount rate must be used. If a 10% inflation rate and a 3% real rate are assumed, then a nominal discount rate of roughly 13% is appropriate. Second, 3% is too low as a real discount rate given the uncertainty involved. Third, an inflation rate of 10% seems high.

E. Increased Environmental Liability There are two major problems with this analysis that should be addressed. First, DEQ already fully takes into account the worst case outcomes in its probability analysis producing the $.03 per ton charge on out-of-state waste. The analysis should stop here, since the correct approach is to compute the expected increased environmental liability created by out-of-state waste, and then charge out-of-state waste for the increased liability it creates. DEQ then argues incorrectly that it is appropriate also to do a worst case analysis that assumes that the worst case will occur and charge out-of-state waste as though such an outcome were certain. This makes no sense and is inconsistent with basic actuarial and economic principles.

The second problem is that the DEQ imposes the same charge on all landfills regardless of a landfill's impact on the likelihood of environmental damage. Landfills that use environmentally

dangerous technologies and have no financial assurances are charged no more than those that have invested in modern technology and have provided financial assurances. This is extremely poor public policy, as I outlined in greater detail in my October 2, 1990 comments.

F. Lost Disposal Capacity My earlier comment (in my October 2, 1990 report) that it is not clear that the State of Oregon has has any lost disposal capacity costs applies here. The arguments that DEQ makes on page 16 do not establish that the State incurs any predevelopment costs that are not already reflected in the charge imposed on users of the landfills or that are not recaptured in some other way by the State.

G. Lost Tourism or Business Development Revenues Due to Stigma of Accepting Out-Of-State Waste This analysis is rife with numbers that have no basis in any empirical data; they are simply guesses about what might happen. For example, the annual impact of $200,000 per year in Step 2, of $2 million in Step 3, and the $.30 in Step 7 are simply pulled out of the air.

Equally serious is the incorrect economic analysis of the numbers. Even if the numbers were correct, the analysis is not. First, a reduction of tourism of $200,000 per year does not imply a loss to the State of $200,000 per year. The loss is the difference between the additional spending in the State produced by tourist expenditures (including any multiplier effects) minus the costs of producing the items acquired by that spending. For example, if a tourist comes into the State and spends $1,000 on food, the net gain to Oregon from that $1,000 expenditure is $1,000 minus the cost of providing the food. The profit margin for most products is less that 20% of the sales, implying a loss of less than $200 to the State economy. The entire analysis makes this error.

Third, in Step 5 the rate of inflation is assumed equal to the discount rate. This is inconsistent with reality, and is also inconsistent with the assumption made elsewhere in the DEQ proposal that the real interest rate is 3%.

H. Publicly Supported Infrastructure First, in Step 1 it is pointed out that the estimated cost of the Columbia Gorge study is $1 million. If this is an estimate that takes into account expected inflation over the next two years (i.e., that it will actually cost $1 million over years 3 to 5), the

$333,333 per year for years 3 to 5 should be discounted using a nominal rather than a real discount rate. It is not clear from the DEQ proposal whether the $1,000,000 is in current dollars or is an estimate of what it will actually cost to do the study. Second, in Step 4, dividing the $88,786 by tons only during the next 5 years assumes that out-of-state waste will only go through the gorge for only five years. Assuming that the charge is permanent and that out-of-state waste will go thorugh the gorge for more than five years, the charge as computed will result in the State collecting far more than what is necessary to cover the $88,686.

It is also worth repeating that a charge for infrastructure costs is appropriate only for incremental infrastructure costs imposed on the State that are not otherwise covered through other charges on out-of-state waste. DEQ must establish what those costs are and must demonstrate that out-of-state waste is not already paying for those costs through other fees, e.g., through fuel and road taxes.

I. Nuisance Impacts From Transportation It is important that DEQ substantiate that these costs are real. The Step 1 and Step 2 analysis is reasonable (assuming that the data available to DEQ are accurate), which would imply a $.01 charge per ton, not a range from $.01 to $.03.

III. SUMMARY AND CONCLUSIONS

The revised methodolgy outlined by DEQ in its October 2, 1990 memo fails to correct the major errors made in the July 25, 1990 DEQ Proposal. Furthermore, the methods now recommended by DEQ to quantify the costs created by out-of-state waste contain numerous and significant errors. The DEQ proposal ignores the benefits to Oregon created by the importation of out-of-state waste, and fails to take into account landfills technology and financial assurances in setting the charge for increased environmental liability. In addition, much of the quantitative analysis in the DEQ proposal is muddled and simply incorrect. The result is that the cost computations are wrong. The consequence of the errors identified here is a charge on out-of-state waste that is significantly greater than that justified under the assumptions DEQ claims it is using in its analysis.

Oregon Waste Systems Inc.
5240 N.E. Skyport Way
Portland, Oregon 97218
(503) 281-2722

A Waste Management Company

October 26, 1990

Members of the EQC

Dear Mr. Weaver:

At the November meeting of the Environmental Quality Commission, you will adopt a rule setting a surcharge on out-of-state waste as required by ORS 459.297. The DEQ has recommended a $3.00 fee.

Oregon Waste Systems believes there are sound policy, economic development, and legal reasons to set a substantially lower fee on out-of-state waste.

POLICY

In their September 1989 Municipal Solid Waste Needs Assessment Report, the Environmental Protection Agency Region 10 pointed out that one of the Northwest's biggest policy challenges was to achieve a balance between too few regional landfills and too many.

Too few landfills will create a hardship for municipalities seeking disposal options. The EPA reports says that too many landfills will create a surplus of capacity promoting importation of waste from outside the region.

There are two statewide policy groups addressing the out-of-state waste issue which bear on this challenge of creating a regional landfill balance. However, they are approaching the issue from substantially different perspectives.

On the one hand, the Regional Solid Waste Policy Commission has come to accept the idea of regional, interstate waste disposal. The commission is working to identify and address the issues created by this growing trend.

On the other hand, the DEQ Solid Waste Advisory Committee approaches the out-of-state waste issue from a revenue perspective. The committee has sought to raise as much money as possible from out-of-state waste to fund the DEQ solid waste section. The advisory committee, which includes haulers and other landfill operators, understands the need for DEQ to have adequate staff. The committee is also aware that, unless they can find an external source of funding, the most likely source of funding for the agency will come from in-state landfill compliance fees and solid waste tip fees .

Oregon Waste Systems (OWS) agrees that out-of-state waste will have to "pay its way" in Oregon, and supported the out-of-state surcharge bill. The company still believes it should pay costs that are direct and measurable. However, out-of-state waste should not be treated as a "cash cow" -- especially in light of the growing trend toward regional cooperation in the disposal of all wastes.

ECONOMIC DEVELOPMENT

The Columbia Ridge Landfill in Gilliam County and the Finley Butte landfill in Morrow County are huge boosts to the local economy. The effect of the proposed rule on this economic development has been largely ignored.

Eastern Oregonians have competed for Oregon's garbage (METRO waste) and Oregon's prisons because they need to diversify their economic base. In the DEQ public hearing held in Arlington citizens from Morrow and Gilliam County testified that out-of-state waste means more new jobs in Oregon and more than $1 million in host fees and local taxes every year. There is no question that the citizens of Gilliam and Morrow county feel that out-of-state waste is vital to their community's economic interests. I have enclosed copies of testimony from DEQ's Arlington public hearing which dramatize this fact.

The current DEQ surcharge will act as an economic barrier to the importation of waste. The proof of this is the recently negotiated contract between Washington Waste Systems and the City of Seattle.

The City of Seattle paid special attention to the Oregon out-of-state waste fee discussions. At the time the contract was negotiated, Seattle was aware of the range of the surcharge (from $1.50 to $3.50). Because of the level of the fee, the City included two new clauses in the contract. In the Seattle contract, Washington Waste Systems agreed to pay 50 percent of the costs due to changes in Oregon law. In addition, the City of Seattle has required WWS to build a landfill in Washington and to accept the City's waste there on January 2, 1995 or pay liquidated damages.

Seattle's waste business is going to Washington on or before January 1995 unless the City of Seattle waives the contract clause. As a result, many in eastern Oregon see the level of the out-of-state waste surcharge, not their own regional economic strategy, determining their economic futures.

CONSTITUTIONAL ISSUES

In addition to the policy and economic arguments against a high surcharge, there are strong legal arguments against this fee.

The Supreme Court has ruled that waste is an interstate commodity subject to the Commerce Clause. The Commerce Clause prohibits a state from imposing an impermissible burden on the free flow of interstate trade among the states. The imposition of a higher fee on the disposal of waste generated outside of Oregon than is imposed on the disposal of waste generated inside Oregon will be *per se* invalid under the Commerce Clause.

The Department of Justice suggests that it is constitutional to impose a higher fee if there is a rational basis for the difference. This position has yet to be supported by the Supreme Court under the Commerce Clause on any fee for interstate trade. Considering the consequences of a high surcharge, it may make more sense to have a formal Attorney General's opinion before proceeding further.

THE DEQ REPORT

The DEQ analysis of the costs to Oregon for out-of-state waste is a far from perfect document. The methodology for the cost calculations has been improved by the NERA, the economic consulting firm hired by DEQ to assist them. However, the biggest problem remains -- the difficulty in correctly identifying and measuring the costs to be included in the calculations.

For example, in measuring unfunded liability DEQ has performed very complicated underwriting feats done only by a few insurance underwriting specialists. In judging the costs of lost image DEQ has made extremely speculative value judgments about tourism and industrial motivation.

NERA and other experts stressed a "net benefit" analysis to arrive at costs. DEQ can find no benefits in out-of-state waste. No economic benefits, no regional policy benefits, no benefits period. However, when 400,000 tons of waste moves from Columbia Ridge to a landfill in Washington, something important to Oregon will move with it. Specifically:

- Gilliam County will lose the jobs associated with the unloading and disposal of the waste.
- Gilliam County will lose between $400,000 and $425,000 annually in host fees.
- DEQ will lose $400,000 annually for every dollar per ton of tip fees it assesses.

Over the remaining 34 years of the Seattle contract that's a minimum of $27 million in lost revenue.

The policy arguments boil down to a choice between setting a high fee that discourages out-of-state waste but could raise significant revenue, if the waste flow stays in Oregon -- or setting a fee close to the level of the in-state fee and encouraging local economic growth and the development of regional solid waste cooperation.

The economic choices are between economic growth for Gilliam and Morrow counties or high short-term revenues that cause the waste and the jobs and the host fees to move.

Ultimately, the legal question will have the greatest impact on the level of the fees. The policy question is whether to push the limits of the constitution by setting a disproportionate fee and thereby effectively move the waste out of the state, or to address the policy issues more straightforwardly.

I hope the EQC will review the record closely and adapt an out-of-state surcharge that can be justified.

Sincerely,

Doris Bjorn

Doris Bjorn
Oregon Waste Systems

File Copy

OREGON LEGISLATIVE ASSEMBLY

State Capitol

October 31, 1990

Henry Lorenzen
Corey, Byler, Rew, Lorenzen, and Hojem
PO Box 218
Pendleton, OR 97801

Dear Commissioner Lorenzen

I am writing regarding the proposed out-of-state waste surcharge that the Environmental Quality Commission will consider this week.

Solid waste management policy was one of the most contentious environmental issues during the last legislative session. While some success in the area was achieved, we failed to adopt a comprehensive state recycling policy or waste management policy. Part of the reason for this failure was the issue of out-of-state waste and what share it should pay.

In an effort to remove the out-of-state waste issue from the larger more pressing matter of state solid waste management policy, the Legislature added a provision to HB 3515 requiring the EQC to adopt an out-of-state waste surcharge equal to the cost to Oregon of accepting the waste.

I have followed the work of the Department in assessing the true cost to the state. Although I am not in a position to comment on specific dollar amounts, I believe the cost analysis does a good job in identifying virtually all the costs to the state.

I urge the EQC to act on this surcharge at its November meeting.

I also urge the EQC to adopt a surcharge that covers the complete costs to the State of Oregon. Anything less will likely cause the out-of-state waste issue to again dominate the solid waste policy debate next session.

Thank you for your attention.

Sincerely,

John Kitzhaber

John Kitzhaber, M.D.
Senate President

File Copy

OREGON LEGISLATIVE ASSEMBLY
State Capitol

November 1, 1990

William W. Wessinger
1133 W. Burnside Street
Portland, OR 97209

Dear Commissioner Wessinger:

I had hoped to be able to testify before the Commission today. I have followed closely the Department of Environmental Quality's work on the out-of-state waste surcharge. I am writing to applaud its efforts.

I would like to request that the EQC focus on potential future costs attributable to the importation of out-of-state solid waste. If it does, I believe a fee on the order of $3.00 to $3.50 per ton is appropriate. I believe it would be a mistake to significantly reduce the surcharge proposed by the DEQ staff.

Attached please find a copy of a letter describing out-of-state solid and hazardous waste fees assessed by other states. I think you will find it of interest. Thank you for your consideration.

Sincerely,

Jeannette Hamby

Sen. Jeannette Hamby

Attach:

Defenders
OF WILDLIFE

MEMORANDUM

TO: Joint Interim Committee on Revenue and School Finance Members, Associated Oregon Industries/Environmental Committee, Resource Conservation Trust Fund Supporters

FROM: Sara Vickerman

DATE: September 24, 1990

SUBJ.: Implementing the Oregon Resource Conservation Trust Fund -- Analysis of Solid, Hazardous Waste Fees

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At the July 12 hearing, several members of the Revenue Committee requested additional information about the disposal of hazardous and solid waste in Oregon.

The attached letter from Bill Kovacs explains some opportunities we may have to make Oregon a leader in the development and application of waste recovery technology. As you can see, he wrote the letter in response to specific questions we discussed at an earlier meeting.

Bill Kovacs is one of the nation's authorities on waste management and resource recovery. He authored an extensive article in the Ecology Law Quarterly entitled, "The Coming Era of Conservation and Industrial Utilization of Recyclable Materials." The citation and table of contents for that article are enclosed. Reprints are available from Mr. Kovacs.

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WILLIAM L. KOVACS
(ADMITTED IN WASHINGTON, D.C.
AND PENNSYLVANIA
NOT ADMITTED IN OREGON)

WASHINGTON, D.C. OFFICE
1900 L STREET N.W.
SUITE 500
WASHINGTON, D.C. 20036
TELEPHONE (202) 862-4972

September 20, 1990

Ms. Sara Vickerman
Regional Program Director
Defenders of Wildlife
Pacific Northwest Office
0434 S.W. Iowa
Portland, OR 97201

Dear Sara:

I apologize for the delay in responding to your July 13, 1990 letter, however, at long last I am providing the answers to your questions.

Perhaps the best way to proceed is to list each question separately and then provide you with my response.

Question 1: Oregon imports more hazardous waste than any western state and has lower fees. These fees can be increased without affecting the flow.

RESPONSE: The first part of the question concerning Oregon's importation of more hazardous waste than any other western state is clearly demonstrated by the interstate waste flow studies that I previously provided you. With regard to disposal fees, it should be noted that the tipping fee in Oregon at the present time on hazardous waste is $20 per ton. On solid waste it is .50¢ per ton on domestic solid waste. There is no present fee on out of state waste. I understand that by rule, DEQ is proposing a fee of $1.50 to $3.50 per ton on out of state waste disposed in Oregon.

It should be noted that at the present time California imposes a $115 per ton tax on all hazardous waste disposed in the state. This tax along with a $110 disposal fee brings the disposal cost for hazardous waste to $225.00 per ton. In addition, California has given its municipalities the authority to impose a 10% gross receipts tax on the revenues of a hazardous waste

treatment, storage or disposal facility. Ten percent (10%) of a company's gross receipts is an extremely high tax and is looked upon as a host community fee.

Nevada, Utah, Oklahoma impose disposal taxes between $37-$57 per ton.

With regard to solid waste, I have fewer numbers, however, most eastern states are imposing $2 to $3 per ton tax on all solid waste disposal.

Tipping fees in the east are in excess of $100 per ton. Further, several states are permitting local fees in addition to the state tax.

It should also be noted that the trend is towards the long haul transportation of waste to cheaper disposal sites. For example, waste is moving by rail off the east coast as far away as the Dakotas. The reason is that the landfill costs which are somewhere above $100 per ton make it cheaper to pay the transportation to lower priced disposal sites.

Oregon could significantly increase its disposal tax without impacting the flow of waste into the state. It is ironic that Oregon, with its belief in strong environmental protection, is perhaps the only state that actively seeks to encourage the import of solid and hazardous waste.

Question 2. Increasing fees on waste disposal will stimulate recycling through an economic incentive.

RESPONSE: As we have discussed, industry will generally let waste flow to the cheapest alternative. As long as land disposal is the cheapest alternative, it will be selected by the generator. That is the primary reason that 80% of the waste in the country is still being disposed of in landfills. If land disposal were more expensive, more waste would either be source reduced or removed for recycling. However, at the present time recycling is more expensive because of the expense associated with the collection and processing system. As long are recycling is more expensive than landfilling, landfilling will occur.

Question 3. Linking hazardous and solid waste disposal and land conservation is appropriate.

RESPONSE: All environmental protection efforts must be viewed as an integrated whole. In the early 70's federal laws took the contaminants out of the air and water and placed them on the land for disposal. By the mid 70's the nation recognized that land disposal was becoming a problem and therefore, enacted legislation to regulate land disposal. All aspects of the system must be considered as a whole if we are to eliminate pollution in both the most efficient and comprehensive manner as well as to understand the tradeoffs involved with all forms of disposal activity in the various media.

Question 4. Trust Fund monies could be used to help establish a Resource Recovery Technology Center ("Center") to stimulate economic development and improve recycling. If allocated properly, this could create new industry, jobs and job training programs.

RESPONSE: The purpose of the Trust Fund and the establishment of a Center is to be able to solve waste management problems in an integrated manner with the availability of the best available technology rather than in a fragmented manner which focuses on the cheapest methods of disposal and simplistic solutions to complex social, industrial and political problems.

Quite simply, Oregon should turn the solid and hazardous waste issues from a problem into an opportunity by increasing recycling and the development of all the related technologies and businesses which process recycled materials into new products and develop the technologies that can clean-up the environment. This is already being done by several of the paper mills that are changing their technologies to use recycled fiber in lieu of virgin fiber as a raw material source.

To further the goal of establishing Oregon as the leader in the development of environmental technology, the Center would be established, perhaps at a state

university. The sole purpose of this Center would be to work with the state in developing new technologies for the clean-up of hazardous waste sites, contaminated groundwater supplies and recycling and energy conservation technologies. As these advanced technologies are developed, the state would license them throughout the United States and the rest of the world. Again, the goal would be to make Oregon a leader in solving one of the most serious problems in the United States, the clean-up of pollution, the reuse of materials and energy conservation. The training ground for the new technologies will be the clean-up of our own sites and the development of recycling technologies. The Center would make an opportunity out of a problem.

As Oregon becomes the leader in the research and development of recycling, energy conservation and waste management technologies, the state will benefit by both increased business development and the conservation of its resources. Development of these technologies is essential if Oregon is to compete in the future international marketplace, because of the increasing reliance by industry on recyclable materials and the need to reduce our dependence on fossil fuels in order to deal with global warming. For example, the largest exports out of the Port of New York (the largest port in the world) are: 1) scrap steel for the furnaces in the Pacific Rim; and 2) waste paper for the recycle paper mills of the Pacific rim.. Recyclable materials generally are less expensive than virgin materials, and in addition, offer the manufacturer the advantage of energy savings. The advantage ranges from 40% for paper to 98% for aluminum. The cost benefits increase if one considers the reduction in solid waste. By developing the technologies necessary for recycling and energy conservation, Oregon can take the lead in this important new industry. Further, it will make

significant inroads in assisting the nation and the world to deal with the effects of global warming.

Question 5. The solid waste part of the Trust Fund should be administered by the Department of Economic Development since DEQ lacks the expertise and the will to develop markets and programs to provide economic incentives to businesses that recycle.

RESPONSE: As you can tell from my response to question number 4, I view recycling, materials management, the recovery of recyclable materials from the waste stream and the supply of such materials to industry as an economic development activity as much as an environmental activity. The regulatory aspects would, obviously, have to remain with DEQ, however, I see those as being limited. The primary focus however, is economic development which occurs by developing industries to recover waste, process it and supply the recyclable materials to industry as its raw material supply. This is all industrial development, research and development and is a very dynamic process rather than a regulated process. As such, Oregon needs to look at new mills and new industries. All of this is even more essential if Measure 6 passes, which mandates that all packaging in the state be made of recycled material or be recyclable at certain rates.

We need to integrate all of these activities in a manner which will let Oregon become competitive in the future, as well as deal with its solid waste problem. As long as the state looks at the solid waste issue solely as one that is to be regulated by government, it most likely will not be able to expand recycling. The state of Washington is clearly the leader in making recycling an economic development activity, in that it has put recycling in its Department of Trade.

I wish you and your committee the best of luck. If I can help to expand upon these ideas in the coming months, I would be pleased to do so.

Very truly yours,

Bill

William L. Kovacs

WLK037:jlm

DICK SPRINGER
MULTNOMAH COUNTY
DISTRICT 6

REPLY TO ADDRESS INDICATED:
☐ Senate Chamber
Salem, OR 97310
☐ 7624 SE 13th Avenue
Portland, OR 97202

OREGON STATE SENATE
SALEM, OREGON
97310

1 Nov 90

TO: EQC
RE: Out-of-state Waste Disposal fees

1989 Session - SB 424
Agriculture/Natural Resources Comm.
recommends $2/ton fee all waste (domestic, out-of-state)
Also recommends add'l fee out-of-state waste to recover
negative impact upon receiving state (Oregon)

Interim Task Force Solid Waste --
Funding continues to be major issue

Contact with Seattle & Wash State officials regarding
out-of-state waste fees
Seattle says no problem with their share fee up to $2/ton
Seattle contract says city pays only 50% host state fees
Wash. state incentives to develop in-state landfill capacity

Contact with DEQ staff re: recommendations, process

Urge EQC support staff report and fee
support E-Board action 11/15 to begin 1/1/91 collection
$2.50/ton was minimum amt fee on out-of-state waste

If 1991 session asked to re-examine out-of-state fee,
could easily decide greater amount
other states imposing substantially greater fees
staff approach - cautious in its estimates of negative
impacts on Oregon
Oregon fees ought not to invite out-of-state dumping in Oregon
as lower-cost option

Legislature directed EQC to recommend fee
act now to fulfill avoid delay and to meet Jan deadline
unrealistically low fee will only invite more bills
and debate next session

Dick Springer

Dick Springer

COST CATEGORIES:
OUT-OF-STATE SOLID WASTE SURCHARGE

CATEGORY	COST	
	Range	DEQ Recommendation
o Statewide activities for reducing environmental risk and improving solid waste management, paid for through the per-ton fee on domestic solid waste.	$ .50	$ .50
o Statewide activities for reducing environmental risk and improving solid waste management, paid for through general funds.	$ .42	$ .42
o Tax credits and other public subsidies.	$ .20 - 1.51	$ .58
o Solid waste reduction activities related to the review and certification of waste reduction and recycling plans.	$ .05	$ .05
o Increased environmental liability.	$ .03 - .72	$ .72
o Lost disposal capacity.	$ .20	$ .20
o Lost tourism or business development revenues due to stigma of accepting out-of-state waste.	$ .33 - .65	$ .47
o Publicly supported infrastructure.	$ .02 - .05	$ .03
o Nuisance impacts from transportation.	$ .01 - .03	$ .01
Total:	$1.76 - $4.13	$2.98

G:\SW\SB10013

SUMMARY OF NERA COMMENTS ON OREGON DEQ SURCHARGE METHODOLOGY

TABLE 2

Cost Category	Legitimate Cost (1)	Comment (2)	Methodology Requires Revision (3)	Comment (4)
1. Statewide Activities for Reducing Environmental Risk Paid Through Fee	Yes		No	
2. Statewide Activities for Reducing Environmental Risk Paid Through General Fund	Yes		No	Costs may not be strictly proportional to tonnage.
3. Tax Credits and Other Public Subsidies	Maybe	A cost is incurred only if the costs of the credit exceed the benefits. This cost would be incurred by all waste disposers.	Yes	Proposed approach does not reflect that the tax credit is applied over time.
4. Solid Waste Reduction Activities	Yes		Yes	Proposed approach charges on a per ton basis continually, but costs may vary over time. Also, costs may not vary proportionately with tonnage.
5. Unfunded Liability	Yes	This cost is also incurred by some in-state waste disposers.	Yes	Proposed approach does not correctly account for cost of waste leaving the system. Fees are not adjusted for tonnage losses before calculating expected value and the time value of money is ignored.
6. Lost Disposal Capacity	Yes	This cost is also incurred by in-state waste disposers.	Yes	Proposed approach bases cost on private developer costs not on state costs. The time value of money is also ignored.
7. Other Costs (image, infrastructure, nuisance)	Yes	This cost is also incurred by in-state waste disposers.	Yes	Proposed methods are not yet fully developed, but some costs will be difficult to quantify. One method proposed for image would result in double counting.

OUT-OF-STATE WASTE SURCHARGE

Panel Discussion
November 1, 1990

2:15 p.m. Remarks by members of the Oregon Legislature

2:30 p.m. Discussion of Constitutional Issues - Larry Edelman

2:45 p.m. Overview of Department Methodology and Recommendations - Steve Greenwood

3:15 p.m. Brief Presentations by Members of the Panel:

- Mark Berkman - NERA
- John Frewing - SWAC Chair
- John DiLorenzo - representing Tidewater Barge
- Doris Bjorn - representing Oregon Waste Systems, Inc.
- Judge Laura Pryor - Gilliam County
- Bruce Rettig - OSU economist

4:00 p.m. Discussion and Questions from Environmental Quality Commission

SB10020

NEIL GOLDSCHMIDT
GOVERNOR

Environmental Quality Commission

811 SW SIXTH AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

REQUEST FOR EQC ACTION

Meeting Date: November 2, 1990
Agenda Item: I
Division: Air Quality
Section: Planning & Development

TO: The Environmental Quality Commission

FROM: Fred Hansen, Director

SUBJECT: Wood Heating Alliance Presentation on Klamath Falls Study

The Wood Heating Alliance has rescheduled a presentation they requested to make to the Environmental Quality Commission in June of 1990 to the November 1990 meeting. This presentation is on an in-home study of the emission performance of certified woodstoves in the Klamath Falls area. Enclosed is a copy of this study, along with a letter that the Department sent commenting on this study.

It should be noted that while the results of this study are encouraging, the Department took exception to the portrayal of this study as proving that the 1990 certified stoves have solved the durability problems associated with previous stove models. The main point in support of the Department's position is that the study report indicates that it was beyond the scope of the project to determine appliance durability. The stoves were tested in a relatively new state - without significant in-home "aging", therefore factors affecting durability could not be adequately assessed.

JFK:a
PLAN\AH11110
(10/19/90)

THE WOOD HEATING ALLIANCE

WHITE PAPER

Summary of Klamath Falls, Oregon Woodstove Field Study
Commissioned by the WHA Stove Technical Committee

April 6, 1990

BACKGROUND

Early studies of the in-home performance of phase-one certified woodstoves indicated that many first-generation appliances produced more emissions in consumer use than they did in the laboratory. As a consequence of these studies, some regulatory authorities concluded that certified wood stoves do not maintain their clean-burning performance, that additional regulatory standards should be required, and that, in some areas, wood burning stoves should be prohibited altogether.

In August, 1989 the WHA Stove Technical Committee circulated a *Strategic Analysis Questionnaire* to WHA members. The members of the Committee were confident that stoves certified to the EPA 1990 standard are durable, more efficient and cleaner burning than the older generation stoves. The questionnaire produced an overwhelming consensus that the WHA should conduct a field test to develop independent and accurate information on emissions and durability performance of 1990 certified stoves.

In response to the directive of the members, the Stove Technical Committee designed a study to contrast with previous studies which assessed only the earlier stove technologies. The study would be used to portray the dramatic improvements which have been made in wood stove technology and the clean-burning benefits available from the new generation of stoves.

OBJECTIVES

The primary objective of the Klamath Falls, Oregon Field Study was to compare the performance of 1990 certified, clean-burning wood stoves with conventional, non-certified stoves. A secondary objective was to demonstrate, to the extent possible within the time frame of the study, the performance durability of 1990 certified wood stoves. A third objective was to test the assumptions of the EPA regarding the emissions performance of conventional, non-certified wood stoves in actual consumer use.

METHODOLOGY

The study was conducted in homes near Klamath Falls, Oregon by an independent research firm, OMNI Environmental Services, based in Beaverton, Oregon. Klamath Falls is a community in which many residents use wood as a home heating fuel. Klamath Falls is at an elevation of 4,800 feet above sea level, and it has been found to have the highest level of woodsmoke pollution in the nation. Site preparation and field activity began on January 3, 1990 and stove testing concluded March 1, 1990.

The test plan involved three non-catalytic, 1990 certified wood stoves, three catalytic 1990 certified wood stoves, and three conventional, non-certified wood stoves. The emissions performance of all of the stoves was measured using Automated Woodstove Emissions Samplers (AWES) operated by OMNI Environmental Services.

The conventional, non-certified woodstoves were thermostatically controlled, were connected to eight-inch diameter flues, and were tested in consumer homes for one week. At the conclusion of the first week of testing, the non-certified stoves were replaced by three 1990 certified stoves and three additional homes were outfitted with 1990 certified stoves. The chimneys of all of the homes outfitted with certified stoves were re-lined with six-inch flues, in accordance with the appliance manufacturers instructions, and the homeowners were instructed in the proper use of the appliances. All six certified wood stoves were tested for two successive weeks.

RESULTS

The results of the test demonstrate dramatic improvements in the performance of 1990 certified wood stoves over the performance of earlier generations of appliances in previous studies. The six certified appliances in the Klamath Falls Study averaged only 6 grams per hour, which is cleaner than any appliances tested in previous in-home studies. The 1990 EPA standards for certified stove performance in controlled, laboratory conditions are 7.5 grams per hour for non-catalytic stoves and 4.1 grams per hour for catalytic stoves.

Significantly, the study also demonstrates that conventional, non-certified wood stoves produce substantially more pollution than originally estimated by the EPA. The EPA has estimated that non-certified stoves generate an average of 22 grams of emissions per hour of operation. In the Klamath Falls Study, conventional, non-certified wood stoves generated an average of 42 grams of pollution per hour.

The results of the study indicate that the certified appliances reduced woodsmoke pollution by more than 85% from the emissions of non-certified stoves.

CONCLUSIONS

The Klamath Falls Woodstove Field Study demonstrates that the wood stove industry has produced a new generation of appliances capable of dramatically reducing pollution in consumer use. It demonstrates that the 1990 certified appliances operate consistently cleaner than non-certified stoves by a sufficient margin to achieve the air quality objectives of federal, state, and local air quality authorities.

The WHA Stove Technical Committee intends to communicate the results of the study to environmentalists, consumers, and regulators to assure them of the sufficiency of the existing regulatory framework.

NEIL GOLDSCHMIDT
GOVERNOR

Department of Environmental Quality

811 SW SIXTH AVENUE, PORTLAND, OREGON 97204-1390 PHONE (503) 229-5696

June 13, 1990

Jim Irvine
VanNatta,Irvine and Associates
3140 SE Hawthorne
Portland, OR 97214

Re: WHA Klamath Falls
Woodstove Field Study

Dear Jim:

As you requested I have arranged to have you present the results of the Wood Heating Alliance's Oregon Woodstove Field Study in Klamath Falls to the Environmental Quality Commission. This presentation has been tentatively scheduled for the afternoon of June 28 at 1pm.

My staff has had an opportunity to review the report of this study and I thought it would be worthwhile to pass along their comments.

The major conclusion of the study as portrayed in a WHA white paper indicates that 1990 certified woodstoves reduced woodsmoke pollution by more than 85% and that the tests demonstrate a dramatic improvement in the 1990 certified stoves over the performance of earlier generations in previous studies. This is encouraging; but, a more detailed look at the study raises significant questions about the representativeness of this data and the generalization of the conclusions.

Unrepresentativeness of Conventional Stove Baseline

The conventional stoves tested appear to be biased to the dirtiest of units which will unrealistically inflate the performance of certified stoves when they are compared to such units. Two conventional models in a total of three homes were tested at an average emission rate of 42.8 grams per hour. Previous studies on both coasts of this country (including in Oregon) and in Canada which comprise a much, much larger data base have consistently shown conventional stoves to average about 21 grams per hour although select stove models and homes in these studies have exceeded even 42 grams per hour emission rates. One stove design which was in two of the three homes has been identified as among the most polluting (large fire box with thermostatic control). Laboratory and inhome testing of such a design by DEQ has show emissions to range from 25 to 90 grams per hour.

A point may be made that Klamath Falls is at a higher elevation and in a colder climate than most study areas and that these factors would have a tendency to increase baseline emissions of conventional stoves. A recent study of 6 conventional stove models in the Crested Butte, Colorado area does not support average levels as high as reported for Klamath Falls. Crested Butte is at a very high elevation of about 9000 feet compared to Klamath Falls at about 4000 and it has a colder climate. Yet, average conventional stove emissions were measured at 32 grams per hour. With Klamath Falls being about halfway in elevation difference between Crested Butte and most other study areas that were near sea level and with somewhat similar climate differences one would expect that the true average conventional stove baseline in Klamath Falls would be no more than halfway between sea level data and the Crested Butte data or about 26 grams per hour.

Comparison of certified stove test data from the Klamath Falls study with a more realistic convention stove emission baseline in the range of 21-26 grams per hour would result in a projected emission reduction in the low 70% range which is still encouraging and in the range of what the best of certified stoves have demonstrated in other studies.

Unrepresentiveness of Certified Stoves and Lack of Aging

Generalizing as WHA has that the study demonstrates "a dramatic improvement in the performance of 1990 certified wood stoves over the performance of earlier generations of appliances in previous studies" is not substantiated in that the selection process of the five stove models tested by the wood stove industry has not been documented to be unbiased. Ideally selection should be by a body independent of the woodstove industry and on a random basis. There are certain pre-1990 and subsequent 1990 certified stove in other inhome studies that have demonstrated emission performance in the same range as reported for the 1990 models tested in Klamath Falls. Certainly it would be expected that a select population of 1990 models would perform better than the group as a whole.

Additionally the less than expected performance of certified stoves in past inhome studies has, to a major extent, been attributed to durability problems. It appears that the testing of the certified stoves in the Klamath Falls study was conducted within just a few weeks of initial stove installation. This would hardly be adequate time for stove component aging and durability problems to surface.

Unrealistic Coaching/Modification of Operators/Stoves

There are several indications in the study report that stove operators were given instruction beyond what would normally be expected to be given to the average homeowner who buys a certified stove despite the statement in the

report that "no special operating instructions were given". Such abnormal actions would tend to enhance the performance of stoves beyond their normal expectations. For instance, it is indicated that in four of the six homes stove manufacturer's representatives provided on-site operating instructions. It most cases we would expect that most new stove owners do not receive on-site operating instructions from their retailer let alone from a manufactures representative. In one home it was indicated that a request was made during the second week of sampling to cut fuel smaller in accordance with operating instructions. In another home it is reported that a request was made to load larger fuel pieces and burn at a lower air setting, in accordance with instructions. In another home the air inlet control was adjusted with a screw driver for easier operation after the first week of sampling. Another case indicates that the flue was lengthened between sampling periods. These on site actions after stoves were installed appear above and beyond what would be normally expected in typical new stove installation raising the question of how representative can the test results be of typical operation .

Concluding Remarks

We are very much interested in gaining more information on the "typical" inhome performance of 1990 certified stoves and we appreciate the efforts of the Woodheating Alliance to develop such data. We regret not being a part of the Klamath Falls Study planning effort. If WHA is interested in continuing to develop such information we would suggest that studies be planned and conducted in cooperation with government agencies with a strong commitment made to provide the most typical and average case conditions as possible. We would be happy to join with you in exploring with EPA the possibility of conducting truly independent, statistically significant testing of 1990 certified stoves over a number of years of in home use.

DEQ now has inhome woodstove testing capability which we would be willing to apply to the tested stoves in the Klamath Falls area during the 90/91 heating season. This would provide an opportunity to at least characterize the performance of these stoves after they have had a reasonable amount of aging. Please let us know your thoughts on this offer.

I know you may take our comments as being overly critical but we are ultimately held responsible for bringing our PM10 nonattainment areas into compliance. We, therefore, must be reasonably convinced that control strategy credits are totally representative of real world conditions. You may or may not be aware that motor vehicle emission control performance is based on in field testing of variety of representative models with varying degrees of aging. Data from such testing is put into a formula referred to as "Mobile 4" which can then be used by an area to input its fleet mix to get a realistic estimate of the emission reduction potential of the Federal new vehicle certification program. We all should be striving to generate a similar data base for certified woodstoves.

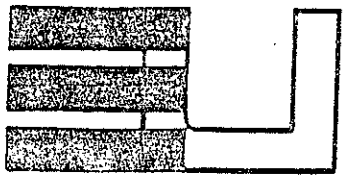
We do not have any problem with portraying the Klamath Falls study as representing the ideal or best performance of 1990 certified stoves since installation, flue height and size, wood moisture and operator instructions as well as aging of stoves were at an ideal state. This data when adjusted to a more realistic baseline is consistent with the best stove performances reported in other studies. We just cannot agree with WHA's conclusion "that it has been demonstrated that 1990 certified stoves meet objectives of federal, state and local air quality authorities and that WHA will use this data to assure the sufficiency of the existing regulatory framework". Durability problems with certified stoves have been the major concern of air quality authorities and the Klamath Falls report clearly states "it was beyond the scope of the project to determine the stove or combustor durability".

We are fully committed to work with WHA and EPA to reach the goal of accurately characterizing 1990 certified stove performance and gaining full confidence that certified stoves fully meet air quality control objectives. We would very much welcome the opportunity to further discuss this issue with WHA in the near future.

Sincerely,

Nick Nikkila
Administrator
Air Quality Division

NN:JFK:a
PLAN\AH10010
cc: William Hutchison, EQC
Tim Nissen, WEI-West
Jim Herman, WEI-West



Elements Unlimited

WOODSTOVE FIELD PERFORMANCE IN KLAMATH FALLS, OREGON

Prepared for: Wood Heating Alliance
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Washington, DC 20036

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Elements Unlimited
6614 S.E. 48th
Portland, Oregon 97206

APRIL 18, 1990

WOODSTOVE FIELD PERFORMANCE IN KLAMATH FALLS, OREGON

EXECUTIVE SUMMARY

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The Wood Heating Alliance (WHA) sponsored a field study of woodstove emission performance in six homes in Klamath Falls, Oregon. The primary objective of the study was to determine the field performance of both "conventional" and "advanced technology" woodstoves. Early field studies indicated that "advanced technology" woodstoves were not performing to expectations. But some previous field studies are limited in application due to the use of outmoded appliance and installation technology, and testing conducted in colder than average climates. Data on particulate emissions of conventional stoves were also limited.

The woodstoves used in this study are considered representative of the advanced technology units available today, and all were certified to the Environmental Protection Agency's (EPA) most stringent Phase II (1990) emission standards. Today, "advanced technology" applies to the incorporation of design factors such as secondary air systems, balanced air intake and mixing systems, insulated baffles, and catalytic combustion systems. The term also refers to the treatment of the appliance as only one part of a four-part heating system that includes not only the stove, but a correctly sized and installed flue, fuel of correct length and moisture content, and knowledgeable operators.

In-situ emissions sampling was conducted by OMNI Environmental Services on three conventional and six advanced technology woodstoves (three catalytic and three non-catalytic). One week of sampling was conducted on the conventional stoves and two sampling periods of one week each were conducted on the advanced-technology stoves. Data collection included particulate emissions, burn rate, and fuel moisture and type. It was beyond the scope of this project to determine average flue and combustor temperatures, fuel loading frequency and density, or appliance durability.

Particulate emissions for the conventional stoves averaged 42.8 grams/hour (g/hr). Catalytic stoves averaged 6.4 g/hr, non-catalytics emitted an average of 5.0 g/hr. The average emissions for all the advanced technology stoves were 5.8 g/hr (difference is due to rounding). The EPA emission factors for conventional, catalytic, and non-catalytic stoves are 21.3, 6.2, and 9.4 g/hr, respectively. The advanced technology units in Klamath Falls exhibited the best overall performance of any field testing to date. The high emission rates measured in conventional units indicate that woodstove control strategies that remove incentives to upgrade existing conventional systems are potentially self-defeating.

WOODSTOVE FIELD PERFORMANCE IN KLAMATH FALLS, OREGON

TABLE OF CONTENTS

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WOODSTOVE FIELD PERFORMANCE
IN
KLAMATH FALLS, OREGON

INTRODUCTION

This document presents results from a field study of woodstove emission performance in six homes in Klamath Falls, Oregon. The study was sponsored by the Wood Heating Alliance (WHA), a not-for-profit national trade association representing the hearth-related products industry, including woodstoves, fireplaces, pellet stoves, hearth furnishings, and other related products. The WHA Stove Technical Committee identified the need for a field performance study using only woodstove models which were considered representative of the newest generation of products certified to meet the Environmental Protection Agency's (EPA) most stringent emission standards.

Appliances which burn solid fuel (woodstoves, pellet stoves, and some fireplaces) are regulated by the EPA and numerous state and local agencies. Appliances are tested at accredited laboratories and required to pass strict particulate emission standards. Recent field performance studies (1, 2) have indicated that some "advanced technology" appliances are not able to duplicate lab values in the field. Some of these field studies were limited to early appliances that are being phased out this year as "Phase II" of the EPA emission standards takes effect. The Klamath Falls performance study was limited to stoves that were representative of the most advanced appliances available.

Both "conventional" and "advanced technology" woodstoves were tested. In-situ testing and data reduction were conducted by OMNI Environmental Services of Beaverton, Oregon, using the OMNI Data LOG'r(TM) and Automated Woodstove Emission Sampling (AWES) systems. Elements Unlimited was retained by the WHA to prepare this report on the results of the field testing conducted during January and February, 1990.

Project Objectives

The primary objective of the Klamath Falls project was to determine the emission performance of catalytic and non-catalytic stoves that had been certified to the EPA "Phase II" (1990) emission standards. This project is the first field study that limited the definition of "advanced technology" woodstoves to include only EPA 1990-certified models. Previous in-home field studies were usually confined to non-certified, EPA 1988-certified, or early Oregon-certified models.

The second objective of this study was to determine the emission performance of conventional, "traditional technology" woodstoves. Most of the data concerning conventional woodstoves were from testing conducted in the Northeastern U.S. and the city of Whitehorse (Yukon Territory, Canada) from 1985 to 1988 (1). The WHA desired to collect additional data that would reflect conventional stove performance in a more representative (milder) climate, since burn rates are known to affect emissions levels. Klamath Falls was selected as the testing site not only because it had the desired climate, but because the city often experiences episodes of air quality degradation due to woodsmoke trapped in the airshed.

The discrepancies between laboratory and field performance have raised the issue of durability of stove components, especially catalytic combustors. A recently released study (2) identifies stove component and combustor durability as significant factors in field performance degradation over the sample period. It was beyond the scope of this project to determine stove or combustor durability of the tested models.

Differences between lab and field performance can also be attributed to variations in operating and fueling practices found in the field. Home installations show leaner operating conditions, more dilute flue gases, and higher drafts than are produced with standard test methods (2).

Emission Factors

The EPA established in-situ particulate emission factors for both conventional and advanced technology woodstoves based on results from early field studies (1). Regulatory agencies use the emission factors as part of the calculation to determine the current and projected contribution of woodstove emissions to airshed particulate loading.

The conventional stoves tested in Klamath Falls averaged 42.8 grams/hour (g/hr), almost twice the value determined by the EPA (21.3 g/hr). Although the amount of data from Klamath Falls is limited, it highlights the potential variability of emissions performance in the field.

The EPA emission factor for advanced technology catalytic woodstoves is 6.2 g/hr. The average emissions of the catalytic stoves used in the Klamath Falls was 6.4 g/hr. Non-catalytics in Klamath Falls averaged 5.0 g/hr, compared to the EPA emission factor of 9.2 g/hr. The overall average for all advanced technology stoves in Klamath Falls was 5.8 g/hr (rounded).

BACKGROUND

Regulatory Control of Woodstoves

Residential Wood Combustion (RWC) has been identified as a contributor to air quality degradation, especially in areas like Klamath Falls, where local geographic and atmospheric conditions can result in temperature inversion layers which trap pollutants near the ground. By 1983 the contribution of woodstove emissions to poor air quality prompted the Oregon Department of Environmental Quality (DEQ) to develop the first stove certification program in the nation (3). Klamath Falls is one of several local areas designated a non-attainment area for "PM-10" by the DEQ.

"PM-10" refers to particulate matter less than 10 microns in diameter (the period at the end of this sentence is about 1000 microns in diameter). Particles this small are easily respirable and present a health threat because they can lodge deep in the lungs. PM-10 particles can be produced by a variety of combustion sources, including woodstoves, slash and field burning, motor vehicles, and industrial processes, although the largest single source of PM-10 in Oregon is dust from roads, agriculture, and other industrial activities (4).

In February of 1988 the EPA promulgated federal "New Source Performance Standards" (NSPS) for Residential Wood Heaters (5). The NSPS is based on estimates of the current number of households using wood heat, the average emissions of the conventional woodstoves assumed to be in use in these homes, the turnover rate as these woodstoves are replaced by new generations of advanced technology stoves, and the desired reduction in emissions. The emission standards were implemented in two phases so that the industry would have time to conduct the research and development necessary for cleaner and more efficient burning technology.

The wood heating industry participated in the "Regulatory Negotiation" process to set Phase I and Phase II standards. Phase I standards were set at 5.5 grams/hour for catalytic stoves and 8.5 for non-catalytics. Phase II standards, effective in July, 1990, are 4.1 grams/hour for catalytics and 7.5 for non-catalytics. At this time, testing and sampling methods were limited to laboratory applications.

The Oregon DEQ continued to pursue its state certification program even after the promulgation of federal regulations. In 1988 the DEQ conducted a study entitled the "BEST" project (Best Existing Stove Technology) which endeavored to identify design and operation parameters critical to long-term durability and emissions performance in the field (6). They constructed several units incorporating the design factors and conducted stress and in-situ emission testing. The DEQ is now considering further standards for woodstove performance and durability. Other state and local air quality agencies are considering, or have already implemented, woodstove control strategies.

Field Performance

Between 1985 and 1989 the pressure of increasingly stringent regulations forced accelerated advances in wood burning design and operating technology. The rapid advance was at a severe economic cost to the industry, both in dollars and diversity. Eighty percent of the woodstove manufacturers active in 1985 have since withdrawn from the market.

Certification programs required test methods that would give reproducible results so that each woodstove model would be compared under the same conditions. But standard test methods developed during the early phases of the certification programs did not reflect fueling and operating practices in field installations. The wide variety of uncontrolled variables in the field has made it difficult to duplicate lab performance values.

There were very little reliable data available prior to 1985 concerning the emissions performance of woodstoves in the field, primarily because no reliable and practical sampling methods existed. In recent years accurate field sampling methods have been developed and field performance has been studied in several projects. Results from some of the earliest studies showed that advanced technology woodstoves were not achieving the performance levels obtained in the laboratory setting. This prompted some agencies to consider further use restrictions on woodstoves, even those that had been certified to the EPA Phase II standards.

But the early studies often used stove models that were not EPA-certified and/or were no longer in production. Some studies tested "advanced technology" stoves that were installed with incorrectly sized flues and/or unlined masonry chimneys. These types of installations are now considered obsolete by industry members.

"Conventional" vs. "Advanced Technology"

Numerous factors have been identified that can affect emissions performance, including design and durability of stove components; operating practices; fuel moisture and loading methods; and installation method (1, 2, 6, 7). The design technology now being utilized relies on all components of the heating system to function correctly. The wood heating industry has been working to standardize installation and operation practices through a variety of educational and professional certification programs.

Conventional woodstoves popular in the 1970's and early 1980's rarely consisted of much more than a combustion chamber with primary air intakes and a flue exhaust. Little thought was given to combustion or heat transfer efficiency, and units were often oversized for the area being heated. Early flue installation methods often included multiple bends and connections to oversized masonry chimneys.

An advanced technology woodstove can be differentiated from a conventional woodstove by its use of proven design factors and professional installation. Advanced design factors can include secondary air systems, balanced air intake and mixing systems, insulated baffles, and catalytic combustion systems. Advanced technology includes the treatment of the woodstove as just one part of a complete system that includes a properly sized stove and flue, a knowledgeable operator, and fuel of the correct size and moisture content.

Industry Viewpoint

The wood heating industry feels that some regulatory agencies are developing control strategies based on performance data that are not reflective of the advanced technology heating systems now being produced and installed. Inaccurate assumptions concerning emissions are often combined with incorrect estimates of current stove populations, replacement rates, and cordwood fuel usage. The result can be a woodstove control strategy that is unnecessarily strict. Some communities have banned the use of all wood-fired appliances during periods of poor air quality.

The conventional woodstoves in the Klamath Falls study emitted more than seven times the amount of particulate matter than the advanced technology systems. The industry is concerned that indiscriminate application of burning restrictions to both certified and non-certified units removes the homeowner's incentive to upgrade existing conventional woodstoves. Without upgrading, these units will continue to have a severe negative impact on local airshed particulate loading.

STUDY METHODS

Klamath Falls is located in southern Oregon at an altitude of 4800 feet above sea level. The local topography contributes to the formation of winter inversion layers, and trapped wood smoke has been identified as a significant contributor to local air quality problems. Because very few of the field studies conducted in the past used the latest available technology, the Klamath Falls study was designed to generate data about the field performance of both "conventional" and "advanced technology" woodstoves. The advanced technology stoves selected for Klamath Falls were all stoves that had been certified to the EPA's most stringent emission standards (Phase II, 1990).

It was determined that a minimum of three units per stove type (conventional, catalytic and non-catalytic) was required to generate sufficient data for analysis. Sampling was conducted over three one-week periods from January to early March, 1990. Sampling on the three conventional stoves was conducted during the week of January 9-17, 1990 (Week 1). Sampling on the advanced technology stoves was conducted during early and late February (Weeks 2 and 3, see Appendix A for exact sampling periods). The mean temperature during January and February was 29.8 and 36.9 degrees Fahrenheit, respectively (average for the Klamath Falls area).

Cordwood fuel was not generally provided to the study participants, each home used whatever fuel they had on hand for their existing woodstove. Home H-1 was provided with fuel (Juniper cordwood) from a local source during Week 3 to augment their existing supply. The predominate fuels used by the study participants were all softwoods, with juniper, fir, and pine the most common.

Home Selection

With the assistance of a local chimney sweep, six study homes were selected; five of the six were located along the same neighborhood block and had been constructed by the same builder. Houses H-1, H-2, and H-3 were selected for the conventional stove testing. Each had a conventional woodstove with a large firebox. All three of the conventional stoves had primary air supplies that were thermostatically controlled, although the thermostat on the stove in House H-1 was not functioning (See Appendix A).

Woodstove Installation

A local chimney sweep and other project representatives interviewed homeowners and inspected the existing installations for safety violations. Some minor upgrading was conducted to bring installations into compliance with local safety codes. All homes except for Home H-4 required hearth extensions. In addition, door gasketing was inspected (part of a normal maintenance program) and replaced when required. The chimneys of all the study homes were cleaned prior to the start of sampling.

All advanced technology stoves were installed in strict accordance with the manufacturer's installation instructions. Both catalytic stoves and one of the non-catalytics (H-2) had ash pans (See Appendix A for firebox sizes). Homes H-1 and H-6 contained the same catalytic model. Each installation of an advanced technology stove included a properly designed flue system. All flue connectors and chimneys were 6" diameter, matching the flue collar size of the study stoves. In all homes except for H-5, the existing 8" chimney system was re-lined with a 6" stainless steel liner.

The chimneys in Homes H-2 and H-4 were lengthened prior to the start of the advanced technology sampling period. (The sampling of the conventional stove in Home H-2 was conducted on the pre-existing flue system.) The chimney of Home H-3 was lengthened between Week 2 and Week 3 sampling. No other modifications were made during or between sampling periods, although the primary air control in Home H-5 was adjusted after it was found to be sticking.

Operator Training

Operation manuals were provided to every study participant, and in some cases operators also received individual review of stove operation from a manufacturer's representative (using the operation manual as a guide). Homes H-1, H-2, H-4, and H-6 all received personal instruction (prior to sampling) concerning the operation of their advanced technology stove. Home H-3 received only a follow-up call to answer any of their questions about the manual. Home H-5 received only the operation manual, with no additional follow-up. No "special" operating instructions were given; the instructions were limited to those that a competent stove dealer would provide to a new customer.

During sampling Week 2 it was observed that Home H-3 (catalytic) was loading the stove with very small loads and then burning at a high rate. This home was requested to use larger fuel loads burned at a lower air setting, which is more

representative of normal fueling patterns. Home H-2 (non-catalytic) was found to be loading fuel that was too long for the stove, necessitating fuel loads that often consisted of one large fuel piece loaded diagonally in the firebox. This home was requested to split/cut their fuel into the correct size for the stove, in accordance with the manufacturer's operating instructions.

Data Collection/Analysis

Emissions sampling was conducted by OMNI Environmental Services, Inc., using the AWES/Data LOG'r (TM) system developed from previous studies. At pre-determined intervals the AWES system measures and records exhaust gas concentrations and temperatures, and stove and combustor temperatures. Fuel loads are weighed as they are loaded into the stove.

A sample of the flue gases is extracted, and subsequent laboratory analysis calculates burn rates and particulate emissions. Sampling was conducted for one-week sampling periods. Thermocouples were mounted approximately one foot and four feet above the flue collar, and upstream and inside of the combustor (if present). AWES sample logs and fuel data sheets can be found in Appendix B.

OMNI provided emissions and burn rate summary data for each week, in addition to fuel type and mosture data for each study home. It was beyond the budget of this project to contract for information concerning flue and catalyst temperatures and fuel loading data, although this information might be acquired at a later date.

RESULTS

Conventional (traditional) Woodstoves

Week 2 of testing was conducted on three "conventional" stoves that were installed in existing systems in Homes H-1, H-2, and H-3. All the conventional stoves had thermostatically controlled air supplies and large fireboxes. Table 1 below shows the results for Week 1 of sampling (See Figure 1 on Page 12 for a graph of emissions vs. burn rate):

Table 1. Conventional Woodstoves, Sampling Week 1. Fuel Moisture, Particulate Emissions, and Burn Rate.

HOME #	FUEL H20 (% D.B.)	PARTICULATE EMISSIONS GRAMS/HR	GRAMS/KG	BURN RATE (DRY KGS/HR)
H-1	8.3	23.6	10.8	2.18
H-2	15.8	55.3	34.5	1.55
H-3	18.2	51.6	29.0	1.78
AVERAGE:	14.1	42.8	24.8	1.84
STD. DVN.:	5.2	16.7	12.4	0.3

The particulate emissions performance of the conventional stoves in Homes H-2 and H-3 (average 52.5 g/hr) was more than double the emissions of conventional stoves cited in previous studies (21.3 g/hr, Ref. 1). The average burn rate for these two homes was 1.67 kg/hr, compared to 2.18 kg/hr in Home H-1, which showed emissions of 23.6 g/hr.

Home H-1 had an inoperative thermostat, which resulted in a constant "high" air setting. The relatively low emissions of H-1 compared to H-2 and H-3 is probably the effect of burn rate on particulate emissions, combined with the low moisture content (8.3% dry basis) of the fuel. As burn rate is increased emissions decrease, due to the improved combustion effciency obtained with higher firebox temperatures and better air/fuel mixing. Table 2 on Page 10 shows the fuel types used by each home during Week 1 testing on the conventional stoves.

Table 2. Conventional Woodstoves, Week 1. Fuel Type and Percent Use.

HOME	FUEL TYPE	PERCENT USE
H-1	Yellow Pine	90
	Lodgepole Pine	10
H-2	Yellow Pine	50
	Cedar	50
H-3	White Fir	100

Advanced Technology (1990-certified) Woodstoves

Table 3 below shows the average emissions and burn rate results for each home in the study over both weeks of sampling, and the average by stove type. The average emissions rate of the catalytic stoves was 6.4 g/hr at a burn rate of 1.13 kg/hr. Non-catalytics averaged 5.0 g/hr at 1.04 kg/hr. The overall average emissions rate for all advanced technology stoves was 5.8 g/hr (difference due to rounding). Tables 4 and 5 (Page 11) show the results for each study home by sample week. Figure 1 (Page 12) plots all data points by emissions and burn rate. Figure 2 (Page 13) shows results by stove type (catalytic and non-cat).

Table 3. Advanced Technology Woodstoves, Average Particulate Emissions and Burn Rate for Both Sample Weeks, and Overall Averages by Stove Type.

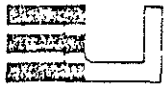
	HOME #	STOVE TYPE	PARTICULATE EMISSIONS GRAMS/HR	GRAMS/KG	BURN RATE DRY KGS/HR
	H-1	CAT	6.7	6.3	1.15
	H-2	NON	5.8	6.4	0.89
	H-3	CAT	5.3	5.4	0.99
	H-4	NON	3.3	2.4	1.35
	H-5	NON	6.1	7.0	0.88
	H-6	CAT	7.4	6.0	1.24
AVERAGES:	CONVENTIONAL:		42.8	24.8	1.84
	ALL ADV. TECH:		5.8	5.6	1.08
	CATALYTIC:		6.4	5.9	1.13
	NON-CATALYTIC:		5.0	5.3	1.04

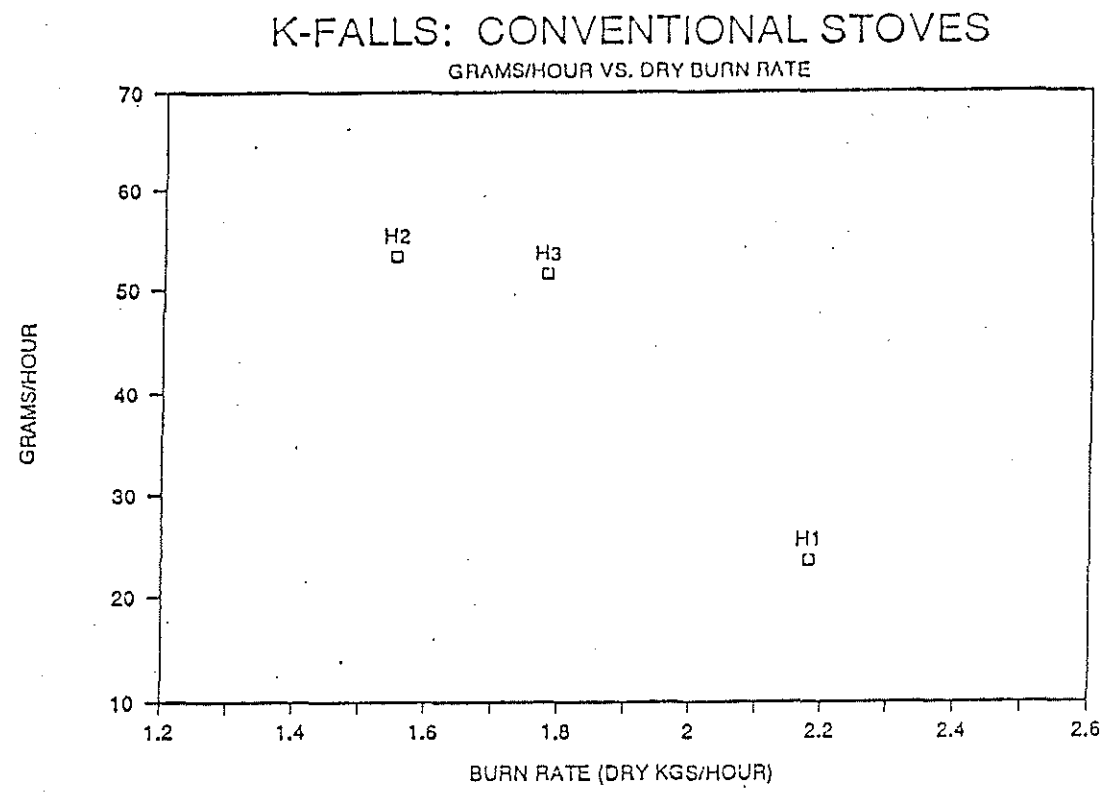
Table 4. Advanced Technology Woodstoves, Sample Week 2.
Fuel Moisture, Emissions, and Burn Rate.

HOME #	STOVE TYPE	FUEL H20 (% D.B.)	PARTICULATE EMISSIONS GRAMS/HR	GRAMS/KG	BURN RATE (DRY KGS/HR)
H-1	CAT	10.0	4.9	3.6	1.36
H-2	NON	19.1	6.6	6.8	0.96
H-3	CAT	19.7	5.0	4.9	1.02
H-4	NON	13.4	3.4	2.2	1.50
H-5	NON	17.6	6.2	6.5	0.97
H-6	CAT	21.2	6.6	4.9	1.34
WEEK 2 AVERAGES:					
ALL ADV. STOVES:			5.5	4.8	1.19
CATALYTIC:			5.5	4.5	1.24
NON-CATALYTIC:			5.4	5.2	1.14
SAMPLE STD.DVN.:			1.3	1.7	0.2

Table 5. Advanced Technology Woodstoves, Sample Week 3.
Fuel Moisture, Emissions, and Burn Rate.

HOME #	STOVE TYPE	FUEL H20 (% D.B.)	PARTICULATE EMISSIONS GRAMS/HR	GRAMS/KG	BURN RATE (DRY KGS/HR)
H-1	CAT	21.4	8.4	8.9	0.94
H-2	NON	18.4	4.9	6.0	0.81
H-3	CAT	19.6	5.5	5.8	0.95
H-4	NON	12.9	3.1	2.6	1.20
H-5	NON	15.0	5.9	7.5	0.78
H-6	CAT	22.7	8.1	7.1	1.14
WEEK 3 AVERAGES:					
ALL ADV. STOVES:			6.0	6.3	0.97
CATALYTIC:			7.3	7.3	1.01
NON-CATALYTIC:			4.6	5.4	0.93
SAMPLE STD.DVN.:			2.0	2.1	0.2





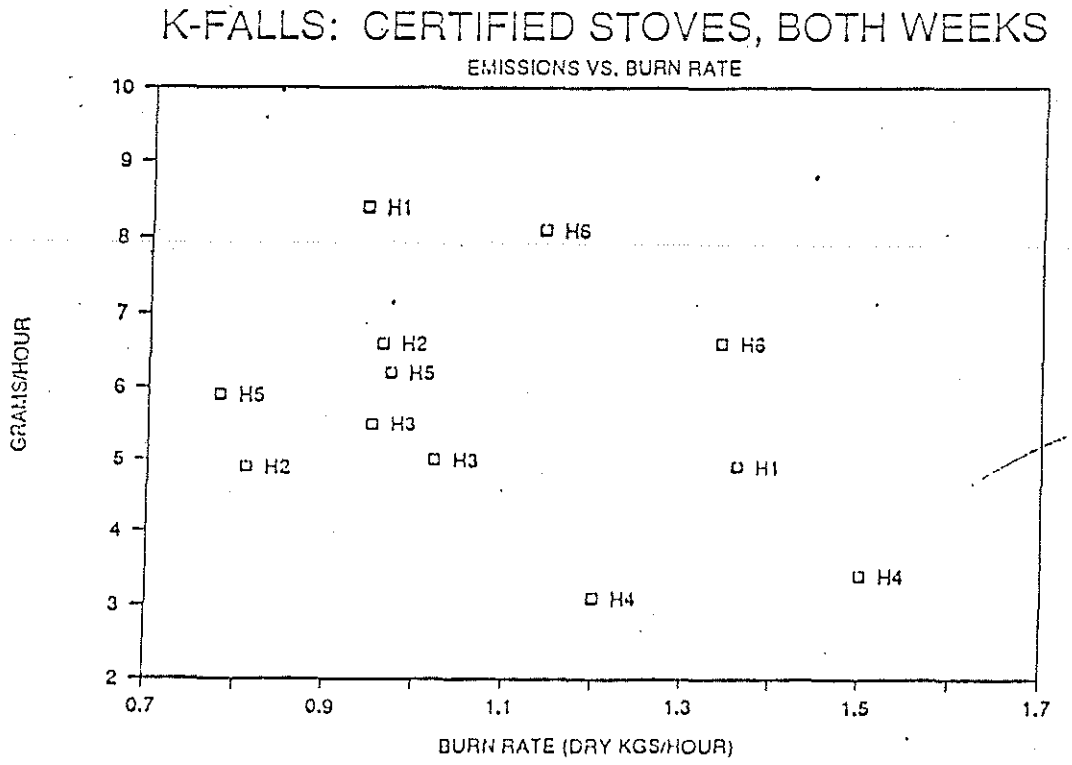


Figure 1. Emissions vs. Burn Rate for all Sample Points. Advanced Technology and Conventional Woodstoves.

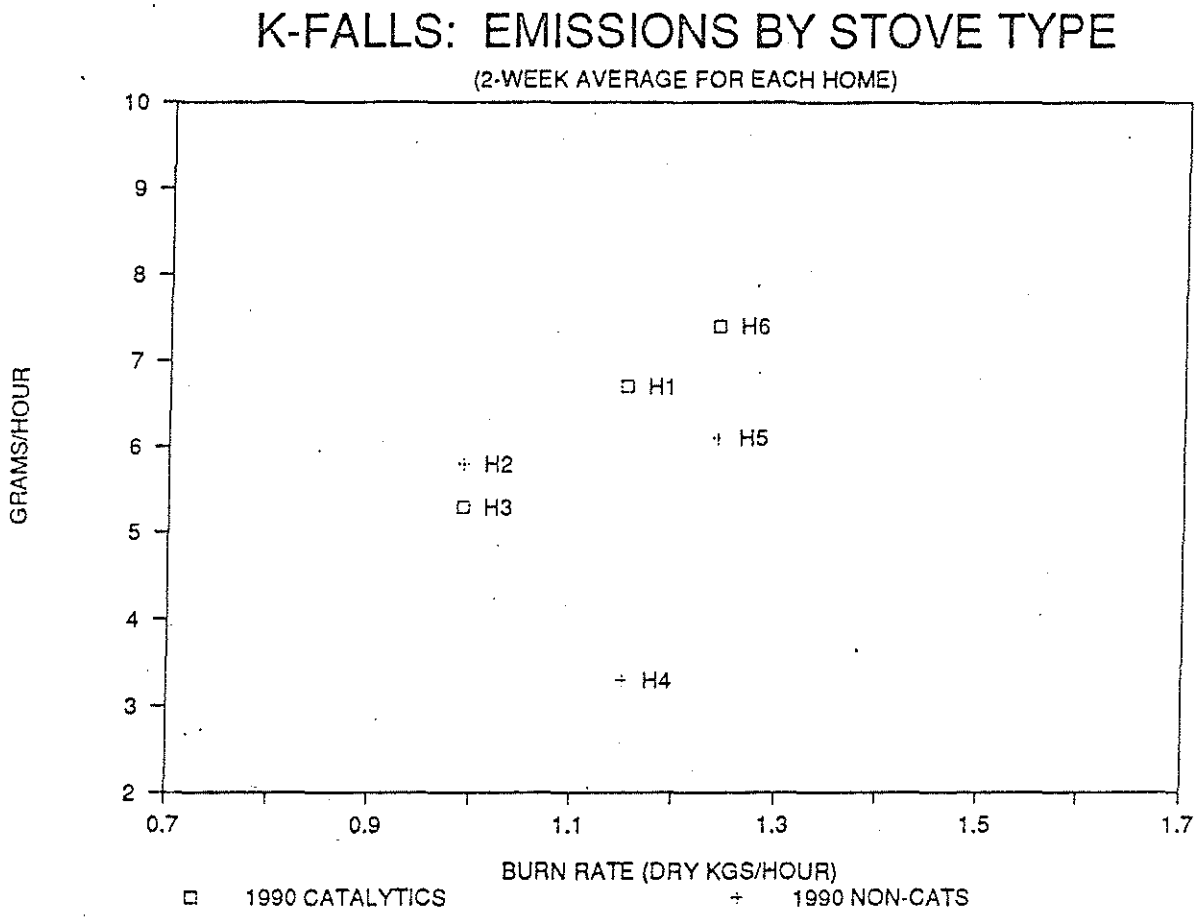


Figure 2. Emissions vs. Burn Rate by Stove Type for Both Sample Weeks.

The type of fuel used by each home during each week of sampling is presented in Table 6 below. With one exception the study homes used some type of softwood, the most common fuel in the area. Homes H-2 and H-5 used juniper exclusively, Home H-3 used only white fir, and H-6 used mostly red fir. Homes H-1 and H-4 used a mix of other softwoods, including lodgepole pine. Home H-4 used small amounts of oak, the only home in the study to use any hardwood fuel at all.

Table 6. Advanced Technology Woodstoves, Weeks 1 and 2. Fuel Type and Percent Use.

	<--------WEEK 1------->		<-------WEEK 2-------->	
HOME	FUEL TYPE	PERCENT USE	FUEL TYPE	PERCENT USE
H-1	Yellow Pine	100	Juniper	60
			Red fir	40
H-2	Juniper	100	Juniper	100
H-3	White fir	100	White fir	100
H-4	Lodgepole Pine	50	Juniper	70
	Juniper	25	Oak	30
	Oak	25		
H-5	Juniper	100	Juniper	100
H-6	Red fir	100	Red fir	50
			Lodgepole Pine	50

Differences Between Sampling Periods

"Sample Week 2" (the first week of testing on advanced technology stoves) was conducted during the first week of February (except Home H-6, which was sampled during the week of February 6). Sample Week 3 was conducted approximately two weeks later for all homes except H-2 and H-6, where the interval between sample weeks was three weeks. Table 7 on Page 15 compares the fuel moisture and burn rates for each sample week.

None of the study homes showed statistically significant changes in burn rates between the two sampling periods (See Appendix C for Test Statistics), although all study homes showed a slightly lower burn rate during Week 3. The only marked change in operating conditions between sample weeks occurred in Home H-1 (catalytic), where the fuel moisture more than doubled between Week 2 and 3 when the homeowner changed fuel sources.

The increased fuel moisture, combined with a lower burn rate, appears to have had a detrimental effect on the performance of the H-1 catalytic stove during Week 3. The non-catalytic homes showed no statistically significant change in emissions rates between sample weeks (Table 8 on Page 16, and Table C-1, Appendix C). The only statistically significant difference in emissions occurred in the grams/kg emissions of catalytic models (Table C-1, Appendix C).

Homes H-1 and H-6, which contained the same catalytic model, both showed increased emissions during Week 3. But the largest emissions increase occurred in Home H-1 (4.9 g/hr [3.6 g/kg] in Week 2 to 8.4 g/hr [8.9 g/kg] in Week 3), which used notably wetter fuel and burned at a lower burn rate during Week 3.

Both of these conditions (wet fuel and low burn rates) are known to detrimentally affect performance. It is likely that temperatures dropped below the threshold required to keep the combustor catalytically active, but temperature and fuel loading data are not available for review at this time.

The difference in burn rate betwen sample weeks for Home H-6 (0.2 kg/hr less during Week 3) did not appear to be a factor in the emissions rate increase observed in this home. The emissions increase was not as marked as Home H-1, climbing from 6.6 to 8.1 g/hr. The third unit (Home H-3) exhibited the best performance of the catalytic models, with emissions of 5.0 g/hr in Week 2 and 5.5 g/hr during Week 3.

Table 7. Advanced Technology Woodstoves, Differences Between Sampling Periods in Fuel Moisture and Burn Rate.

	FUEL MOISTURE (% DRY BASIS)			BURN RATE (DRY KGS/HR)		
HOME #	WEEK 2	WEEK 3	CHANGE	WEEK 2	WEEK 3	CHANGE
NON-CATALYTIC:						
H-2	19.1	18.4	- 0.7	0.96	0.81	-0.15
H-4	13.4	12.9	- 0.5	1.50	1.20	-0.30
H-5	17.6	15.0	- 2.6	0.97	0.78	-0.19
CATALYTIC:						
H-1	10.0	21.4	+11.4	1.36	0.94	-0.42
H-3	19.7	19.6	- 0.1	1.02	0.95	-0.07
H-6	21.2	22.7	+ 1.5	1.34	1.14	-0.20

Table 8. Advanced Technology Woodstoves, Differences Between Sampling Periods in Particulate Emissions.

	PARTICULATE EMISSIONS (GRAMS/HOUR)			PARTICULATE EMISSIONS (GRAMS/KG)		
HOME #	WEEK 2	WEEK 3	CHANGE	WEEK 2	WEEK 3	CHANGE
NON-CATALYTIC:						
H-2	6.6	4.9	-1.7	6.8	6.0	-0.8
H-4	3.4	3.1	-0.3	2.2	2.6	+0.4
H-5	6.2	5.9	-0.3	6.5	7.5	+1.0
CATALYTIC:						
H-1	4.9	8.4	+3.5	3.6	8.9	+5.3
H-3	5.0	5.5	+0.5	4.9	5.8	+0.9
H-6	6.6	8.1	+1.5	4.9	7.1	+2.2

DISCUSSION

Table 9 below shows the results of the Klamath Falls testing (grams/hour) as compared to some of the field studies conducted in the past. Catalytic values are equivalent to the emission factors used by EPA, and better than those obtained in the most recent "CONEG" study. Overall, the emissions performance of the advanced technology woodstoves in Klamath Falls was the best yet exhibited in a field study.

Table 9. Comparison of Klamath Falls Results with Previous Woodstove Field Performance Studies.

	CONVENTIONAL	CATALYTIC	NON-CATALYTIC
STUDY (REF. #)	<----------GRAMS/HOUR---------->		
KLAMATH FALLS	42.8	6.4	5.0
EPA (1)	21.3	6.2	9.2
NCWS/CONEG (2)		8.7	10.3
OREGON "BEST" (6)		4.5	14.5

Although the Klamath Falls data are limited, Elements Unlimited feels that the low level of emissions of the advanced technology woodstove models in this study can be attributed to two primary factors:

1) The units used in this study were of the latest design and representative of the advanced technology woodstoves available today.

2) The stoves were treated as one part of a complete system, which included correct flue sizing and operator training. (The installations in this study followed recommendations contained in manufacturer's operation manuals. and it is accepted industry practice to provide customers with the information required to help them learn about the latest advances in wood-burning technology.)

Past studies often ignored the potential effects of short flues with multiple bends, wet fuel, or operators that were not sensitive to the operating differences between their old stove and an advanced technology stove. But even when there are attempts to control these variables, field performance rarely matches what is seen in the lab. The most recent "CONEG" study controlled installations and provided operator training, but four out of the five stoves still exceeded their "certification" emissions values (2). The remaining stove closely matched its lab values, and showed the best field performance of all five units, but was still unable to pass an actual certification test because it exceeded the emissions "cap" limit at high burn rates.

Performance discrepancies between lab and field have been attributed to differences in fuel piece size and loading geometry (1, 2). Standard test methods use smaller fuel pieces than are normally found in the field. Small pieces expose large surface areas to flames, resulting in rapid volatilization of gases. Stove manufacturers trying to pass the standard test methods are forced to "tune" the combustion air to supply enough oxygen for the fuel-rich conditions of the certification tests.

Homeowners tend to load their stoves with larger (and fewer) pieces of wood than used in the standard tests--the volatilization rate is much slower, and the result is high levels of excess air that can negatively impact performance. Home installations usually show leaner operating conditions, more dilute flue gases, and higher drafts than in the lab.

Figure 3 on the following page illustrates the dramatic reduction in particulate emissions that advanced technology woodstoves are capable of achieving. Airsheds impacted by wood smoke could reduce particulate loading by encouraging replacement of conventional woodstoves with more advanced designs, and by educating the public about the latest clean-burning technology.

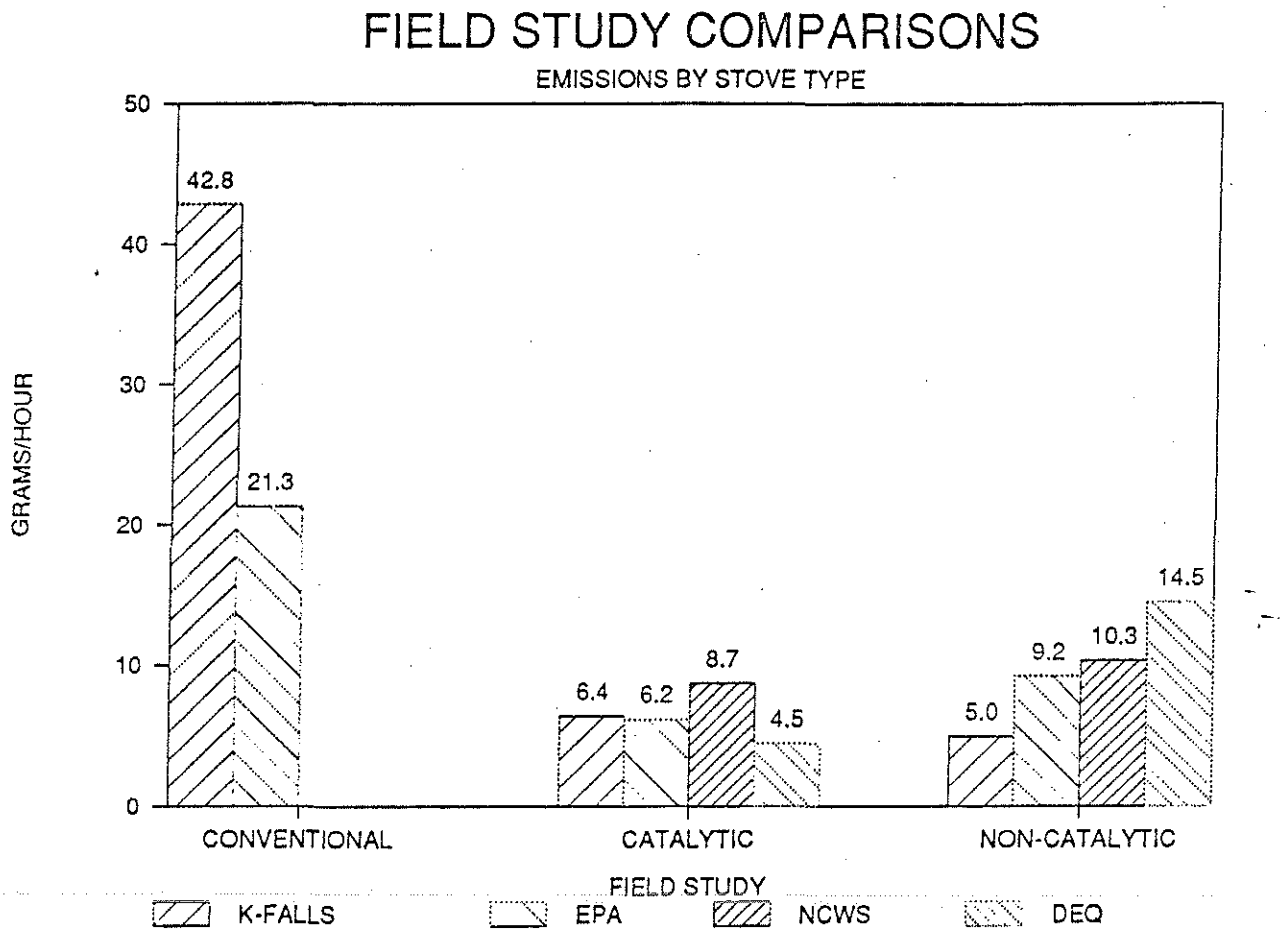


Figure 3. Emissions vs. Burn Rate, Advanced Technology and Conventional Woodstoves, Klamath Falls and Other Field Studies (See Table 9).

REFERENCES

1 U.S. Environmental Protection Agency, "In-Situ Emission Factors for Residential Wood Combustion Units." Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, December, 1988 (EPA-450/3-88-013).

2 Barnett, Stockton, "Field Performance of Advanced Technology Woodstoves in Glens Falls, N.Y., 1988-1989, Volume I." Prepared for New York State Energy Research and Development Aurthority, U.S. EPA, and CONEG Policy Research Center, December, 1989.

3 Oregon Department of Environmental Quality, Oregon Revised Statute 468.630 thru .655, OAE 340-21-100 thru -190, Salem, Oregon, 1983.

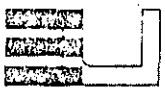
4 Oregon Department of Environmental Quality, "1986 Oregon Air Quality Annual Report," Air Quality Control Division, Portland, Oregon, 1987.

5 U.S. Environmental Protection Agency, "Standard of Performance for New Stationary Sources; New Residential Wood Heaters." Federal Register, Volume 53, Number 38, Section 40 CFR, Part 60, February 26, 1988.

6 Simons, Carl A. and S.K. Jones, "Performance Evaluation of the Best Existing Stove Technology (BEST) Hybrid Woodstove and Catalytic Retrofit Device." Prepared for Oregon Department of Environmental Quality, Project #PS-320, July, 1989.

7 Burnet, Paul B., and C.A. Simons, "Identification of Factors Which Affect Combustion Efficiency and Environmental Impacts from Woodstoves." Task D, U.S. Department of Energy Biomass Energy Program, Contract No. DE-AC79-85BP18508, July, 1988.

8 Statistical Analysis Provided by Gary Hazard, Chairman, Stove Technical Committee, Wood Heating Alliance, April, 1990 (See Appendix C).



KLAMATH FALLS FIELD STUDY

APPENDIX A

TEST HOME DESCRIPTIONS

TEST HOME DESCRIPTION

HOME # H-1

ORIGINAL "CONVENTIONAL" STOVE: Earth Stove 101. Approximately 10 years old, thermostatically controlled. (Stove had minor crack inside, thermostat was inoperative.)

1990 STOVE TYPE: Catalytic
FIREBOX SIZE: 2.9 cubic feet

TEST WEEK 1: January 9 - 17
TEST WEEK 2: February 1 - 7
TEST WEEK 3: February 22 - 28

FUEL USED: Yellow Pine
Juniper
Red fir

OPERATOR INSTRUCTIONS: Received operating instructions on-site from a manufacturer's representative.

OTHER NOTES: This home was provided with Juniper fuel (common fuel in the area) during Week 3 when it appeared their supply would run out.

Chimney re-lined with 6" stainless steel liner prior to start of Week 2 sampling.

TEST HOME DESCRIPTION

HOME # H-2

ORIGINAL "CONVENTIONAL" STOVE: Earth Stove 101. Approximately 10 years old, thermostatically controlled. (Test Week 1: January 10-16)

1990 STOVE TYPE: Non-catalytic
FIREBOX SIZE: 1.8 cubic feet

TEST WEEK 1: January 10 - 16
TEST WEEK 2: January 31 - February 6
TEST WEEK 3: February 26 - March 4

FUEL USED: Juniper

OPERATOR INSTRUCTIONS: Instruction was provided before the stove was actually installed. A representative of one of the other manufacturers in the study used the woodstove model in Home H-4 to provide general operating instructions to Home H-2.

OTHER NOTES: Operator is a renter who just recently moved in. House has had a chimney fire in the past. The chimney was lengthened prior to the start of advanced technology sampling (Weeks 2 and 3).

During Week 2 of sampling this home was requested to cut their fuel smaller in accordance with the operating instructions.

Chimney re-lined with 6" stainless steel liner prior to start of Week 2 sampling.

TEST HOME DESCRIPTION

HOME # H-3

ORIGINAL "CONVENTIONAL" STOVE: Centennial.
10 years old, thermostatically controlled.

1990 STOVE TYPE: Catalytic
FIREBOX SIZE: 2.0 cubic feet

TEST WEEK 1: January 10 - 16
TEST WEEK 2: January 31 - February 6
TEST WEEK 3: February 23 - March 1

FUEL USED: White Fir

OPERATOR INSTRUCTIONS: A retailer from Portland gave operating instructions verbally by telephone.

OTHER NOTES: Homeowners were found to be using very small fuel loads and then burning at a high rate. This home was requested to load larger fuel pieces and burn at a lower air setting, in accordance with the instructions in the operating manual.

The flue was lengthened between Weeks 2 & 3.

Chimney re-lined with 6" stainless steel liner prior to start of Week 2 sampling.

TEST HOME DESCRIPTION

HOME # H-4

1990 STOVE TYPE: Non-catalytic
FIREBOX SIZE: 2.0 cubic feet

TEST WEEK 1: (Not Applicable)
TEST WEEK 2: January 31 - February 6
TEST WEEK 3: February 22 - 28

FUEL USED: Juniper
Lodgepole Pine
Oak

OPERATOR INSTRUCTIONS: Received firing demonstration and instructions from a manufacturer's representative.

OTHER NOTES: The chimney was lengthened prior to the start of advanced technology sampling (Weeks 2 and 3).

Chimney re-lined with 6" stainless steel liner prior to start of Week 2 sampling.

TEST HOME DESCRIPTION

HOME # H-5

1990 STOVE TYPE: Non-catalytic

FIREBOX SIZE: ___ cubic feet

TEST WEEK 1: (Not Applicable)
TEST WEEK 2: January 31 - February 6
TEST WEEK 3: February 23 - March 1

FUEL USED: Juniper

OPERATOR INSTRUCTIONS: No instructions (other than the operator's manual) were provided to this home.

OTHER NOTES: The flue connector included a 45 degree offset. On February 20 the air inlet control was adjusted with a screw driver for easier operation.

TEST HOME DESCRIPTION

HOME # H-6

1990 STOVE TYPE: Catalytic
FIREBOX SIZE: 2.9 cubic feet

TEST WEEK 1: (Not Applicable)
TEST WEEK 2: February 6 - 12
TEST WEEK 3: March 3 - 8

FUEL USED: Red Fir
Lodgepole Pine

OPERATOR INSTRUCTIONS: Received operating instructions from a manufacturer's representative.

OTHER NOTES: Chimney re-lined with 6" stainless steel liner prior to start of Week 2 sampling.

KLAMATH FALLS FIELD STUDY

APPENDIX B

AWES SAMPLE LOG
AND
FUEL DATA SHEETS

KLAMATH FALLS FIELD STUDY

HOME H — 1

AWES Log Book

Home Code: K01 Sampling Rotation: 1☑ 2☐ 3☐ 4☐ 5☐ B☐

Sample I.D.: K01-1

AWES Box # 26 Filter # K002 XAD# 195

Teflon Line # K01 (P.S.) Probe # 20

Installation

Date AWES Installed 1/8/90

by: P.J.

1. Programmed Start time

Date: 1/9/90 Time: 0:00

2. Leak Check (inlet plugged, outlet open)

max. vacuum, ~~right~~ TDF gauge 21.75 "Hg
max. vacuum, ~~left~~ bottom gauge 21.5 "Hg P.S.

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.75 "Hg
max. vacuum, left gauge 21.5 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.0 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.05 "Hg

4. Heater works: Yes ☑ (if no, use substitute AWES

5. O_2 cell calibrated ☑ Yes

Removal

Date AWES Removed 1/19/90

by: JF, P.S.

1. Programmed Stop time

Date: 1/19/90 Time: _____

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.25 "Hg
max. vacuum, left gauge 20.75 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 2075 "Hg
max. vacuum, left gauge 20.50 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.0 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.05 "Hg

4. Heater works: Yes ☑ No ☐

5. O_2 cell on ambient air 21.5 %

Ambient temp. 71 °F

AWES temp. strip 82 °F

AWES.C

Wood Characteristics—Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK01 Resident Name: Charles Land Technician P.J.

Sampling Rotation: 1 ☑ 2 ☐ 3 ☐ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Corrected
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	Yellow pine	Cedar	Juniper	Moisture (%DB
		9.0, 8.5, 6.5	70							90% PJ			
		6.5, 6.0, 10.0	70							✓			
		9.5, 9.5, 9.0	70							✓			
		8.0, 8.5, 9.0	70							✓			
		7.5, 8.0, 9.5	70							✓			
		6.0, 5.5, 8.0	70								10%		
		9.0, 8.5, 10.5	70									5	
		8.75, 9.0, 8.0	65							✓90%			
		8.25, 8.0, 9.0											
		9.75, 10.5, 9.25											
		9.75, 8.25, 8.0											
		7.75, 8.75, 9.0											
											Ledge 10%		
		16.0, 17.25, 17.5									✓		
		19.0, 19.5, 19.0											
		17.5, 16.5, 16.0											
		14.0, 17.5, 19.0											
		18.5, 20.5, 19.0											

Make notation if wood block(s) obtained.

AWES

AWES Log Book

Home Code: WK01 Sampling Rotation: 1☐ 2☑ 3☐ 4☐ 5☐ B☐

Sample I.D.: _____

AWES Box # 11 Filter # K030 XAD# 190

Teflon Line # 20 Probe # 2

Installation

Date AWES Installed 2/1/90 (1/31/90)

by: RR, JF, C

1. Programmed Start time

Date: 2/1 Time: 0

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 20.0 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 20.0 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.05 "Hg

4. Heater works: Yes ☑ (if no, use substitute AWES

5. O_2 cell calibrated ☑ Yes

Removal

Date AWES Removed 2/12/90

by: JF, RJ

1. Programmed Stop time

Date: 2/7 Time: 23:59

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 20.6 "Hg 20.8
max. vacuum, left gauge 20.0 "Hg 20.7

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 19.6 "Hg 20.8
max. vacuum, left gauge 18.6 "Hg 20.6

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 18.8 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.05 "Hg

4. Heater works: Yes ☑ No ☐

5. O_2 cell on ambient air _____ %

Ambient temp. _____ °F

AWES temp. strip _____ °F

AWES.C

from previous visit to home

Sample Data

Lab Cleanup Date _____ Technician _____

Probe Rinse—Sample No. _____

Filter # _____

XAD # _____

Samples delivered to OMNI? ☐ Yes

Delivered by: _____

Comments

NOTE: THIS UNIT STARTED UP IMMEDIATELY AFTER BEING RE-PROGRAMMED.

2/1/90 18:20 STRONG FLAME - SETTING - MED-LOW (SEE DRAWING)

CAT TEMP = 1650°+.
CAT GLOWING BRIGHTLY. O_2 = 5.5%

2/12/90

Homeowners told us that Bypass on stove was not all the way pushed in on 1 or 2 nights

AWES.D

Wood Characteristics—Log Sheet
Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK0102 Resident Name: LOUD Technician DT

Sampling Rotation: 1 ☐ 2 ☑ 3 ☐ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Corrected
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	Yellow Pine			Moisture (%DB)
	2/12/90	9.75, 9.5, 10.0	70°							100%			
		10.5, 10.5, 10.5											
		10.75, 9.75, 10.25											
		9.0, 9.0, 8.25											
		10.0, 10.5, 11.5											
		12.0, 10.5, 11.25											
		9.5, 9.75, 10.75											
		9.25, 9.75, 10.0											
		10.0, 9.5, 9.25											
		10.0, 10.5, 9.5											

Make notation if wood block(s) obtained.

AWES.BI

AWES Log Book

Home Code: WK01 Sampling Rotation: 1☐ 2☐ 3☒ 4☐ 5☐ B☐

Sample I.D.: WK0103

AWES Box # -11	Filter # KD70	XAD# 5
Teflon Line # 20 [on/off nut]	Probe # 25	

Installation	Removal
Date AWES Installed 2-21-90	Date AWES Removed 3/2/90
by: JWF	by: BS
1. Programmed Start time	1. Programmed Stop time
Date: 2-22 Time: 0	Date: 2/28 Time: 23:59
2. Leak Check (inlet plugged, outlet open)	2. Leak Check (inlet plugged, outlet open)
max. vacuum, right gauge 21.0 "Hg	max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 21.0 "Hg	max. vacuum, left gauge 20.7 "Hg
Close toggle, turn off pump, wait 30 seconds	Close toggle, turn off pump, wait 30 seconds
max. vacuum, right gauge 21.0 "Hg	max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 21.0 "Hg	max. vacuum, left gauge 20.7 "Hg
3. Free-flow check (inlet open, outlet open)	3. Free-flow check (inlet open, outlet open)
vacuum, right gauge 18.9 "Hg	vacuum, right gauge 18.8 "Hg
vacuum, left gauge 0 "Hg	vacuum, left gauge 0.0 "Hg
rotometer 1.05 "Hg	rotometer 1.05 "Hg
4. Heater works: Yes ☒ (if no, use substitute AWES	4. Heater works: Yes ☑ No ☐
5. O_2 cell calibrated ☑ Yes	5. O_2 cell on ambient air 20.9%
	Ambient temp. ______ °F
	AWES temp. strip ______ °F

Wood Characteristics—Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WKØ1   Resident Name: LOUD   Technician JWF

Sampling Rotation: 1 ☐ 2 ☐ 3 ☒ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Corrected
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	100% LODGE-POLE	Juniper		Moisture (%DB)
2/21/90		30	70										
		32, 22, 23											
		22, 30, 23											
		23, 23, 32											
		23, 29, 29											
		23, 30, 31											
		20, 31, 21											
		31, 36, 24											
		34, 24, 31											
		28.0, 32.0, 27.0									60% ↓		
		19.5, 20.0, 20.0											
		20.0, 20.5, 23											
		19.5, 19, 22											
		20.5, 20, 20.5											
		20, 20.5, 20.5											
		16, 14.5, 14.5				✓40 ↓						
		16, 17.5,											
		14.5, 13.5, 14											
		13.5, 12											
		16.5, 16.5, 19											

Make notation if wood block(s) obtained. —

AWES.BI

2/22 — THE LOUD'S STARTED USING THE SAME RED-FIR AS IN THE LAST SAMPLE-WEEK — WHA IS PROVIDING THE FAMILY WITH WOOD OTHER THAN THE PINE THAT WAS MEASURED — ASK THE LOUD'S WHAT ~~[crossed out]~~ [crossed out] WOOD WAS USED ON WHICH DAY OF THE STUDY. JWF.

Red fir during day (earlier)
[illegible] Juniper from WHA   2/23/90 mostly oak night

AWES Log Book

Home Code: K02 Sampling Rotation: 1☑ 2☐ 3☐ 4☐ 5☐ B☐

Sample I.D.: K02-1

AWES Box # 8641-29 Filter # K005 XAD# 33

Teflon Line # 23 Probe # 5

Installation

Date AWES Installed 1/10/90

by: P.J.

1. Programmed Start time

Date: 1/10/90 Time: 0:00

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.75 "Hg (Top R.T.)
max. vacuum, left gauge 21.50 "Hg (bottom P.J.)

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.75 "Hg
max. vacuum, left gauge 21.50 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.5 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.15 "Hg

4. Heater works: Yes ☑ (if no, use substitute AWES)

5. O_2 cell calibrated ☑ Yes

Removal

Date AWES Removed 1/19/90

by: P.J.

1. Programmed Stop time

Date: 1/16 Time: 23:59

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.5 "Hg
max. vacuum, left gauge 21.0 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 21.0 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.25 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.10 "Hg

4. Heater works: Yes ☑ No ☐

5. O_2 cell on ambient air 21.7 %

Ambient temp. 78 °F

AWES temp. strip 82 °F

AWES.C

KLAMATH FALLS FIELD STUDY

HOME H — 2

AWES Log Book

Home Code: WK02 Sampling Rotation: 1☐ 2☒ 3☐ 4☐ 5☐ B☐

Sample I.D.: _____

AWES Box # 26 Filter # K025 XAD# 220

Teflon Line # 6 Probe # 10

Installation

Date AWES Installed 1/29/90

by: JIM V

1. Programmed Start time

Date: 1/31/90 Time: 8

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21 "Hg
max. vacuum, left gauge 20.5 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 20.5 "Hg
max. vacuum, left gauge 20 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 20 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.65 "Hg

4. Heater works: Yes ☒ (if no, use substitute AWES

5. O_2 cell calibrated ☒ Yes

Removal

Date AWES Removed 2/11/90

by: PJ

1. Programmed Stop time

Date: _____ Time: _____

2. Leak Check (inlet plugged, outlet open)

P.J. 21.0
max. vacuum, right gauge 20.5 "Hg
max. vacuum, left gauge 20.75 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 20.75 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.0 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.10 "Hg

4. Heater works: Yes ☒ No ☐

5. O_2 cell on ambient air 20.7 %

Ambient temp. _____ °F

AWES temp. strip _____ °F

AWES.C

Wood Characteristics—Log Sheet
Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: W K02 Resident Name: Sherri Terrell Technician P.T.

Sampling Rotation: 1 ☑ 2 ☐ 3 ☐ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Corrected
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	Yellow Pine	Cedar		Moisture (%I
		18.0, 16.0, 17.0	73							80			
		14.25, 16.75, 16.5								✓			
		15.0, 14.5, 15.25								✓			
		15.5, 13.0, 14.0								✓			
		17.5, 16.0, 17.25								✓			
		10.0, 12.0, 10.75									20		
		13.25, 11.75, 13.0									✓		
		9.5, 10.0, 10.25									✓		
		10.25, 11.0, 11.5									✓		
		9.0, 8.5, 10.5	↓								✓		
		15.0, 12.75, 13.5	100							50%	50%		
		23.0, 22.0, 24.0									✓		
		14.5, 14.25, 15.0											
		17.25, 24.0, 16.5											
		18.75, 15.25, 13.5											
		17.25, 17.0, 21.75								✓			
		16.25, 16.75, 16.5											
		13.5, 13.75, 13.5											
		14.0, 16.5, 13.5											
		15.0, 15.75, 16.5	↓										

cedar

Pine

Make notation if wood block(s) obtained.

AWES.

AWES Log Book

Home Code: WK03 Sampling Rotation: 1☐ 2☐ 3☒ 4☐ 5☐ B☐

Sample I.D.: WK0203

AWES Box # 26 Filter # K072 XAD # 155

Teflon Line # 8 Probe # 5

Installation

Date AWES Installed 2-21-90

by: JWF

1. Programmed Start time

Date: ~~0:00~~ 2/26 Time: 0:00

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.4 "Hg
max. vacuum, left gauge 20.8 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.3 "Hg
max. vacuum, left gauge 20.7 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.0 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.1 "Hg

4. Heater works: Yes ☐ (if no, use substitute AWES)

5. O_2 cell calibrated ☑ Yes

Removal

Date AWES Removed 3/7/90

by: MB

1. Programmed Stop time

Date: 3/4 Time: 23:59

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.2 "Hg
max. vacuum, left gauge 20.8 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.2 "Hg
max. vacuum, left gauge 20.5 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.0 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.1 "Hg

4. Heater works: Yes ☒ No ☐

5. O_2 cell on ambient air 20.9 %

Ambient temp. _____ °F

AWES temp. strip _____ °F

AWES.C

Wood Characteristics—Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK02 Resident Name: Terrell Technician C. L40V

Sampling Rotation: 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Correcte
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	JUNIPER			Moisture (%
1/29/90		20	68							100			
"		17	"										
"		14	"										
"		21	"										
"		13	"										
"		20	"										
"		21	"										
"		24	"										
"		18	"										
"		20	"										
	2/11/90	19, 22, 17, 23, 23, 23, 13, 14.5, 14.75	70							100%			
	2/12/90	18.0, 18.5, 16.0, 13.0, 16.75, 19.5, 20.5, 20.0, 20.0, 17.5, 18.5, 19.5, 21.5, 24.0, 26.0, 19.5, 22.0, 19.25, 20.25, 17.25, 19.75	70°							100%			

Make notation if wood block(s) obtained.

AWES

KLAMATH FALLS FIELD STUDY

HOME H – 4

Wood Characteristics—Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK02 Resident Name: Jewel Technician AJ

Sampling Rotation: 1 ☐ 2 ☐ 3 ☑ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)								Corrected
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	Cedar	Juniper	Moisture (%
2/21		22, 17, 19.5	70*							10%	90%	
		18, 22, 17.5										
		21, 21, 20.5	85									
		16.5, 19, 14.5										
	AVG =	16, 17.5, 20*										
	17.1875	15, 17.5, 13.5										
		15.5, 18, 15.5										
		16.5, 17.5, 17.5										
		14, 15.5, 12.5										
		16.5, 16.75, 17*										
	3/7/90	19, 16.5, 14.5	60° (garage)									
		23.5, 21, 21.5										
		17, 18, 15										
		19, 20.5, 18.5										
		20, 19, 18										
		17.5, 16.5, 15										
	*	22.5, 20, 28										
		15.5, 17.5, 18.75										
		15.5, 14, 16.5										
	AVG =	27, 27.5, 21.5										
	19.432	23, 22, 23										

Make notation if wood block(s) obtained.

AWES

AVG = 18.428

* warmed for 12 hrs to 70° | 17.5 | 17.75 | 18.0 | 70° | 16.5 | 16.75 | 17.0 | 35° (calibrated)

→ switched to Juniper for most of test

Sample Data

Lab Cleanup Date _____ Technician _____

Probe Rinse—Sample No. _____

Filter # _____

XAD # _____

Samples delivered to OMNI? ☐ Yes

Delivered by: _____

Comments

V20/90 - TC INDICATES 1124° INITIALLY WHEN SET TO 1000° — AFTER 5 MINS, PORTABLE TC READOUT ATTRIBUTED TO THE COLISEUM ALONG WITH THE DATA LOGGER TC. THE DATA LOGGER THEN INDICATED 999°.

SCALE INDUSTRIAL READS 218.4 LBS

NEED TO SWITCH OUT SCALE.

SCALE OCCASIONALLY GIVE READINGS OF 270 + LBS.

O_2 LOOKS GOOD

HOME SCALE

COUNT	INDICATED
10.0	9.9
40.0	41

AWES.D

AWES Log Book

Home Code: K03 Sampling Rotation: 1 ☑ 2 ☐ 3 ☐ 4 ☐ 5 ☐ B ☐

Sample I.D.: K03-1

AWES Box # 8641-12 Filter # K001 XAD# 211

Teflon Line # 7 Probe # 10

Installation

Date AWES Installed 1/9/90

by: RJ.

1. Programmed Start time

Date: 1/10/90 Time: 0:00

2. Leak Check (inlet plugged, outlet open)

max. vacuum, ~~right~~ Top gauge 21.2 "Hg
max. vacuum, ~~left~~ bottom gauge 20.8 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 20.8 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.2 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.05 "Hg

4. Heater works: Yes ☑ (if no, use substitute AWES

5. O_2 cell calibrated ☑ Yes

Removal

Date AWES Removed 1/20/90

by: R.J/J.F.

1. Programmed Stop time

Date: _____ Time: _____

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.2 "Hg
max. vacuum, left gauge 21.0 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 20.9 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.2 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.05 "Hg

4. Heater works: Yes ☑ No ☐

5. O_2 cell on ambient air 20.9 %

Ambient temp. 70 °F

AWES temp. strip 82 °F

AWES.C

AWES Log Book

Home Code: WK03 Sampling Rotation: 1☐ 2☑ 3☐ 4☐ 5☐ B☐

Sample I.D.:_____

AWES Box # 29 Filter # K026 XAD# 10

Teflon Line # 7 Probe # WK0302

Installation

Date AWES Installed 2/11

by: JWF

1. Programmed Start time

Date: 1/31 Time: 0:00

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.3 "Hg
max. vacuum, left gauge 21.0 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.1 "Hg
max. vacuum, left gauge 21.0 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.3 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.05 "Hg

4. Heater works: Yes ☑ (if no, use substitute AWES

5. O_2 cell calibrated ☐ Yes

Removal

Date AWES Removed 2/11/90

by: PS

1. Programmed Stop time

Date:_____ Time:_____

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.5 "Hg
max. vacuum, left gauge 21.0 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.25 "Hg
max. vacuum, left gauge 21.0 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.5 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.10 "Hg

4. Heater works: Yes ☒ No ☐

5. O_2 cell on ambient air _____ %

Ambient temp. 83 °F

AWES temp. strip 0 °F

AWES.C

Wood Characteristics—Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK03 Resident Name: Harris Technician P.J

Sampling Rotation: 1 ☑ 2 ☐ 3 ☐ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Correcte
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	white fir			Moisture (%
1/20/90		18.5, 16.5, 14.0	74°							100%			
		9.5, 9.5, 9.0								✓			
		9.75, 8.0, 8.0								✓			
		17.5, 20.0, 17.75								✓			
		19.0, 16.0, 17.5								✓			
		13.5, 14.0, 15.5								✓			
		17.0, 15.5, 14.5								✓			
		14.0, 13.75, 15.0								✓			
		15.0, 13.0, 13.5								✓			
		9.0, 10.0, 10.0								✓			
	1/20/90	24.0, 23.5, 26.5	71°							100%			
		17.5, 17.25, 18.75											
		24.0, 26.5, 23.0											
		21.0, 19.75, 24.0											
		15.5, 20.5, 19.0											
		* see below											

Make notation if wood block(s) obtained.

AWES

* all of the wood that was left indoors

AWES Log Book

Home Code: WK03 Sampling Rotation: 1☐ 2☐ 3☒ 4☐ 5☐ B☐

Sample I.D.:_____

AWES Box # 29 Filter # K0788 XAD# 4

Teflon Line # 69 Probe # K0305

Installation

Date AWES Installed 2-22-90

by: JWF

1. Programmed Start time

Date: 2/23 Time: 0:00

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge *21.9 "Hg
max. vacuum, left gauge 21.5 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.8 "Hg
max. vacuum, left gauge 21.4 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.5 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.10 "Hg

4. Heater works: Yes ☑ (if no, use substitute AWES

5. O_2 cell calibrated ☑ Yes

Removal

Date AWES Removed 3/2/90

by: PJ, GB

1. Programmed Stop time

Date: 3/1 Time: 23:59

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.5 "Hg
max. vacuum, left gauge 21.0 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.3 "Hg
max. vacuum, left gauge 21.0 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.4 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.15 "Hg

4. Heater works: Yes ☑ No ☐

5. O_2 cell on ambient air 21.1 %

Ambient temp. _____ °F

AWES temp. strip _____ °F

AWES.C

Wood Characteristics—Log Sheet
Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK03 Resident Name: Harris Technician PS.

Sampling Rotation: 1 ☐ 2 ☑ 3 ☐ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Corrected
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	W. Fir ✓			Moisture (%
1/29/90		24	68°							100%			
		23											
		21											
		16											
		19											
		23											
		22											
		14											
		20											
		22											
	2/11/90	21.0, 19.5, 20.25	75°							100%			
		16.5, 17.75, 18.0								✓			
		17.75, 18.0, 17.0								✓			
		18.75, 18.5, 17.0								✓			
		16.5, 16.5, 21.0								✓			
		24.0, 23.0, 23.5								✓			
		20.5, 19.5, 21.0								✓			
		20.25, 18.5, 17.25								✓			
		14.75, 18.5, 17.0								✓			
		17.5, 18.0, 19.5								✓			

Make notation if wood block(s) obtained.

AWES.L

KLAMATH FALLS FIELD STUDY

HOME H — 4

Wood Characteristics—Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK03 Resident Name: HARRIS Technician JWF

Sampling Rotation: 1 ☐ 2 ☐ 3 ☒ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Corrected
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	Wht. Fir			Moisture (%
7-22-90		21,19,23	90										
		21,23,23											
		24,23,26											
		15,15,16.5											
		20,21,20											
		24,23,24											
		19,22,19											
		19.5,21.5,22											
		23,22,22											
		22,22,24											
	3/2/90	16.92	75°							100%			
		23.17											
		23.17											
		18.5											
		20.08											
		19.58											
		22.67											
		20.17											
		17.83											
		17.67											

Make notation if wood block(s) obtained.

Avg. already

AWES

Sample Data

Lab Cleanup Date _____ Technician _____

Probe Rinse—Sample No. _____

Filter # _____

XAD # _____

Samples delivered to OMNI? ☐ Yes

Delivered by: _____

Comments

NOTE: TC #1 WAS READING LOW AT TAKEDOWN - APPROX ½ ROOM TEMP (POSSIBLE SHORT AT CONNECTOR, AVERAGING ROOM & STACK TEMP

(AFTER REVIEW FILE)

NOTE: TC #1 HAD A SPORADIC SHORT, ONLY SOMETIMES READING LOW. USE TC #2

AWES.D

AWES Log Book

Home Code: WK0402 Sampling Rotation: 1☐ 2☒ 3☐ 4☐ 5☐ B☐

Sample I.D.: WK0402

AWES Box # 12 Filter # K024 XAD # 308

Teflon Line # 23 Probe # 5

Installation

Date AWES Installed 1/29/90

by: SEE PREVIOUS SHEET

1. Programmed Start time

Date: _____ Time: _____

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 20.6 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 20.8 "Hg
max. vacuum, left gauge 20.6 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 18.5 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.05 "Hg

4. Heater works: Yes ☒ (if no, use substitute AWES

5. O_2 cell calibrated ☐ Yes

Removal

Date AWES Removed Jul 2/11/90

by: JNF, PJ

1. Programmed Stop time

Date: 2/6 Time: ~~1400~~ 23

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.2 "Hg
max. vacuum, left gauge 20.5 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 20.8 "Hg
max. vacuum, left gauge 20.5 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 18.8 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.0 "Hg

4. Heater works: Yes ☒ No ☐

5. O_2 cell on ambient air 20.9 %

Ambient temp. 80 °F

AWES temp. strip 84 °F

AWES.C

AWES Log Book

Home Code: W K34 Sampling Rotation: 1☐ 2☐ 3☒ 4☐ 5☐ B☐

Sample I.D.:_____

AWES Box # 12 Filter # K077 XAD# 217

Teflon Line # 7 Probe # 2 (on tape)

Installation

Date AWES Installed _____

by: _____

1. Programmed Start time

Date: _____ Time: _____

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 20.8 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 20.6 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.0 "Hg
vacuum, left gauge 9 "Hg
rotometer 1.05 "Hg

4. Heater works: Yes ☒ (if no, use substitute AWES

5. O_2 cell calibrated ☒ Yes

Removal

Date AWES Removed 3/2/90

by: MB

1. Programmed Stop time

Date: 2/28 Time: 23:59

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.1 "Hg
max. vacuum, left gauge 20.9 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 20.9 "Hg
max. vacuum, left gauge 20.8 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 18.8 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.05 "Hg

4. Heater works: Yes ☒ No ☐

5. O_2 cell on ambient air _____ %

Ambient temp. _____ °F

AWES temp. strip 84 °F

AWES.C

– missed wood heater on 2/28/90

KLAMATH FALLS FIELD STUDY

HOME H — 5

Wood Characteristics—Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK04 02 Resident Name: Rickard Technician PJ

Sampling Rotation: 1 ☐ 2 ☑ 3 ☐ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Corrected
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	AVE Lodge Pole	Juniper	O	Moisture (%I
↗ PS 1/29/90		10	40°							50	50		
		11											
		9											
		13											
		9											
		11											
		13											
		17	62°										
		15											
		14											
		12											
		13/12											
	2/11/90	11.5, 9.0, 12.25	50° (outside)								60%		
		10.5, 11.5, 9.75	(see below)								✓		
		10.5, 12.75, 14.0									✓		
		21.0, 19.5, 21.0		30%									
		12.5, 12.0, 12.5		✓									
		21.0, 17.25, 19.5		✓									
		20.5, 19.5, 19.5		✓									
		16.5, 17.5, 16.0		✓									
		11.5, 11.5, 12.25									✓10%		
	2/12/90	12.75, 12.5, 12.5	60°								✓		
		11.0, 10.5, 11.5	60°								✓		
		14.0, 14.0, 13.5	60°	✓									

See Previous Sheet

Wood outside

Wood inside

Make notation if wood block(s) obtained.

wood probably 45°

AWI

for test: mostly Juniper
some Oak at night
for start ups Lodgepole

AWES Log Book

Home Code: WX05 Sampling Rotation: 1☐ 2☒ 3☐ 4☐ 5☐ B☐

Sample I.D.: 01

AWES Box # 21 Filter # X003 XAD# 007

Teflon Line # 10 Probe # 4 9 P.J.

Installation

Date AWES Installed 11/30/90

by: JJF

1. Programmed Start time

Date: 11/31 Time: 0

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 20.0 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 20.0 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.1 "Hg

4. Heater works: Yes ☐ (if no, use substitute AWES

5. O_2 cell calibrated ☒ Yes

Removal

Date AWES Removed 2/12/90

by: JF, PJ

1. Programmed Stop time

Date: _____ Time: _____

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.75 "Hg
max. vacuum, left gauge 21.0 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.75 "Hg
max. vacuum, left gauge 21.0 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.25 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.10 "Hg

4. Heater works: Yes ☑ No ☐

5. O_2 cell on ambient air _____ %

Ambient temp. _____ °F

AWES temp. strip _____ °F

AWES.C

Wood Characteristics—Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK 04 Resident Name: _____ Technician _____

Sampling Rotation: 1 ☐ 2 ☐ 3 ☑ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Corrected
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	Pine			Moisture (%D
2/21/90		10.5, 12, 11.5	20	25-30									
		11.5, 11.0, 10.0											
		13, 14, 13.5											
		16, 12.0, 12.5											
		12, 12.5, 11.5											
		12, 13.5, 13											
		15.5, 13, 10											
		13, 10, 11.5											
		19, 12, 12											
	3/2/90	15.5, 15.8, 15.0	50°	30						70			
		15.6, 16.4, 15.8											
		17.7, 21, 19.5											
		10.75, 11.0, 10.5											
		11.2, 11.0, 12											
		11.5, 13.0, 12.5											
		11.0, 11.0, 12.0											
		11.0, 11.5, 11.0											
		10.5, 11.0, 11.5											
		11.0, 11.0, 11.0											

Make notation if wood block(s) obtained.

AWES

NOTE - OAK IS MAINLY USED FOR THE LAST LOAD OF THE NIGHT - THE OAK IS SCRAPS FROM MAKING PALLETS

Wood Characteristics—Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK05 Resident Name: NUBERT Technician JWK

Sampling Rotation: 1 ☐ 2 ☐ 3 ☒ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile	Wood Species (% of Woodpile)									Correcte
Installation	Removal	Reading (%DB)	(ambient) Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	JWR			Moisture (%
3/22/00			80										
		18.5, 18, 18											
		17, 17.5, 16											
		20, 18.5, 23											
		19, 18, 18											
		18, 18, 21											
		17.5, 18, 19											
		15, 16, 16.5											
		18, 17, 20											
		16, 16, 15.5											
		18.5, 21, 19											
	3/3/00	16.5, 15.5, 16.0	70							100%			
		14.5, 16.0, 13.5											
		11.5, 12.5, 12.0											
		12.5, 14.0, 14.0											
		11.0, 9.5, 12.0											
		11.0, 12.0, 13.0											
		14.0, 14.5, 14.5											
		13.0, 15.0, 14.0											
		13.0, 13.5, 12.0											
		12.0, 13.0, 14.0											

Make notation if wood block(s) obtained.

AWE

Wood Characteristics—Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK05 Resident Name: Neubart Technician LYAN

Sampling Rotation: 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)								Correcte
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	CEDAR	JUNIPER	Moisture (%
1/30/20		23	35							10		
"		24	"							10		
"		14	"								90	
"		14	"								"	
"		15	"								"	
"		16	"								"	
"		17	"								"	
"		18	"								"	
"		19	"								"	
"		20	"								"	
	2/15/20											
		18	70								1	
		16.5										
		18.23										
		17										
		18										
		19.5										
		16.75										
		16.75									1	
		18.0										
		19.0										

Make notation if wood block(s) obtained.

AWE

AWES Log Book

Home Code: WC06 Sampling Rotation: 1☐ 2☒ C 3☐ 4☐ 5☐ B☐

Sample I.D.: WC0602C

AWES Box # 04 Filter # K053 XAD# 25

Teflon Line # 9 Probe # 4

Installation

Date AWES Installed 2/5/90

by: JF

1. Programmed Start time

Date: _____ Time: _____

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.4 "Hg
max. vacuum, left gauge 20.4 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.0 "Hg
max. vacuum, left gauge 20.2 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.4 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.05 "Hg

4. Heater works: Yes ☒ (if no, use substitute AWES

5. O_2 cell calibrated ☒ Yes

Removal

Date AWES Removed 2/12/90

by: JF

1. Programmed Stop time

Date: 2/13/90 Time: 1140

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 20.6 "Hg
max. vacuum, left gauge 19.9 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 20.1 "Hg
max. vacuum, left gauge 19.5 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.4 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.0 "Hg

4. Heater works: Yes ☒ No ☐

5. O_2 cell on ambient air _____ %

Ambient temp. 71 °F

AWES temp. strip _____ °F

AWES Log Book

Home Code: LVOS Sampling Rotation: 1☐ 2☐ 3☒ 4☐ 5☐ B☐

Sample I.D.: WKOSO3

AWES Box # 21 Filter # KO67 XAD# 107

Teflon Line # 10 (Nat) Probe # 4

Installation

Date AWES Installed 2/22/90

by: JWP

1. Programmed Start time

Date: 2-23 Time: 0

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 22.0 "Hg
max. vacuum, left gauge 21.3 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 22.0 "Hg
max. vacuum, left gauge 21.2 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.3 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.15 "Hg

4. Heater works: Yes ☒ (if no, use substitute AWES

5. O_2 cell calibrated ☒ Yes

Removal

Date AWES Removed 3/3/90

by: BJ, GB

1. Programmed Stop time

Date: 3/1 Time: 3/1 23

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.7 "Hg
max. vacuum, left gauge 21.2 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 21.7 "Hg
max. vacuum, left gauge 21.2 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.3 "Hg
vacuum, left gauge 0.0 "Hg
rotometer 1.10 "Hg

4. Heater works: Yes ☑ No ☐

5. O_2 cell on ambient air 20.5 %

Ambient temp. _____ °F

AWES temp. strip _____ °F

AWES.C

Wood Characteristics Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK06   Resident Name: McDowell   Technician: JWK

Sampling Rotation: 1 ☐ 2 ☒ 3 ☒ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Correcte
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	Lodge Pole			Moisture (%
2/22/00		24,26,25	70										
		32,30,30											
		28,27,26											
		19,20,19											
		17,18,17											
		18,19,19											
		18,18,16											
		17,18,20											
		20,21,19											
		26,24,29											

Make notation if wood block(s) obtained.

AWE

– HOMEOWNER WILL INDICATE WHEN THEY SWITCH FROM RED-FIR TO LODGEPOLE PINE.

KLAMATH FALLS FIELD STUDY

HOME H — 6

(3)

AWES Log Book

Home Code: WH06 Sampling Rotation: 1☐ 2☐ 3☒ 4☐ 5☐ B☐

Sample I.D.: WH0603B

AWES Box # 28 Filter # H086 XAD# 306

Teflon Line # 1 Probe # 14

Installation

Date AWES Installed 3/2/90

by: GB

1. Programmed Start time

Date: 3/3/90 Time: 0

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.1 "Hg
max. vacuum, left gauge 20.9 "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 20.9 "Hg
max. vacuum, left gauge 20.9 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 19.2 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.0 "Hg

4. Heater works: Yes ☒ (if no, use substitute AWES

5. O_2 cell calibrated ☒ Yes

Removal

Date AWES Removed 3/10/90

by: PJ, GB

1. Programmed Stop time

Date: 3/8 Time: 23:59

2. Leak Check (inlet plugged, outlet open)

max. vacuum, right gauge 21.1 "Hg
max. vacuum, left gauge 20.c "Hg

Close toggle, turn off pump, wait 30 seconds

max. vacuum, right gauge 20.6 "Hg
max. vacuum, left gauge 20.0 "Hg

3. Free-flow check (inlet open, outlet open)

vacuum, right gauge 18.9 "Hg
vacuum, left gauge 0 "Hg
rotometer 1.0 "Hg

4. Heater works: Yes ☒ No ☐

5. O_2 cell on ambient air 20.8 %

Ambient temp. _____ °F

AWES temp. strip _____ °F

Wood Characteristics – Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WC0 6 Resident Name: McDonald Technician JVF

Sampling Rotation: 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Corrected
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone				Moisture (%
2/12/20		25	70°				100%						
		14	(35° outside)				↓						
		14											
		26											
		21											
		27											
		17.5											
		25											
		23											

Make notation if wood block(s) obtained.

AW

KLAMATH FALLS FIELD STUDY

APPENDIX C

TEST STATISTICS

Wood Characteristics Log Sheet

Important: A Minimum of 10 Readings Are Required Per House Visit.

Home Code: WK06 Resident Name: McDoyle Technician RF

Sampling Rotation: 1 ☐ 2 ☐ 3 ☑ 4 ☐ 5 ☐

AWES Service Date		Moisture	Woodpile (ambient)	Wood Species (% of Woodpile)									Corrected
Installation	Removal	Reading (%DB)	Temp. (°F)	Oak	Maple	Ash	Red Fir	D.Fir	Madrone	Coffee Hole			Moisture (%L
3/2/90		24, 26, 23	60°				50			50			
		15.75, 16, 16.25					↓						
		24, 23, 23											
		27, 27.5, 26											
	AVG.	21, 20.5, 22											
	20.104	23 (avg.)											
		17.25 (avg.)											
		15.5, 15.5, 15.0											
		15 (avg)											
		15.5, 15.25, 15.5								↓			
	3/10/90	27, 23, 23.5	60 (garage)							100			
		27, 22.5, 23											
		42, 40, 35											
		22, 23, 24											
		21.5, 22.5, 23.5											
		26.5, 22, 19.5											
		27, 22.0, 30											
		21.0, 21.5, 22											
	AVG.	27.5, 32.0, 23											
	25.272	20.5, 24, 24											
		24, 24, 24											

Make notation if wood block(s) obtained.

AWES

Avg = 22.688

KLAMATH FALLS PERFORMANCE STUDY
STATISTICAL ANALYSIS *

ASSUMPTIONS:

1. $X_{11}, X_{12}, X_{13}, \ldots X_{1N_1}$, are random samples
2. $X_{21}, X_{22}, X_{23}, \ldots X_{2N_2}$, are random samples
3. $X_{11}, X_{12}, X_{13}, \ldots X_{1N_1}$ are independent from $X_{21}, X_{22}, X_{23}, \ldots X_{2N_2}$, and both are normally distributed.
4. $\sigma_1^2 \neq \sigma_2^2$

HYPOTHESIS FOR ALL COMPARISONS:

H_o: $\mu_1 = \mu_2$ $\quad \alpha = 0.05$

H_1: $\mu_1 > \mu_2$

REJECT H_o IF $T = \dfrac{\bar{X}_1 - \bar{X}_2}{\sqrt{\dfrac{s_1^2}{N_1} + \dfrac{s_2^2}{N_2}}} > t(D)_{1-\alpha}$

$$D = \frac{N(S_1^2 + S_2^2)^2}{S_1^4 + S_2^4} \quad \text{FOR } N_1 = N_2 = N$$

*Statistical Analysis Provided by Gary Hazard, Chairman of the Stove Technical Committee, April, 1990.

TABLE C-2. Test Statistics, Catalytic vs. Non-catalytic.

PARAMETER	WEEK NO.	CATALYTIC $\bar{x}_1$	CATALYTIC s_1	CATALYTIC n_1	NON-CATALYTIC $\bar{x}_2$	NON-CATALYTIC s_2	NON-CATALYTIC n_2	$\lvert T \rvert$	D	t(D)	(NOTES 1 & 2) DECISION
EMISSIONS (GRAMS/ HOUR)	2	5.5	0.95	3	5.4	1.74	3	0.09	4.6	2.06	F.T.R.
	3	7.3	1.59	3	4.6	1.42	3	2.19	5.9	1.95	REJECT
	2 & 3	6.4	1.55	6	5.0	1.48	6	1.60	11.9	1.78	F.T.R.
EMISSIONS (GRAMS/ KG)	2	4.5	0.75	3	5.2	2.57	3	1.25	3.5	2.24	F.T.R.
	3	7.3	1.56	3	5.4	2.51	3	1.11	5.0	2.02	F.T.R.
	2 & 3	5.9	1.88	6	5.3	2.28	6	0.49	11.6	1.79	F.T.R.
BURN RATE (KG/HR)	2	1.24	0.19	3	1.14	0.31	3	0.48	5.0	2.02	F.T.R.
	3	1.01	0.11	3	0.93	0.23	3	0.54	4.3	2.09	F.T.R.
	2 & 3	1.13	0.19	6	1.04	0.27	6	0.67	10.8	1.80	F.T.R.

NOTE: 1. F.T.R. = FAIL TO REJECT THE NULL HYPOTHESIS (H_0).

2. REJECT = REJECT THE NULL HYPOTHESIS AND ACCEPT THE ALTERNATE HYPOTHESIS.

RESULT: The only statistically significant result is the lower emissions, in grams/hour, of the non-catalytic stoves in week 3 compared to the catalytic stoves in the same time span.

No other result was statistically significant (at 95% confidence level).

TABLE C-1. Test Statistics, Week 2 vs. Week 3.

PARAMETER	STOVE TYPE	WEEK 2 $\bar{x}_1$	WEEK 2 s_1	WEEK 2 n_1	WEEK 3 $\bar{x}_2$	WEEK 3 s_2	WEEK 3 n_2	T	D	t(D)	(NOTES 1 & 2) DECISION
EMISSIONS (GRAMS/ HOUR)	CAT	5.5	0.95	3	7.3	1.59	3	-1.68	4.89	-2.03	F.T.R.
	NON	5.4	1.74	3	4.6	1.42	3	0.62	5.77	1.96	F.T.R.
	CAT & NON	5.5	1.30	6	6.0	2.00	6	-0.51	10.30	-1.81	F.T.R.
EMISSIONS (GRAMS/ KG)	CAT	4.5	0.75	3	7.3	1.56	3	-2.80	4.32	-2.09	REJECT
	NON	5.2	2.57	3	5.4	2.51	3	-0.10	5.99	-1.94	F.T.R.
	CAT & NON	4.8	1.70	6	6.3	2.10	6	-1.40	11.50	-1.79	F.T.R.
BURN RATE (KG/HR)	CAT	1.24	0.19	3	1.01	0.11	3	1.81	4.8	2.04	F.T.R.
	NON	1.14	0.31	3	0.93	0.23	3	0.94	5.5	1.48	F.T.R.
	CAT & NON	1.20	0.20	6	1.00	0.20	6	1.73	12.0	1.78	F.T.R.

NOTES: 1. F.T.R. = FAIL TO REJECT THE NULL HYPOTHESIS (H_o).

2. REJECT = REJECT THE NULL HYPOTHESIS AND ACCEPT THE ALTERNATE HYPOTHESIS.

RESULT: The emissions, in grams/kg, from the three catalytic stoves were higher in Week 3 than Week 2, for those same three stoves.

No other result was statistically significant.

KLAMATH FALLS FIELD STUDY

APPENDIX C

TEST STATISTICS

TABLE C-2. Test Statistics, Catalytic vs. Non-catalytic.

PARAMETER	WEEK NO.	CATALYTIC $\bar{x}_1$	CATALYTIC s_1	CATALYTIC n_1	NON-CATALYTIC $\bar{x}_2$	NON-CATALYTIC s_2	NON-CATALYTIC n_2	T	D	t(D)	(NOTES 1 & 2) DECISION
EMISSIONS (GRAMS/ HOUR)	2	5.5	0.95	3	5.4	1.74	3	0.09	4.6	2.06	F.T.R.
	3	7.3	1.59	3	4.6	1.42	3	2.19	5.9	1.95	REJECT
	2 & 3	6.4	1.55	6	5.0	1.48	6	1.60	11.9	1.78	F.T.R.
EMISSIONS (GRAMS/ KG)	2	4.5	0.75	3	5.2	2.57	3	1.25	3.5	2.24	F.T.R.
	3	7.3	1.56	3	5.4	2.51	3	1.11	5.0	2.02	F.T.R.
	2 & 3	5.9	1.88	6	5.3	2.28	6	0.49	11.6	1.79	F.T.R.
BURN RATE (KG/HR)	2	1.24	0.19	3	1.14	0.31	3	0.48	5.0	2.02	F.T.R.
	3	1.01	0.11	3	0.93	0.23	3	0.54	4.3	2.09	F.T.R.
	2 & 3	1.13	0.19	6	1.04	0.27	6	0.67	10.8	1.80	F.T.R.

NOTE: 1. F.T.R. = FAIL TO REJECT THE NULL HYPOTHESIS (H_o).

2. REJECT = REJECT THE NULL HYPOTHESIS AND ACCEPT THE ALTERNATE HYPOTHESIS.

RESULT: The only statistically significant result is the lower emissions, in grams/hour, of the non-catalytic stoves in week 3 compared to the catalytic stoves in the same time span.

No other result was statistically significant (at 95% confidence level).

NEIL GOLDSCHMIDT
GOVERNOR

Environmental Quality Commission

811 SW SIXTH AVENUE, PORTLAND, OR 97204 PHONE (503) 229-5696

Date: October 3, 1990

To: Environmental Quality Commission

From: Fred Hansen, Director

Subject: Groundwater Management Plan for Malheur County: Background and Update (item I).

This report provides background information on the development and contents of a draft groundwater management action plan for the Northern Malheur County Groundwater Management Area (attached). This topic is an informational item on the November 2, 1990 Commission Meeting.

Legislative Background

Groundwater quality monitoring activities conducted throughout the state in the early- and mid-eighties revealed that groundwater contamination, particularly in agricultural areas, was much more prevalent than had been expected. From 1985 through 1987 the Department of Environmental Quality (Department, DEQ) conducted a statewide assessment of agricultural chemicals in groundwater. Sampling results from over 400 wells indicated nitrate contamination in the Klamath Falls area, northern Umatilla and Morrow Counties, Willamette Valley, and northern Malheur County. The pesticides EDB, Dacthal, Bromacil, Dinoseb, Aldicarb, and 1,2,-dichloropropane were detected in drinking water wells.

In response to an increased awareness of the sensitivity of groundwater to contamination, the 1989 legislature passed the Groundwater Quality Protection Act. This Act insures the implementation of a coordinated groundwater quality protection program through all state agencies and activities. Interagency coordination is accomplished through the Strategic Water Management Group (SWMG), a council of agency directors chaired by the Governor's Office.

The Act established by statute, groundwater protection goals, policies, and a strategy for implementation. The Act takes a green light, yellow light, red light approach to groundwater management. It stresses prevention, and the importance of

research, demonstrations, and public education. Many new groundwater quality protection programs are established under the Act. These include: Standards, Areas of Concern, Groundwater Management Committees, Groundwater Management Action Plans, a Groundwater Information Repository (includes data base), cooperative projects, regional assessments, technical assistance to local government, well head protection , vulnerability assessment, statewide monitoring program, domestic well testing requirements, and others.

Groundwater Management areas are the red light areas under the Act. Oregon Revised Statute ORS 468.698 requires that the Department declare a groundwater management area when it confirms groundwater contamination, resulting from suspected nonpoint source activity, at concentrations exceeding specified levels. The level for nitrates is 100% (70 % two years after Act effective date) of the maximum measurable level for contaminants in groundwater (MMLs) as established under ORS 468.694. For other contaminants the trigger level is 50% of the MML.

When a groundwater management area is declared, the SWMG appoints a lead agency and a local groundwater management committee to develop an action plan for the area, which will then be adopted by the SWMG. Oregon Revised Statute (ORS) 536.157 establishes a process for the development of a groundwater management action plan for a groundwater management area. The purpose of the plan is to lay out a course of action, strategies, programs and activities to reduce existing contamination and to prevent further contamination of the affected groundwater aquifer.

Northern Malheur County Process

In August of 1989 the Department declared a groundwater management area in northern Malheur County based on nitrate contamination. Approximately 35% of 179 wells tested at that time exceeded the interim MML of 10 mg/l nitrate-nitrogen.

On August 22, 1989 the SWMG appointed a local groundwater management committee and designated the DEQ as the lead agency for the development of a groundwater management area action plan.

The local committee was chaired by Barry Fujishin, a local farmer and Vice Chairman of the State Board of Agriculture. The committee had 18 members with local agriculture, industry, and citizens well represented. Reflective of the local community, most of the committee members were in some way connected with agriculture. A nine-person technical advisory committee of state, local, and federal agency personnel was also appointed and met jointly with the groundwater management committee. The Committee met regularly from December 1989 until August 1990. They worked with the Department and the technical advisory committee to develop a draft action plan. On August 2, 1990 they unanimously recommended the draft plan for public review and comment.

Assessment Activities

In order to develop an effective management plan, a thorough understanding of the groundwater quality, local hydrogeology, and mechanisms of contamination had to be developed. The Department, with the assistance of the Water Resources Department, has been intensively studying the Northeastern Malheur County area since July 1988. Additional information was available from past water quality studies conducted in the early- and mid-eighties. The results from these assessment activities are detailed in the action plan.

Action Plan Summary

1. Background Information: Sections 1,2,3 and 4 of the action plan contain introduction and background information. This includes a description of statutory requirements, the process for the plan development, the management committee, contaminant characterization, and geographical features of the area.

2. Hydrogeology: Section 5 contains a summary of the hydrogeology of the area. A complete description of the area hydrogeology is being published under a separate cover as Oregon State Water Resources, Groundwater Report #34, 1990.

   The groundwater needs of the area are primarily served by a shallow alluvial aquifer. The aquifer is recharged extensively from irrigation seepage and canal leakage. Groundwater velocity in the area generally ranges from 2 to 10 feet per day. At that rate it would take approximately 5 to 11 years for existing water to completely move out of the system. Other aquifers in the area are limited and not adequate to meet either quality or quantity needs.

3. Water Quality Conditions: Section 6 describes water quality conditions in the area as they have been determined by various studies and assessment activities. The section addresses surface water quality, background water quality, past studies, areal distribution of contamination, seasonal trends, and long term trends.

   The most severe contamination is found in the area just southwest of Ontario. In this area 23 of 51 (45%) of the wells tested exceeded the nitrate drinking water standard. The herbicide Dacthal was detected in 53% of the wells sampled, but always at levels well below the health advisory. There was a very strong correlation between nitrate levels and Dacthal levels. There was a very significant seasonal

trend in Dacthal concentrations. There was an apparent trend of decreasing nitrate levels, but at this point it is not statistically significant.

4. Impacts: Section 7 addresses the impacts of the contamination on public health, the environment, and beneficial uses of groundwater in the area. Drinking water impacts and treatment options are discussed. The use of reverse osmosis treatment units has become a common method for individuals to treat their water.

5. Sources of Contamination: Section 8 describes the relative contribution from identified and expected sources of contamination in the area. Residential lawn care, food processing waste disposal, cull onion disposal, on-site sewage disposal, and agriculture are all evaluated.

   The data indicates that normal field application of fertilizers and Dacthal is the primary source of the groundwater contamination. All other sources contribute relatively small percentages to the total contaminant loading in the area.

6. Consideration of Reasonable Alternatives: Section 9 describes two possible approaches for implementing the action plan: a voluntary versus a regulatory approach.

7. Implementation of Ameliorative Actions: Section 10 contains the basic strategy of the action plan. It describes a voluntary approach, using individual farm management plans, to implement customized best management practices (BMPs) for northern Malheur County. Included are specific recommended BMPs that have been identified by the committee and a process for updating the BMPs as research and testing develop new and better BMPs. There is a time schedule for activity implementation. One of the critical elements in the plan is contained in subsection 10.6 of the action plan. This subsection contains a schedule and method for measuring the effectiveness of the action plan. The schedule is based on achieving concentrations in the groundwater below red light trigger levels by July, 2000. If after five years a trend analysis indicates this will not occur, the management plan will be found inadequate and will be revised accordingly.

8. Tasks, Duties and Responsibilities: Section 11 specifies what the role of various agencies and organizations will be in the implementation of the action plan. Briefly those are:

   a. Malheur County Groundwater Management Committee - Continue to meet and provide direction for implementing the plan. Provide direction for

research, coordinate and act as liaison with the community.

b. Oregon State University Agricultural Experiment Station - Conduct research and field trials for BMP development.

c. OSU Cooperative Extension Service - Conduct public education and demonstration project activities.

d. United States Department of Agriculture Agricultural Stabilization and Conservation Service - Provide cost share funding for BMP implementation.

e. USDA Soil Conservation Service - Provide technical and financial assistance for implementing BMPs. Conduct demonstration projects, conduct sample collection and field monitoring.

f. Oregon Water Resource Department - Provide hydrogeology technical resources, improve water use efficiency, regulate well construction.

g. DEQ - Maintain regional groundwater monitoring network, assess effectiveness of action plan, and maintain oversight on plan implementation.

h. Health Division - Provide health risk information and treatment advice.

i. Oregon Department of Agriculture - Provide coordination for implementation through the local Soil and Water Conservation Districts.

j. Soil and Water Conservation Districts (SWCDs) - The local SWCDs are the primary agency for implementing the action plan at the local level. They will work with the local farmers to develop the individual farm management plans, update the plans and promote and oversee their implementation.

9. Comprehensive Land Use Plan Evaluation: Section 12 evaluates whether existing land use regulations are adequate with respect to groundwater protection. No changes in existing land use plans are recommended.

<u>Current Status</u>

The action plan is currently out for public review and comment. After comments have been recieved and evaluated, the plan will be revised accordingly and taken to the January SWMG meeting for adoption.

Conclusion

Members of the community in northern Malheur County have responded to evidence of groundwater quality problems in a responsible and positive manner. Under the excellent direction of Chairman Fujishin, the groundwater management committee utilized their expertise and local knowledge to develop a reasonable approach with an excellent prospect for reducing groundwater contamination in the area.

There is every reason to believe that farming practices can be improved to dramatically reduce the amount of leaching to groundwater of agricultural chemicals without severe adverse economic consequences. In fact, many of the BMPs being developed not only protect groundwater, but help to improve product quality, yield, sustain soil fertility, and are an economic advantage to the farmer. However, the effectiveness of BMPs in reducing groundwater impacts, and their economic impacts must be determined before they can be widely adopted. The action plan provides for the coordinated development, demonstration, and implementation of economically viable BMPs. The success of this strategy will be determined by continued monitoring of groundwater quality in the region.

PRELIMINARY DRAFT

Northern Malheur County

Groundwater Management Action Plan

Developed by
Malheur County Groundwater Management Committee
July 20, 1990

TABLE OF CONTENTS

Appendixes

LIST OF TABLES

LIST OF FIGURES

1.0 Introduction

Widespread contamination of groundwater has been found in a 115,000 acre area in Northeastern Malheur County. Groundwater samples from private water wells reveal the presence of widespread nitrate contamination. Sampling confirms that the herbicide dacthal is also present in the groundwater supply.

The contaminated groundwater is present in a shallow sand and gravel aquifer which receives a large proportion of its recharge from canal leakage and irrigation water (Gannett, 1990). Traditional fertilizer and agricultural chemical application practices have been found to be the main source of the contamination. As the irrigation water percolates from the surface to groundwater it carries with it soluble agricultural chemical residues remaining in the soil profile.

Due to the groundwater quality problems identified in Northern Malheur County, the area has been designated by the Department of Environmental Quality as a Groundwater Management Area under the provisions provided by the recently adopted Oregon Revised Statute (ORS) 468.698, commonly referred to as the Oregon State Groundwater Protection Act of 1989.

1.1 Oregon State Groundwater Protection Strategy

Adoption of ORS 468.698 established the Oregon State groundwater quality protection strategy for non-point source problems. The strategy is based on the implementation of agricultural management practices which would revise or replace those practices identified as contributing to groundwater quality degradation.

The objectives of this strategy are to; identify all existing and potential sources of agricultural chemical pollution in the impacted area; evaluate the impact of the current agricultural management practices on the area's groundwater quality; and explore, develop, and implement agricultural management practices which provide groundwater quality protection. The strategy requires cooperative interagency implementation of traditional agricultural programs which have been revised to address groundwater quality degradation resulting from agricultural activities.

1.2 Northern Malheur County Groundwater Management Plan

This management plan has been developed to coordinate the activities to be undertaken by the local agricultural community, Malheur County, the State of Oregon, and the Federal Government. Sections 1 through 8, describe problems to be addressed. Sections 9 and 10, discuss the recommended actions to be taken by the local community. Section 11 describes the actions to be taken by County, State and Federal agencies associated with this project.

The Department of Environmental Quality, (DEQ) will monitor groundwater quality conditions to determine seasonal cycles and trends and provide general analytical support. The Oregon State Department of Agriculture (ODA), the Soil and Water Conservation District (SWCD), and the U.S Department of Agriculture Soil Conservation Service (SCS), in cooperation with the Oregon State University Experiment Station (OSU), will identify and evaluate the land use activities influencing the groundwater quality cycles and trends.

OSU, in cooperation with the ODA and SCS will explore and develop technically sound alternatives and revisions to replace or compensate for those activities identified as adversely impacting groundwater quality. Along with the development of alternative technologies, field studies will be conducted to compliment the formal research and verify the effectiveness of the alternative technology. These studies will be performed as a joint effort by ODA, SCS, OSU, and DEQ.

In conjunction with the development and verification of the best alternative technologies ODA, SCS, OSU, and DEQ will provide public and group demonstrations, educational programs to establish the strategy objectives within the community. To compliment this, the Agricultural Stabilization and Conservation Service (ASCS) will explore and develop economic implementation incentives to assist agricultural producers in the acceptance of the recommended management practices.

2.0 Background

In the past, water quality issues in Malheur County have centered on surface water quality and irrigation water needs. Concerns have been primarily directed towards the erosion and sediment problems caused by overland and irrigation runoff and the chemical loads associated with the runoff. Poor surface water quality resulting from runoff was easily recognized and surface water quality protection was determined to be a necessity.

In 1981 Malheur County adopted a surface water management plan to provide a solution to the surface water quality problems identified. As with most water quality problems resulting from non-point source activities, the most practicable solution was determined to be the implementation of alternative land use management practices.

The plan adopted in 1981 is based on recommended Best Management Practice (BMP) systems established in the USDA Soil Conservation Service (SCS) Field Office Technical Guide. The "BMPs" contained in the plan are current and remain applicable for surface water quality protection in Malheur County. Advancements in water quality protection, such as reduced suspended sediment loads, have been obtained since the problem has been identified. However,the strategy was originally formulated to address surface water not groundwater. As such, it is not adequate for addressing the current situation of the groundwater quality problems in Malheur County.

The value of maintaining Malheur County's groundwater resource is apparent and more recently has gained the attention of the State Legislature. The legislature recognized that groundwater quality protection is an issue which involves multiple concerns founded on immediate individual needs at the local level and society's overall responsibility to future generations. Adoption of the 1989 Groundwater Protection Act established the direction to be taken by the State in resolving area-wide non-point source groundwater quality issues.

2.1 Management Strategy Development

The strategy established by the Oregon State 1989 Groundwater Protection Act is designed to be implemented through the State Strategic Water Management Group (SWMG). The SWMG was formed in 1985 by the Oregon State Legislative assembly to coordinate and manage state agencies involved in water resource issues. The group is composed of the directors of the State resource management agencies and is chaired by the governor's assistant for Natural Resources. Any actions implemented through this plan must first be reviewed and approved by SWMG.

Oregon Revised Statue 468.698 describes a Groundwater Management Area and the conditions for which a declaration occurs. Basically, such an area will be declared when contaminants are found at 50% of the established maximum measurable level for contaminants in groundwater (mml), except nitrates. For nitrate contaminants the law requires that a Groundwater Management Area be established when contaminant levels exceed 100% of the mml for the first two years after the effective date of the law then the level for designation drops to 70% of the mml.

The 1989 Groundwater Protection Act calls for the appointment of a local groundwater management committee to assist in the development of a management plan. The goal of the plan is to reduce Nitrate/Nitrite-Nitrogen contamination in the groundwater to a level below that which caused the declaration of the management area. The Malheur County committee was appointed August 22,1989 and first met November 1989. Since November of 1989 the committee has met seven times and has assisted the state in developing this plan by offering comments, suggestions, and recommendations.

2.11 Malheur County Groundwater Management Committee

The committee members were chosen from a list of recommendations submitted by local civic groups; agricultural organizations; state, county, and city agencies, environmental organizations, and a variety of private citizens. The committee selection was made by SWMG through a careful evaluation of several important factors. Of most importance was the nominee's ability to contribute to the development of a practical plan of action to respond to the region's groundwater quality problem, and their ability to work productively in open forum discussions with other committee members while formulating management decisions which will inherently effect the entire County.

The following list of people were appointed to the Groundwater Management Committee.

Mr. Barry Fujishin, Chairman
Mr. Rodger Findley
Ms. Kathy Jordan
Mr. Bob Butler
Mr. Don Bowers
Mr. Glen Hill
Mr. Joe Hobson
Mr. Nico Hopman
Mr. Ron Schoenman
Mr. Darrel Standage
Mr. Dave Cloud
Mr. Rod Frahm
Mr. Ray Winegar
Ms. Mary Thiel
Mr. Cliff Bentz
Mr. Jim Nakano
Mr. Tom Anderson
Ms. Caroline Nysingh

The following list of people were asked by SWMG to participate in a subcommittee formed to supply the technical answers to committee inquires.

Mr. Lynn Jensen
Mr. Ray Perkins
Mr. Larry Powers
Mr. John Ross
Mr. Ray Dunten
Ms. Marti Bridges
Mr. Herb Futter
Ms. Zadean Auyer
Mr. Ray Huff
Mr. Clint Shock
Mr. Mike Dolton

2.12 Required Components

Required components of the management plan are listed in the 1989 Groundwater Protection Act. In summary, the plan shall include the following:

* Identification and evaluation of the management practices contributing to the contamination.

* Consideration of all reasonable alternatives which will reduce the contaminants found in the groundwater.

* Recommended mandatory actions which will reduce contaminant levels, and which will be implemented if voluntary actions are not adequate and do not lower the contaminant levels found in the groundwater.

* A implementation schedule for estimated contaminant reductions and public review.

* Amendments to local comprehensive plans and land use regulations required by the groundwater management plan.

3.0 Contaminant Characterization

The United States Environmental Protection Agency (USEPA), has set a maximum contaminant level (MCL) of 10 mg/l for nitrate in public water supplies. Nitrate levels above 10 mg/l may represent a serious health concern for infants under 6 months of age and pregnant or nursing women. Adults receive most nitrate exposure from food. Infants, however, receive the greatest exposure from drinking water because most of their food is liquid form. (Department of Human Resources, Health Division, 1988).

Nitrate can interfere with the ability of the blood to carry oxygen to vital tissues of the body in infants of one year old or younger. The result is called methemoglobinemia, or "blue baby syndrome". There have not been any cases of methemoglobinemia reported in Northern Malheur County resulting from consuming nitrate/nitrite-nitrogen contaminated water. This can, in part, be attributed to the increased awareness of the problem and the preventative measures taken by the majority of the community.

The USEPA has reviewed the available health studies on Dacthal. These studies are based on Dacthal alone, and not on the di-acid breakdown products or impurities. In Northern Malheur County, the data generated to describe the Dacthal contamination is based on the di-acid breakdown products not the Dacthal parent material.

The USEPA has established a lifetime health advisory for consuming Dacthal in drinking water to be 3500 ppb (Department of Human Resources, Health Division, 1988). The USEPA believes that no adverse health effects in humans are likely to result from drinking water with 3500 ppb or less of Dacthal.

4.0 Background Information

Malheur County encompasses 6,352,640 acres in the southeastern corner of the state of Oregon (Figure 1). The county is the 2nd largest in the State and 12th largest in the nation. Malheur County's population of 26,000 is primarily supported by agriculture. The county has approximately 260,000 acres of irrigated crop land and approximately 5,971,200 acres of range land.

Malheur County is bordered by the states of Idaho on the east and Nevada to the south. In Oregon, Baker and Grant Counties border Malheur County on the north and Harney County borders to the west. There are three major river basins in the county. The Malheur River drainage and the Owyhee River drainage originate in the high desert uplands to the south and west and flow north and east to the Snake River (Malheur County Planning Office, 1981).

The area addressed by this plan lies in the Northeastern corner of Malheur County near the convergence of these three river valleys (Figure 2). This area consists mainly of alluvial flood plains and terraces. The lower valleys of the Malheur drainage and Owyhee drainage form the fertile farm land which supports intensive agricultural production.

In Malheur County the summers are hot and winters are very cold. The average July temperature is 75 degrees Fahrenheit. In January, the long term average temperature is 29 degrees Fahrenheit. The average annual precipitation is 9.8 inches.

Normally, July, August, and September have minimum amounts of rainfall with 0.11, 0.40, and 0.48 inches respectively. With 140 - 160 frost free days and an arid climate, this region is good for intensive agriculture. Yields are high and product quality is excellent.

FIGURE 1

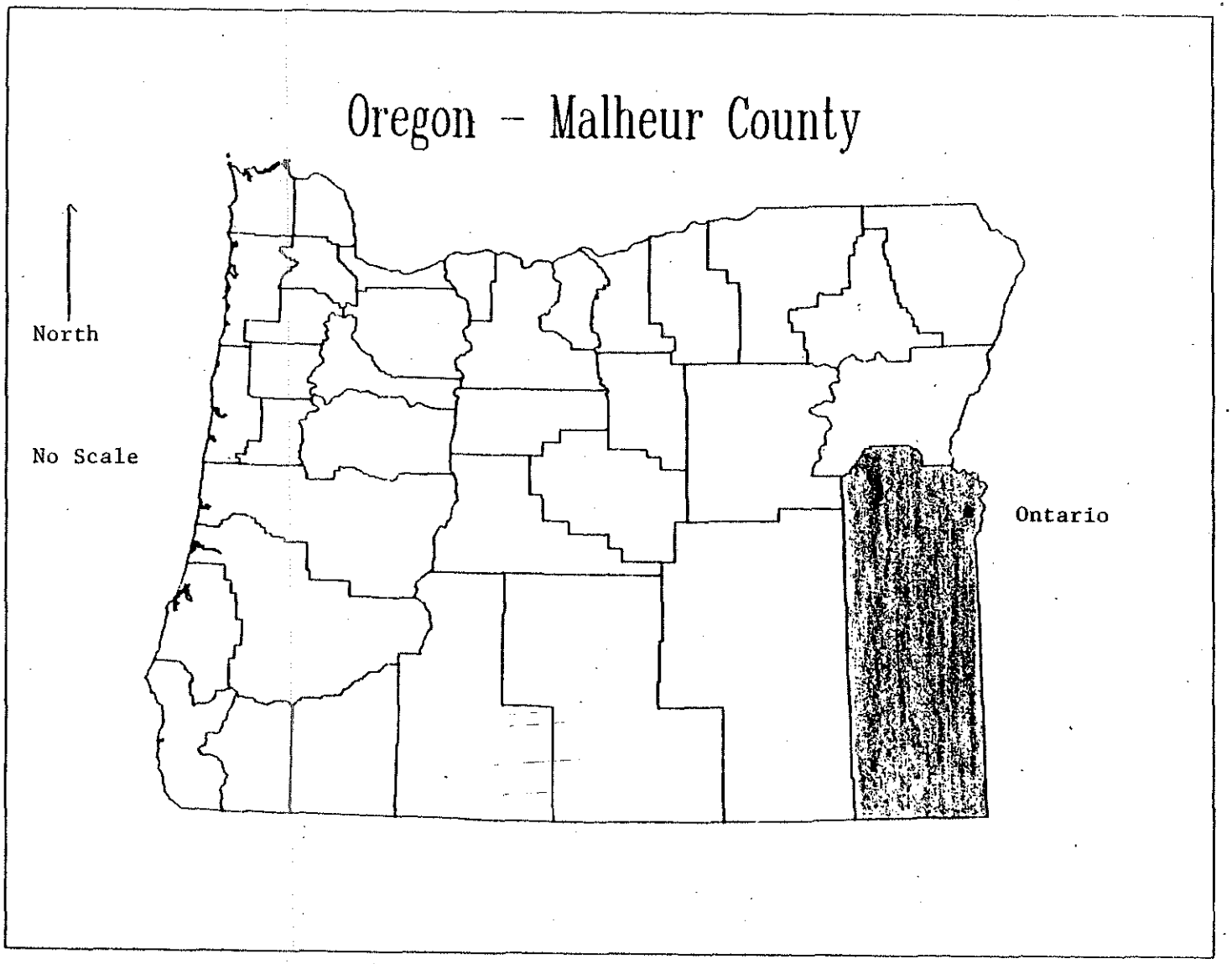
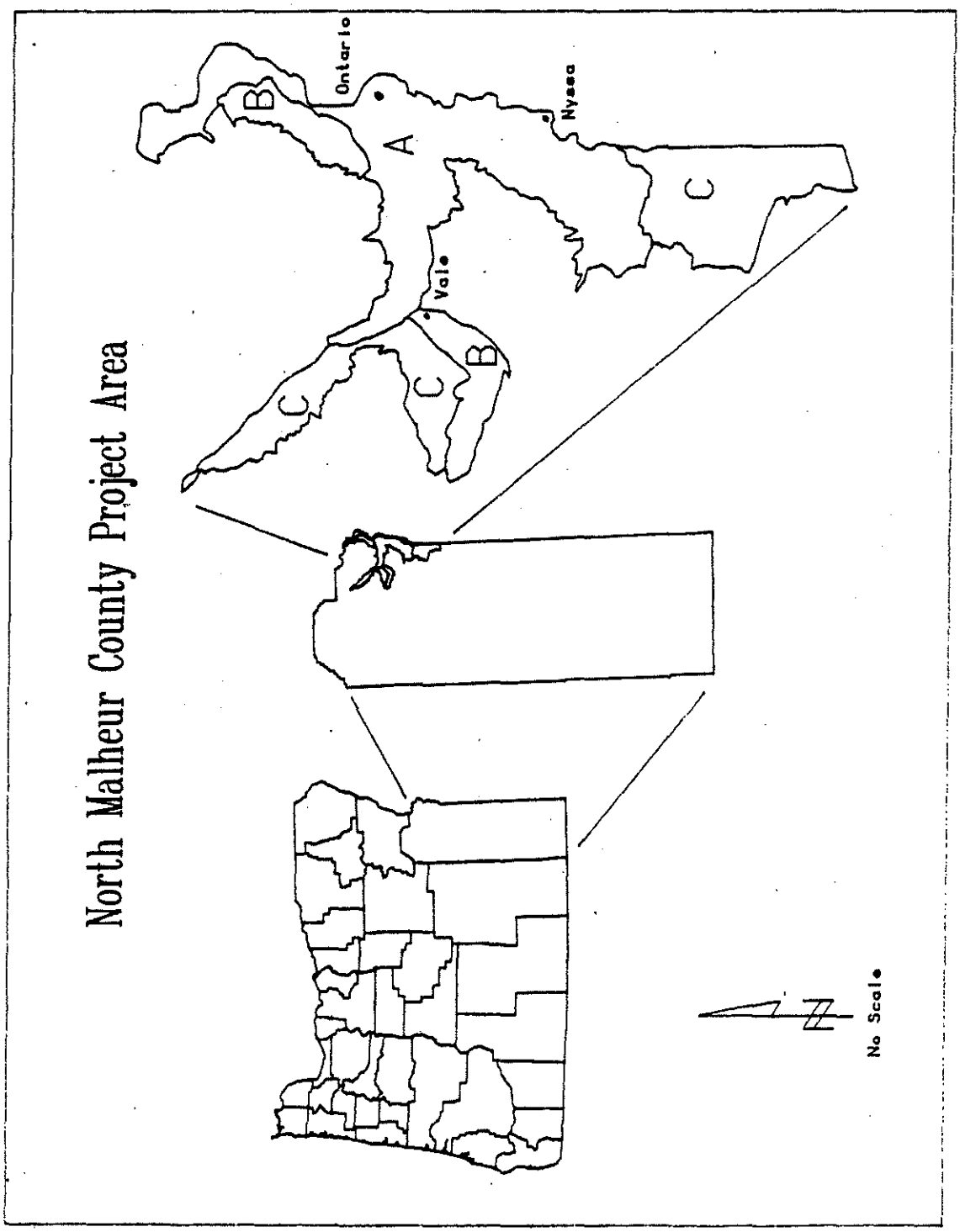


FIGURE 2


North Malheur County Project Area
Ontario
Nyssa
Vale
A
B
C
No Scale

A-15

5.0 Hydrogeology (Marshall Gannett, Oregon State Water Resources Department, Groundwater Report # 34, 1990)

In 1988, the Oregon State Water Resources Division began an intensive field study to characterize the local hydrogeologic environment (Appendix A). The characterization was limited to the shallow groundwater aquifer of the area since it is the upper most aquifer which has been most impacted by the agricultural chemical contamination. The following hydrogeologic description is an excerpt of the report generated.

The sand and gravel aquifer ranges in thickness from approximately 10 to 30 feet and is present throughout the valley and lower terraces around Ontario, Nyssa, and Vale. This aquifer is the most widely used source of groundwater in the area for both drinking water and irrigation.

The shallow aquifer is overlain by approximately 25 feet of silt. The thickness and character of the silt varies from place to place. The silt is generally permeable and allows the downward movement of water from the surface into the shallow aquifer. Therefore, the shallow sand and gravel aquifer is considered unconfined to semi-confined.

The shallow aquifer is recharged by infiltration of local precipitation, leakage of irrigation canals and ditches, and by deep percolation of irrigation water. Conveyance and application of irrigation water is the biggest source of recharge. The water level in the shallow aquifer is highest during the irrigation season. Records from continuous water level recorders show that ground water levels rise in response to melting snow, to canal leakage and irrigation. Ground water levels decline after the irrigation season is over. Deep percolation of irrigation water is believed to be the primary process by which agricultural chemicals are entering the shallow ground water.

Prior to irrigation development, the water level in the shallow aquifer was at or above the elevation of the adjacent rivers. The increase in annual recharge due to irrigation development has raised water levels into the overlying silt, especially at the valley edges. This has increased the gradient of the water table and increased ground water flow velocities. The increased recharge due to irrigation development has not increased storage in the shallow aquifer as much as it has served to greatly increase the annual flow through the system. This means that the shallow sand and gravel aquifer is a naturally saturated aquifer and not an artifact of human activity.

The shallow sand and gravel aquifer in the Ontario area is underlain by several thousand feet of fine sand, silt and clay. These materials were deposited in a large lake which occupied portions of eastern Oregon and western Idaho a few million years ago. The sediments, which are often described as "blue clay" by drillers, are too fine-textured to allow easy movement of ground water. These sediments generally do not yield significant amounts of water to wells. Within the fine sediments there are occasional coarse sand layers and gravel layers which in some places produce substantial quantities of water. These deep aquifers are part of the regional ground water flow system which is recharged by rain and snow over a large part of the basin. These deep aquifers are limited in extent and do not underlie the entire Ontario area.

The static water level elevation in these deep aquifers appears to be slightly higher than in the shallow gravel aquifer. This means that the deep aquifer water is under pressure and there is a natural tendency for ground water to flow upward from the deep zones to the shallow aquifer. Some improperly constructed wells in the area interconnect both the deep and shallow aquifers and provide an avenue for this upward movement of water.

The approximate rate and direction of ground water movement in the shallow aquifer has been determined by measuring water level elevations in wells throughout the area and conducting pumping tests on several wells. Ground water generally flows from the edges of the valley toward major surface streams. The velocity of ground water flow in the shallow gravel aquifer ranges from 5 to 10 feet per day in much of the area. The velocity of flow in the overlying silt and underlying lake sediments is not known.

6.0 Water Quality Conditions

Historic data to establish naturally occurring water quality conditions in the area's shallow groundwater are not available. Therefore, there is no means by which this survey can establish natural groundwater quality conditions for the region. However, portions of data from both existing information and information generated by this project can be interpreted to indicate past water quality conditions generally. The following discussion describes this information.

6.1 Surface Waters

Typical for arid regions, the naturally occurring surface water in the Owyhee and Malheur Basins tend to be higher in total dissolved solids than in areas of the state that receive higher rainfall amounts. This difference is reflected in the surface water standards for the Malheur and Owyhee basins. These standards are established in the Oregon Administrative Rules, Chapter 340, Division 41.

The Malheur and Owyhee Rivers have a minimum dissolved oxygen standard of 75 percent (%) of saturation as compared to the Columbia and Willamette Rivers of 90%. The range of Ph values for the Owyhee and Malheur waters is to be maintained between 7.0 and 9.0, compared to 7.0 to 8.5 for the Columbia and 6.5 to 8.0 for the Willamette. The maximum limit for total dissolved solids is 750 milligrams per liter (mg/l) for the Owyhee and Malheur Basins, in contrast to 500 mg/l for the Columbia and 100 mg/l for the Willamette.

Elevated levels of nitrate and the presence of dacthal have been identified in most surface waters in the area, including the irrigation delivery and drainage network and the Malheur River. Surface water conditions in both the Malheur and Owyhee Basins have been characterized by the State of Oregon as severely impacting fish, aquatic habitat and water contact recreation (Department of Environmental Quality, 1988). Severe impact is defined as substantial or nearly complete interference or elimination of a designated beneficial use.

6.2 Groundwater

Groundwater quality conditions in the area demonstrate similar effects due to the arid climate. Data from DEQ's groundwater monitoring program revealed elevated concentrations of most indicator parameters in the shallow aquifer and mineralized hard water. For example; approximate average levels are as follows; alkalinity - 420 mg/l, conductivity - 1400 u/cm, total dissolved solids - 900 mg/l, hardness - 375 mg/l, sodium - 190 mg/l, calcium - 75 mg/l, sulfate - 200 mg/l, and pH is slightly elevated above neutral at 7.7 standard units.

Since elevated nitrogen levels identified in the area's shallow groundwater supply has triggered a groundwater management area declaration, identifying the approximate background nitrogen concentration is important when projecting achievable contaminant reduction levels. However, actual groundwater data reflecting natural nitrogen levels does not exist. Therefore other information must be referenced when discussing natural nitrogen concentrations in the area's shallow groundwater.

In general, naturally occurring levels of nitrate in groundwater result from decaying organic matter and except in isolated instances do not exceed 2 milligrams per liter (Nitrate Fact Sheet, Department of Human Resources, Health Division, 1988). Naturally low levels of nitrate can also be substantiated through the current water quality survey since very low levels of nitrate/nitrite-nitrogen (0.2 mg/l) have been documented.

Perhaps the best source of information on background nitrate levels is the United States Geological Survey report 84-4242, Oregon Groundwater Quality and Its Relation to Hydrogeologic Factors..A Statistical Approach. Utilizing data from 1,077 total analyses this report establishes a median statewide Nitrate/nitrite-Nitrogen concentration of 0.15 mg/l and a 75 percentile level of 0.73 mg/l. When only data from basin fill and alluvial aquifers of the type found in the study area are considered, results from 300 analyses yield a median concentration of 0.46 mg/l and a 75 percentile level of 1.7 mg/l.

The areal pattern of the groundwater nitrate levels reveals that the highest nitrate levels occur in the areas that are subject to the most intensive agricultural practices, and statistical analysis has indicated a strong correlation between the nitrate level and the Dacthal level. All of this information together, along with the lack of any known source of naturally occurring nitrates, indicates that the nitrate concentrations observed are well above natural levels.

6.3 Past Water Quality Studies

Several water quality assessments have been performed in Northern Malheur County. The early assessment studies were performed primarily to address existing water quality concerns or impacts resulting from particular sources. Assessments have been performed to identify natural arsenic contamination (Oregon State Health Division, 1980), surface water impacts resulting from irrigation runoff (Malheur County Non Point Source Water Quality Management Program, 1980), Public Water Supply impacts resulting from Agricultural chemicals (Oregon State Health Division, 1987), and to determine the correlation coefficient between the Dacthal Di-acid contamination and Nitrite/nitrate-N contamination (Istok, et. al, 1988).

In 1985, the Department of Environmental Quality coordinated a reconnaissance study in Northern Malheur County as part of a state wide groundwater assessment project. Project participants included the U.S. Environmental Protection Agency, U.S. Geological Survey, Oregon State University, Oregon State Health Division, Oregon Water Resources Department, Oregon Department of Agriculture, and Oregon Department of Environmental Quality.

The state wide assessment study consisted of sampling select private domestic wells and public water systems. Wells sampled in each area were selected on the basis of suspected vulnerability and susceptibility to contamination, and availability of well construction information. Sample analyses included general water quality parameters, nutrients, and select pesticides. Pesticides were selected on the basis of quantity used in the area, persistence, toxicity, and leaching potential. Whenever a well water samples which indicated potential water quality problems the well was re-sampled and analyzed for conformation of results.

The analytical results generated by this study revealed 34% (37) of the 107 wells sampled contained nitrate nitrogen at levels above the 10 milligrams per liter (mg/l) federal EPA drinking water standard. The highest contamination found was 49 mg/l. The di-acid breakdown product from the herbicide Dacthal (DCPA), was found in 67% (54) of the 81 wells sampled. The highest Dacthal Di-acid concentration found was 431 parts per billion (ppb). The drinking water health advisory issued by EPA for Dacthal is 3500 ppb.

6.4 Current Water Quality Assessment

In August of 1988, the State initiated a program to monitor and evaluate groundwater quality in Northern Malheur County. The purpose was to provide information to develop and implement a groundwater management strategy to ameliorate the problems identified. Specific agency tasks were delegated by the Strategic Water Management Group under the provisions of the 1989 Groundwater Protection Act.

6.41 Interagency Work

The Oregon State Department of Human Resources Health Division performed health risk evaluations and public notification of sample analyses results. The Oregon State Department of Agriculture provided analytical assessment of agricultural chemicals and coordinated local project activities with the Soil and Water Conservation District.

The Oregon State University Agricultural Experiment Station and Extension Service assisted in evaluation of agricultural chemical analyses and evaluated and explored agricultural management practices relative to groundwater quality protection. The Oregon State Water Resources Department provided a regional hydrogeologic characterization of the project area. The Oregon State Department of Environmental Quality developed and implemented the sampling and analyses program of the project.

6.42 Sampling Program

The project sample and analyses program encompassed a 115,000 acre area extending from Annex on the north to Adrian on the south, and from Vine Hill west of Vale, east to the Snake River (Figure 2). The contamination has not been identified in the higher elevations outside the lower lying irrigated valleys. The sample and analyses program began in August of 1988 and continued through April of 1990. During this time 122 sites were sampled and 469 samples were collected and analyzed (Figure 3).

Existing public and private domestic and irrigation water wells as well as selected surface water locations within the study area were used in this project. Sites were selected on the basis of; location, depth, availability of a well log or well construction information, accessibility, and any previous sample analyses results. The program generated data used to identify existing water quality conditions, seasonal fluctuations, and trends or cycles associated with land use activities.

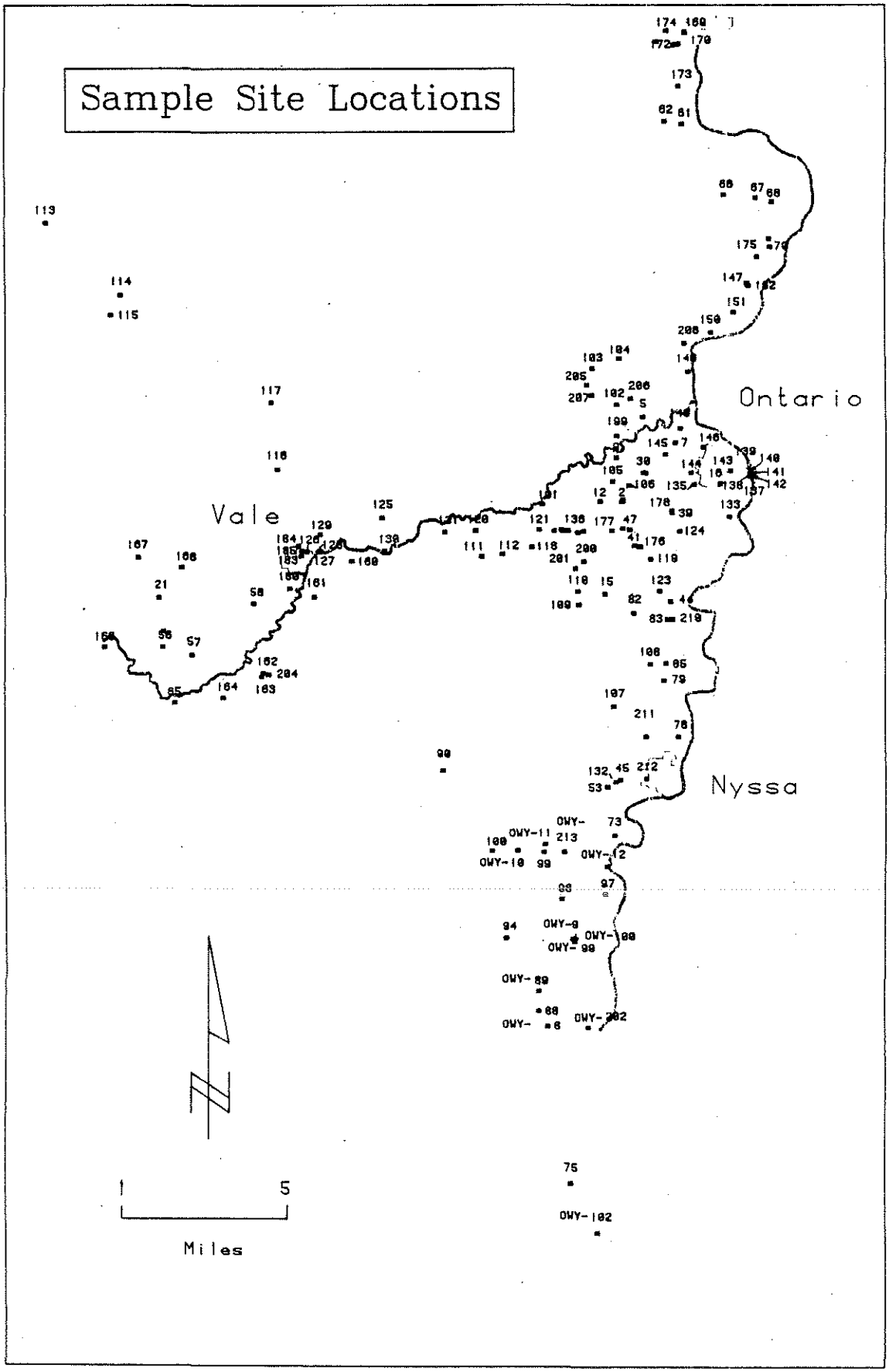
Sampling of a select network of sites as well as a few exploratory sites was conducted every other month. Parameters measured are listed in Table 1. In addition, two complete pesticide screens were conducted during the duration of this project. The analytical screening methods were developed by the U.S. EPA for the National Pesticide Program. The analyses included determining the presence or absence of 61 agricultural chemical compounds likely to be applied in the area. Pesticides were selected on the basis of quantity used, persistence, toxicity, and leaching potential. The 61 compounds measured are listed in Table 2. Excluding the Dacthal di-acid no other pesticide compounds were identified in the project area.

6.43 Analytical Quality Assurance Objectives

All analyses were performed according to U.S. Environmental Protection Agency or Standard Methods Procedures. The analytical parameters, the analytical methods and techniques, the minimum reportable value, and the quality assurance objectives are listed in Tables 1 and 3.

The minimum reportable value was at or below the U.S. EPA Federal Drinking Water Standard if the parameter evaluated has an assigned standard. Analyses of parameters with Federal Drinking Water Standards were used for health risk assessments.

FIGURE 3



A-22

Table 1

Laboratory Analyses

Parameter	Reference	Analytical Technique	Minimum Report Value, mg/l
Organics			
COD	R2-410.4	Dichro. Spectro	5.0
TOC	R2-415.2	UV/sulfate oxidation	1.0
Volatiles			
EDB	EPA 8240	Purge & Trap, GC/MS	0.001
DiChloropropane	EPA 8240	Purge & Trap, GC/MS	0.001
Total Ions & Metals			
Ca	R2-200.7	ICP	1.0
Mn	R2-200.7	ICP	0.02
Na	R2-200.7	ICP	1.0
K	R2-200.7	ICP	1.0
Cl	R2-325.1	Auto Ferricyanide	0.1
SO4	R2-375.2	Auto Methyl Thymol	0.5
As	R2-206.2	Graphite Furnace	0.005
Fe	R2-200.7	ICP	0.05
Mg	R2-200.7	ICP	1.0
Pb	R2-239.2	Graphite Furnace	0.01
Se	R2-270.2	Graphite Furnace	0.005
Cr	R2-218.2	Graphite Furnace	0.002
SiO2	R2-170.1	Silica	1.0
Nutrients			
TKN	R2-351.1	Block Digestion	0.2
NH3-N	R2-350.1	Auto Phenate	0.02
NO3+NO2-N	R2-353.2	Auto Cd Reduction	0.02
Total Phos	R1-424F	Ascorbic Acid Reduct.	0.01
Pesticides			
Dacthal	NPS 515	OSU Modified App. D	0.0001
Physical			
Alkalinity	R2-310.1	Titration	1.0
pH	R2-150.1	Electrode	0-14 SU
Conductivity	R2-120.1	Wheatstone bridge	1umho/cm
Turbidity	R2-180.1	Nephelometric	0.1 NTU

Referenced methodologies are detailed in the following publications. Method modifications unique to this project are listed in Appendix D.

R1, Standard Methods For The Examination Of Water And Wastewater 16th edition, APHA, AWWA, WPCF, 1985.
R2, Methods For Chemical Analysis Of Water And Wastes EPA/4-79-020.
EPA, SW-846 Test Methods For Evaluating Solid And Hazardous Wastes 3rd ed, 1986. Conforms with EPA Drinking Water Method 524.1
NPS, National Pesticide Survey Methodology, EPA Technical Support Division, Office of Drinking Water

A-23

TABLE 2

Pesticide Compounds Investigated

Pesticides of concern, analyzed utilizing the EPA standard methods developed for the National Pesticide Program.

Dichloropropene
Chlorpropham
Alachlor
DCPA
Cycloate
EPTC
Dinoseb
2,4-D
Bensulide
Mancozeb
Phorate
Trifluralin
Metolachlor
Aldicarb
Propargite
Metribuzin
Ethion
Carbofuran
Parathion
Ethoprop
Chlorothalonil
MCPA
Pronamide
Fensulfothion
Azinphos Methyl
Vernolate
M-Parathion
Ethofumesate
Malathion
Atrazine
Thiabendazole
Terbufos
Oxyfluorfen
Bromoxynil
Carbaryl
Captan
Desmedipham
Triadimefon
Naled
Trichlorfon
Pendimethalin
2,4-DB
Phenmedipham
Oxydemeton M
Methamidophos
Diquat
Ethalfluralin
Terbacil
Fonofos
Maneb
Endothall
Endosulfan
Acephate
Demeton
Thiophanate M
Dicamba
Metalxyl
Benomyl
Bentazon
Glyphosate
Disulfoton
Propham

Table 3

Quality Assurance Objectives

Parameter	Concentration Range	Precision Range or	RPD	100%+ Accuracy
Physical				
Conductivity	≥25 umhos/cm3		±5%	±5%
pH	0 - 14 SU	±0.2 SU		±0.1 SU
Alkalinity	≥10 mg/l		±5%	NA
Nutrients				
TKN	0.2-1.0 mg/l	±0.1 mg/l		
	≥1.0 mg/l		±20%	±20%
NH3-N	0.02-0.2 mg/l	±0.05 mg/l		
	≥0.2 mg/l		±20%	±20%
NO3+NO2-N	0.02-0.2 mg/l	±0.05 mg/l		
	≥0.2 mg/l		±10%	±15%
Total Phos.	0.01-0.1 mg/l	±0.05 mg/l		
	≥0.1 mg/l		±20%	±20%
Organics				
COD	5.0-10.0 mg/l	±0.5 mg/l		
	≥10.0 mg/l		±20%	±20%
TOC	1.0-5.0 mg/l	±0.5 mg/l		
	≥5.0 mg/l		±20%	±20%
VOC (8240)	0.001-0.010 mg/l	±0.001 mg/l		
	≥0.01		±15%	±15%
Total Ions and Metals				
Mn	0.02-0.10	±0.01 mg/l		
	≥0.10		±15%	±15%
Ca,Na,K				
Mg,SiO2	1.0-10.0 mg/l	±1.0 mg/l		
	≥10.0 mg/l		±15%	±15%
Cl	0.1-5.0 mg/l	±1.0 mg/l		
	≥5.0 mg/l		±15%	±15%
SO4	0.5-5.0 mg/l	±1.0 mg/l		
	≥5.0 mg/l		±15%	±15%
Fe	0.05-0.5 mg/l	±0.05 mg/l		
	≥0.5 mg/l		±15%	±15%
As	0.005-0.1 mg/l	±0.001 mg/l		
	≥0.1 mg/l		±15%	±15%
Pb	0.01-0.1 mg/l	±0.005 mg/l		
	≥0.1 mg/l		±15%	±15%
Se	0.005-0.03 mg/l	±0.005 mg/l		
	≥0.03 mg/l		±15%	±15%
Cr	0.002-0.1 mg/l	±0.005 mg/l		
	≥0.1 mg/l		±15%	±15%

Routine quality control procedures were employed during this project as listed in EPA SW-846, Test Methods For Evaluating Solid and Hazardous Wastes, 3rd Ed, 1986. Acceptable limits for the laboratory quality assurance objectives are listed in Table 2. In addition to the EPA QA requirements the following procedures were performed. Spiked samples were analyzed to measure analytical accuracy. Duplicate samples were analyzed on 10% of the samples collected to measure analytical precision. Transport blanks were analyzed to detect interferences introduced during sampling and reagent blanks were analyzed to detect interferences introduced during analyses and to verify method detection limits.

The data generated by this program are summarized in Appendix B. Figures 5 and 6 are graphs displaying the quality assurance evaluation results of the NO2+NO3-N analysis performed by the DEQ Laboratory. Figure 5 plots the relative percent difference (RPD) of duplicate samples versus sample concentration to yield an average method precision, or the difference between duplicate samples divided by the mean, of 5.3%. Figure 6 plots the percent recovery versus sample concentration to yield an accuracy, or the average percent recovery of samples spiked with a known amount, of 99.9%. In accordance with the DEQ Laboratory Quality Control requirements, the NO2+NO3-N analysis data generated by this project has met and exceeded the project quality control objectives.

6.44 Sampling Program Results

In April of 1990, enough information existed to determine approximate seasonal fluctuations, ambient water quality conditions, and the general areas within the valley most impacted by the nitrate and dacthal di-acid contamination. Beginning in June of 1990, the sampling and analysis program reduced its scope of analysis to monitoring only for the contaminants of concern and the effects of specific experimental agricultural management practices on ambient water quality conditions.

Overall results from the 116 wells sampled since August of 1988 can be found in Appendix B. 33% (39) of the wells were found to have nitrate/nitrite-nitrogen levels above 10 mg/l. Of the wells exceeding the standard, 8% (10 of 116) were found to be above 20 mg/l. The highest concentration recorded was 52 mg/l. The Dacthal di-acid was found in 63 of the 109 (53%) wells sampled for pesticides, the highest concentration was 986 ppb. The highest concentrations for both the nitrate/nitrite and Dacthal Di-acid were found in the Cairo Junction area.

FIGURE 4

DEPARTMENT OF ENVIRONMENTAL QUALITY

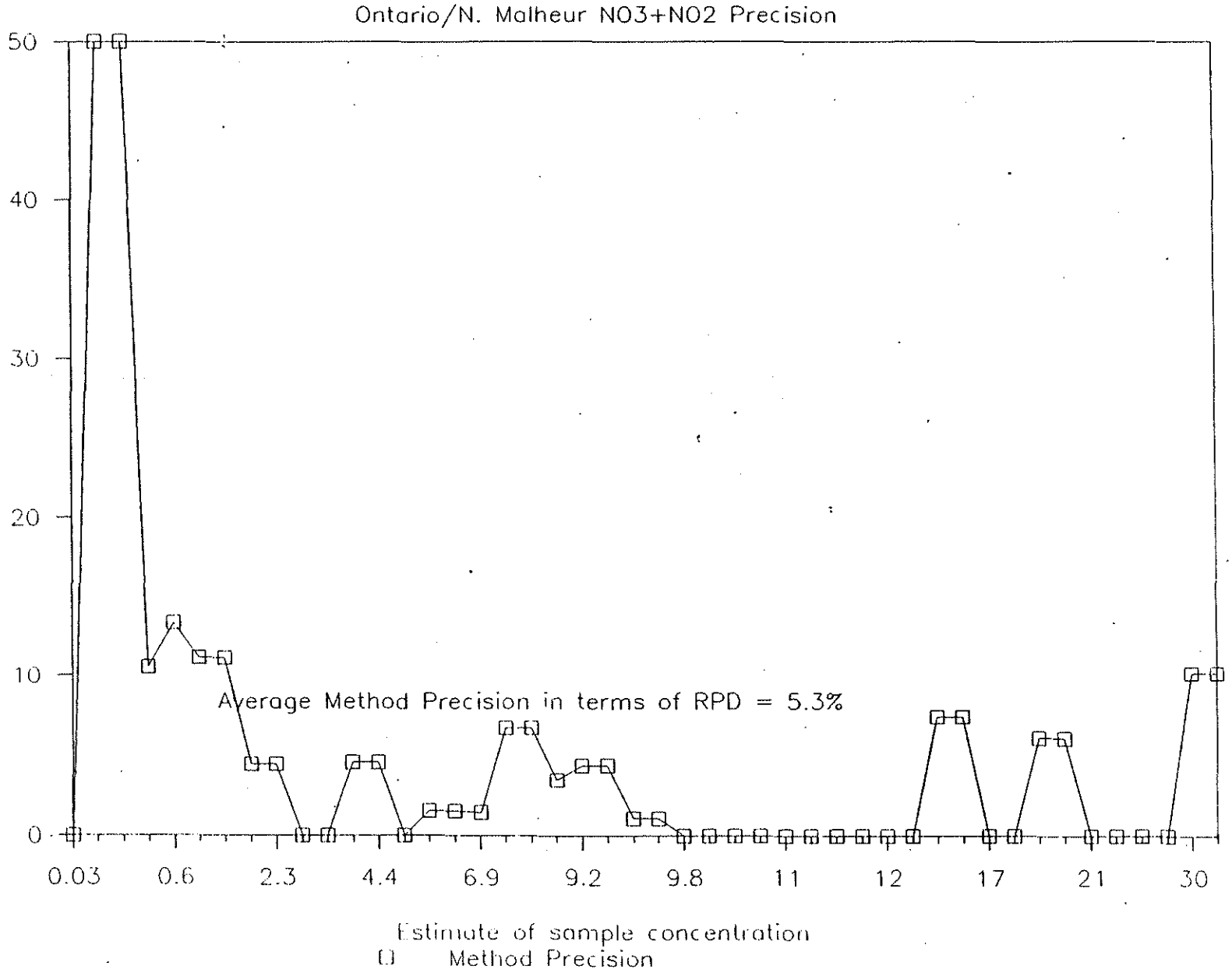
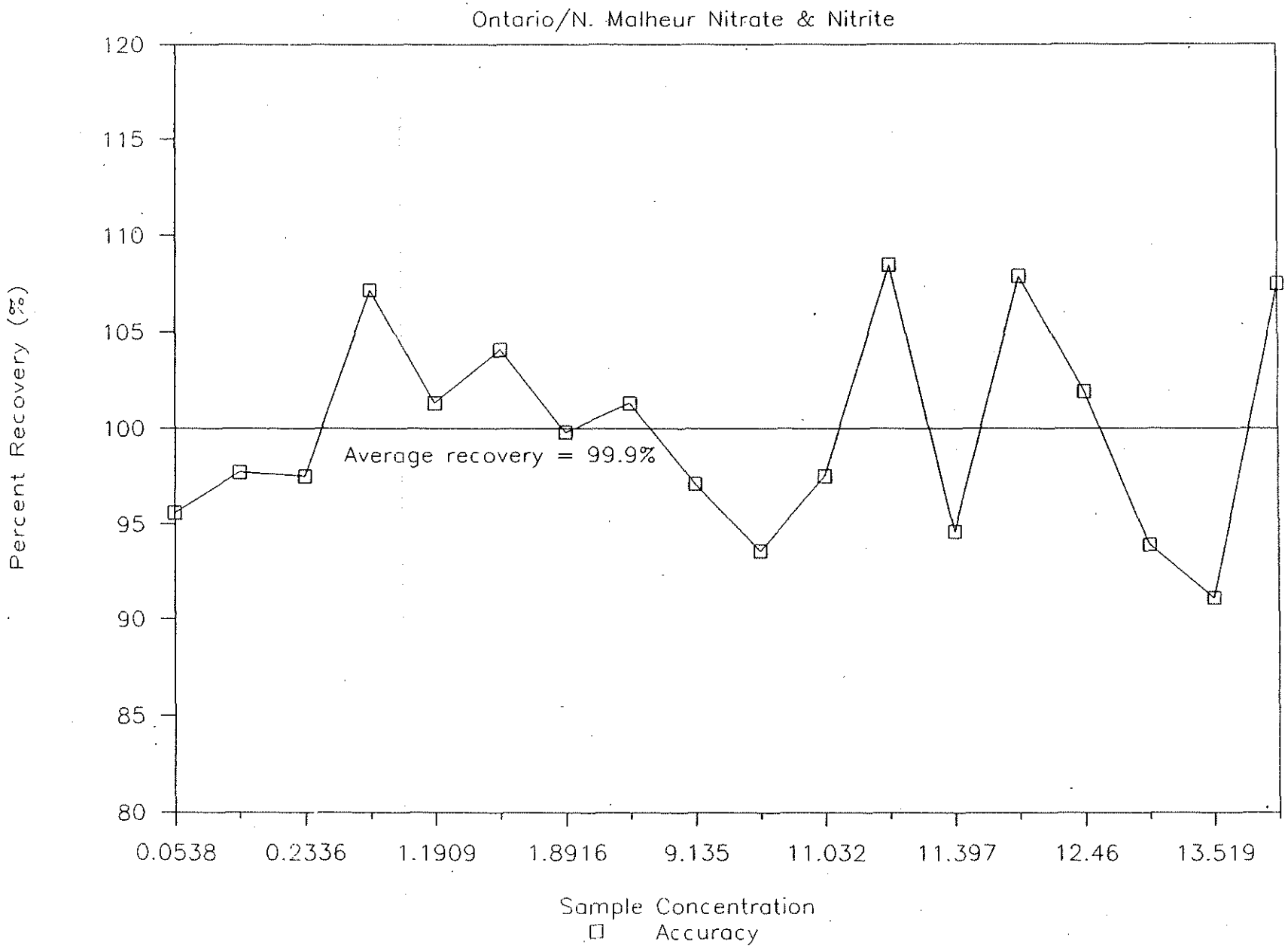


FIGURE 5

DEPARTMENT OF ENVIRONMENTAL QUALITY



A noticeable decline in the proportion of contaminated wells was detected between 1986 and 1988/89, and is considered to result in part, from having a larger sampling area. The sampling area was enlarged to determine the boundaries of the affected area. When the results from wells that were sampled in 1986 are compared to the results from these same wells sampled in 1988/89, few clear trends in nitrate or dacthal di-acid are discernable.

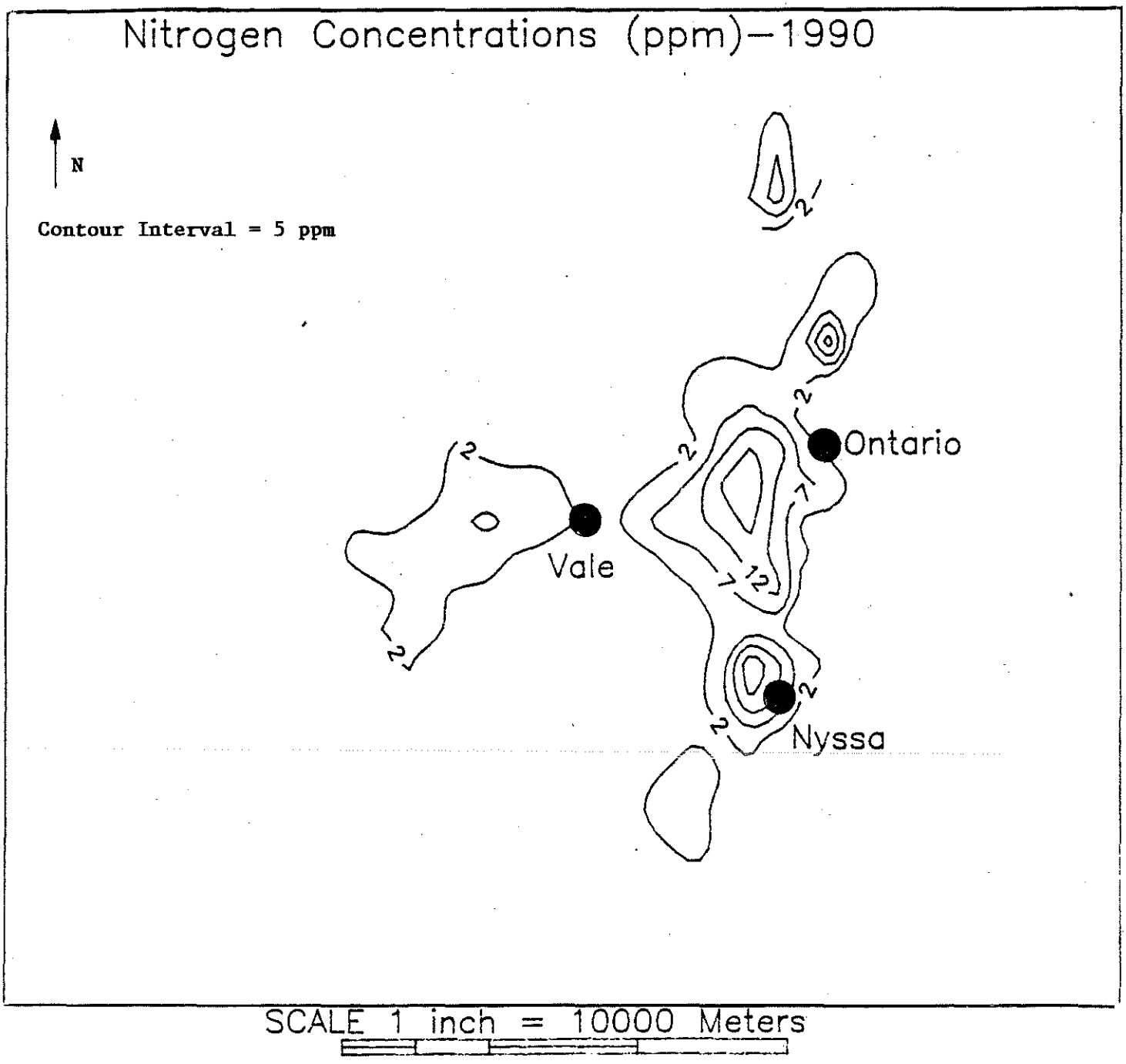
6.45 Areal Distribution

After a thorough review of the available data, several observations can be made. The greatest percentage of sites exceeding the nitrogen drinking water standard are generally located immediately southwest of the city of Ontario (Figure 6). Here 23 of 51 wells (45%) exceed the federal drinking water standard. Groundwater sampling in the Oregon Slope/Annex area revealed 6 of 15 (40%) of the wells sampled exceeded the federal drinking water standard. Analyses of samples collected from the Nyssa/Adrian area showed 3 of 19 (16%) sites in the area exceed the federal drinking water standard. The Vale area had the lowest exceedence percentage with 2 of 28 (7%) of the sites tested exceeding the federal drinking water standard.

Dacthal Di-acid detection patterns were very similar compared to nitrate/nitrite exceedence patterns (Figure 7). The Di-acid was detected in 32 of 45 (64%) of the wells sampled in the Ontario area, with an average concentration of 72 ppb. In the Oregon Slope/Annex area 10 of 15 (66%) of the wells sampled had detectable amounts of Dacthal Di-acid at an average concentration of 29.5 ppb. 11 of 18 or (61%) of the wells sampled in the Nyssa/Adrian area contained Dacthal Di-acid at an average concentration of 9.9 ppb. And in the Vale area 4 of 27 (15%) of the wells sampled contained detectable amounts of the Di-acid at an average concentration of 0.24 ppb.

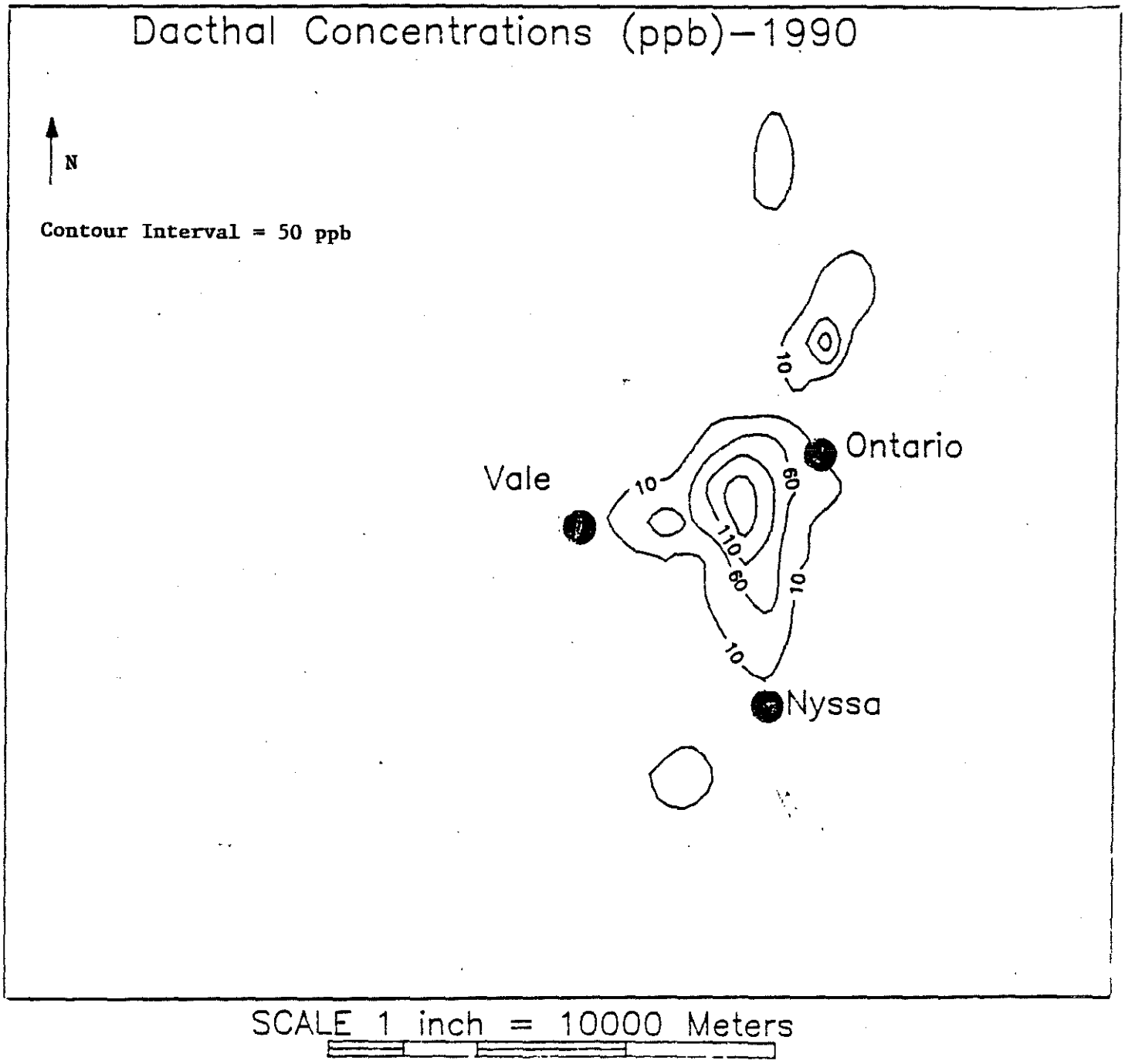
Analytical results of 12 surface water samples collected from 6 sites indicate that irrigation tail water exiting cultivated fields transports nitrate/nitrite and Dacthal di-acid from the fields and into the irrigation and drainage water systems. On one occasion, 2 of these 6 sites exceeded the federal drinking water standard for nitrate/nitrite-nitrogen. Of the 6 sites, 5 have detectable amounts of the dacthal di-acid.

FIGURE 6


Nitrogen Concentrations (ppm)—1990
N
Contour Interval = 5 ppm
Ontario
Vale
Nyssa
SCALE 1 inch = 10000 Meters

A-30

FIGURE 7


Dacthal Concentrations (ppb)–1990
N
Contour Interval = 50 ppb
10
Vale
Ontario
10
60
110
60
10
10
Nyssa
SCALE 1 inch = 10000 Meters

A-31

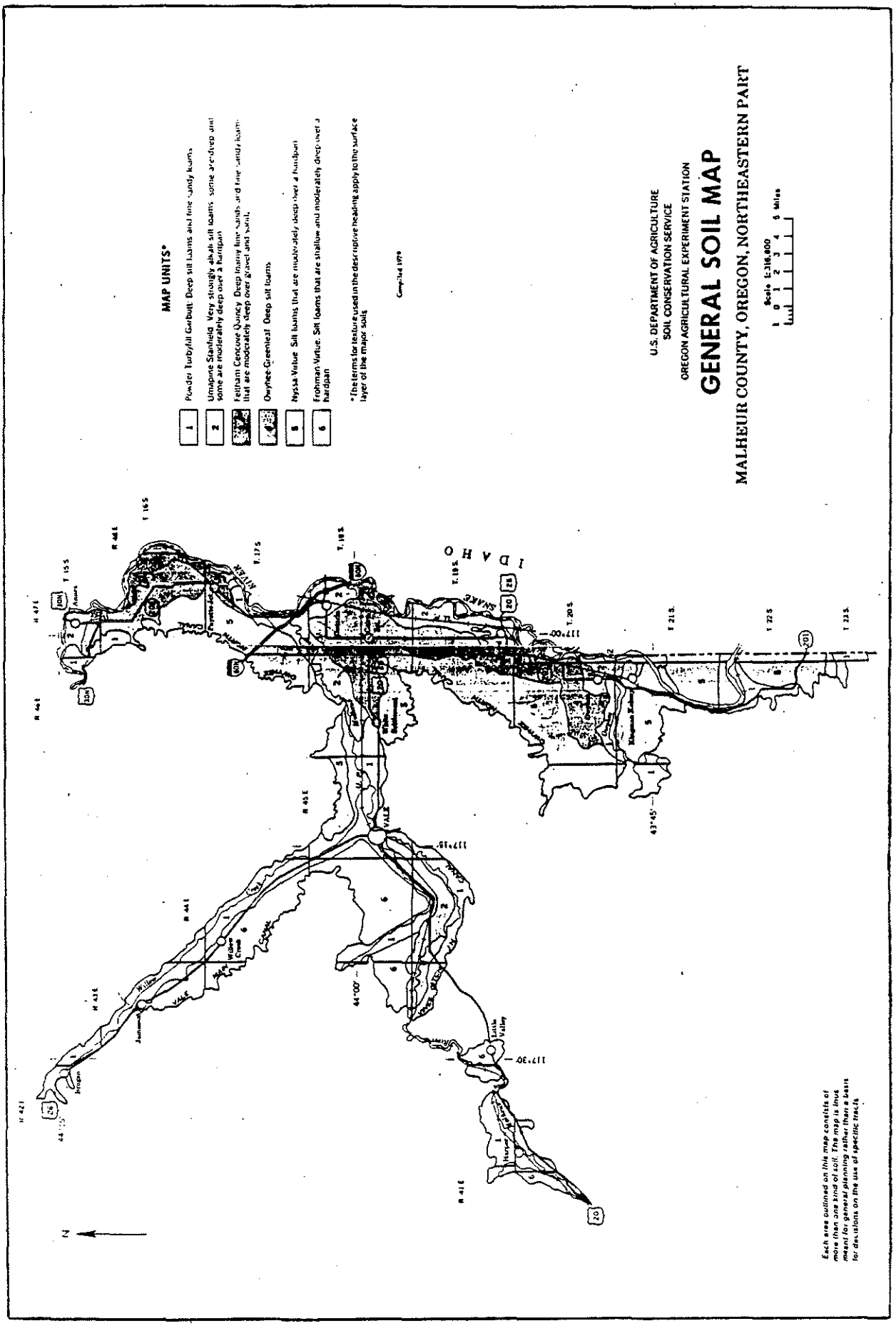
The difference in the contaminant concentrations identified in the wells sampled in the Nyssa, Vale, and Ontario areas may be contributed to both the geological and geographical environments. The major environmental factors influencing the extent of contamination are; depth to groundwater, amount of nutrients and pesticides applied to the surface, amount and source of irrigation water applied, use of the land, and the general groundwater flow direction. Other factors which may influence nitrate/nitrite leaching include subsoil characteristics and the amount of contaminant accumulated in the soil profile, agricultural management practices employed, and seasonal variables such as annual precipitation and snow melt.

A few potential correlations exist between high and low impact areas and should be discussed. The high impact areas of Cairo Junction, Oregon Slope/Annex, and Nyssa/Adrian are similar in that they are generally underlain by the same soil unit, the Owyhee/Greenleaf silt loams (Figure 8). The lesser impacted areas of Vale, Vines Hill, Willow Creek, and White Settlement are underlain by Powder and Umapine silt loams.

Information on soil unit similarities and differences, such as permeability and organic content, and theories of impact mechanisms, such as fluctuating water tables, do not completely characterize contaminant concentration influences because of other factors present. Such factors include, prevailing crop production practices relative to a given soil type. For example, the Owyhee/Greenleaf soil unit appears to overlie the most impacted groundwater areas. This does not mean that impacts can only be expected in this soil unit. Rather, this soil unit is preferred for row crop production, which alone may be the prevailing influence.

Without substantially more information about subsurface soil, vadose zone characteristics and crop production differences or similarities relative to the soil units, it is not possible to make a reasonable correlation between physical characteristics and contamination concentrations. This lack of information is addressed in section 11.10.

FIGURE 8


GENERAL SOIL MAP
MALHEUR COUNTY, OREGON, NORTHEASTERN PART
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
OREGON AGRICULTURAL EXPERIMENT STATION
MAP UNITS*
1 Powder Turbyfill Gerbett: Deep silt loams and fine sandy loams
2 Umapine Stanfield: Very strongly alkali silt loams; some are deep and some are moderately deep over a hardpan
Feltham Cencove Quincy: Deep loamy fine sands and fine sandy loams that are moderately deep over gravel and sand.
Owyhee-Greenleaf: Deep silt loams
Nyssa-Vutue: Silt loams that are moderately deep over a hardpan
Frohman Vutue: Silt loams that are shallow and moderately deep over a hardpan
* The terms for texture used in the descriptive heading apply to the surface layer of the major soils
Compiled 1979
Scale 1:316,800
1 0 1 2 3 4 5 Miles
IDAHO
OREGON
Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

A-33

6.5 Trend Analysis

A simple linear regression correlation coefficient between the Dacthal Di-acid and nitrate/nitrite-nitrogen has been determined to be 0.604 (Figure 9). The graph plots Dacthal Di-acid concentrations versus nitrate/nitrite-nitrogen concentrations of samples analyzed during this project. The graph shows that for a population of 328 samples there is a 99.9% probability that a linear relation exists between Dacthal Di-acid and Nitrate/nitrite-nitrogen contamination (Fisher and Yates, 1962).

Seasonal Trends:

Comparing quarterly concentration averages of the wells sampled for seasonal trends, the Dacthal di-acid shows a significant increase during the July, August, and September quarter (Figure 10). A Student T-Test evaluation determined that this fluctuation is significant at the 95% confidence level. Using the Student T-Test to evaluate the nitrate/nitrite-nitrogen quarterly concentration averages (Figure 11), no significant changes were found.

One possible explanation of the seasonal trend in the Dacthal Di-acid concentration and the lack of a seasonal trend in the nitrate concentrations is that the peak in Dacthal Di-acid observed during the July-September quarter indicates impacts from early summer applications and seasonal loading. The Dacthal may degrade in the aquifer during fall, winter, and spring. In addition, the nitrate applications occur more spread out over the growing season, while the Dacthal is only applied in the spring. Assuming that movement of water through the unsaturated zone occurs primarily as free gravity drainage and is fairly rapid, the increase in Dacthal di-acid in the aquifer during July, August, and September is consistent with travel time estimates developed by Gannett for movement through the saturated layer of the silts.

Long Term Trends:

Evaluation of the data for monotonic trends was conducted using the Seasonal Kendell Statistical method. As shown in figures 12 and 13, there is an apparent trend of decreasing levels for nitrates and the Dacthal di-acid. However, the analysis did not indicate statistically trends in either the Dacthal di-acid or the nitrates for the period of record. This could be because either the trend did not exist or the data base was insufficient to verify a statistically significant trend.

FIGURE 9

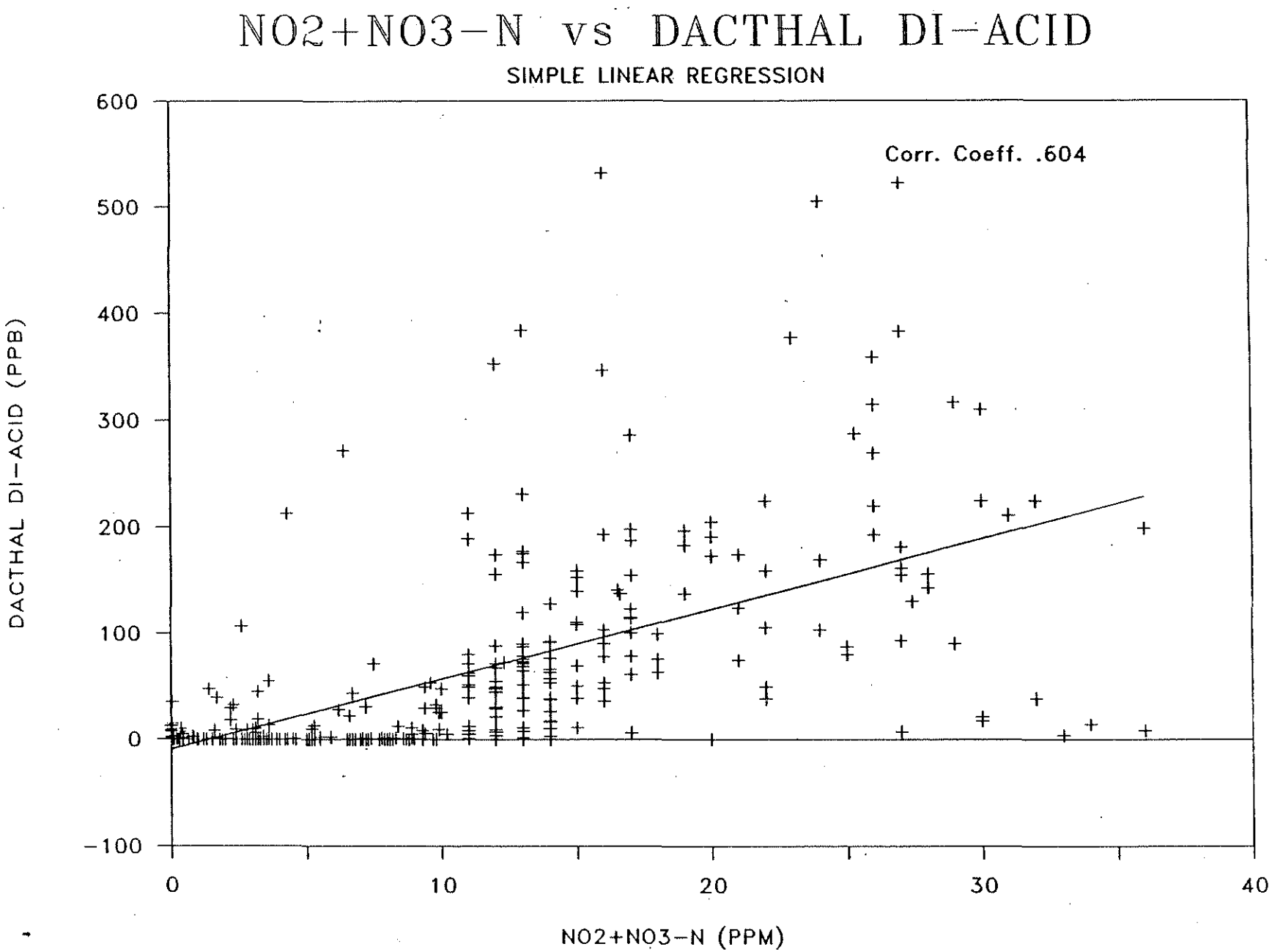

NO2+NO3-N vs DACTHAL DI-ACID
SIMPLE LINEAR REGRESSION
Corr. Coeff. .604
DACTHAL DI-ACID (PPB)
600
500
400
300
200
100
0
-100
0
10
20
30
40
NO2+NO3-N (PPM)

FIGURE 10

N. MALHEUR CO. GROUNDWATER

COMPOSITE AVERAGES -- 156 WELLS

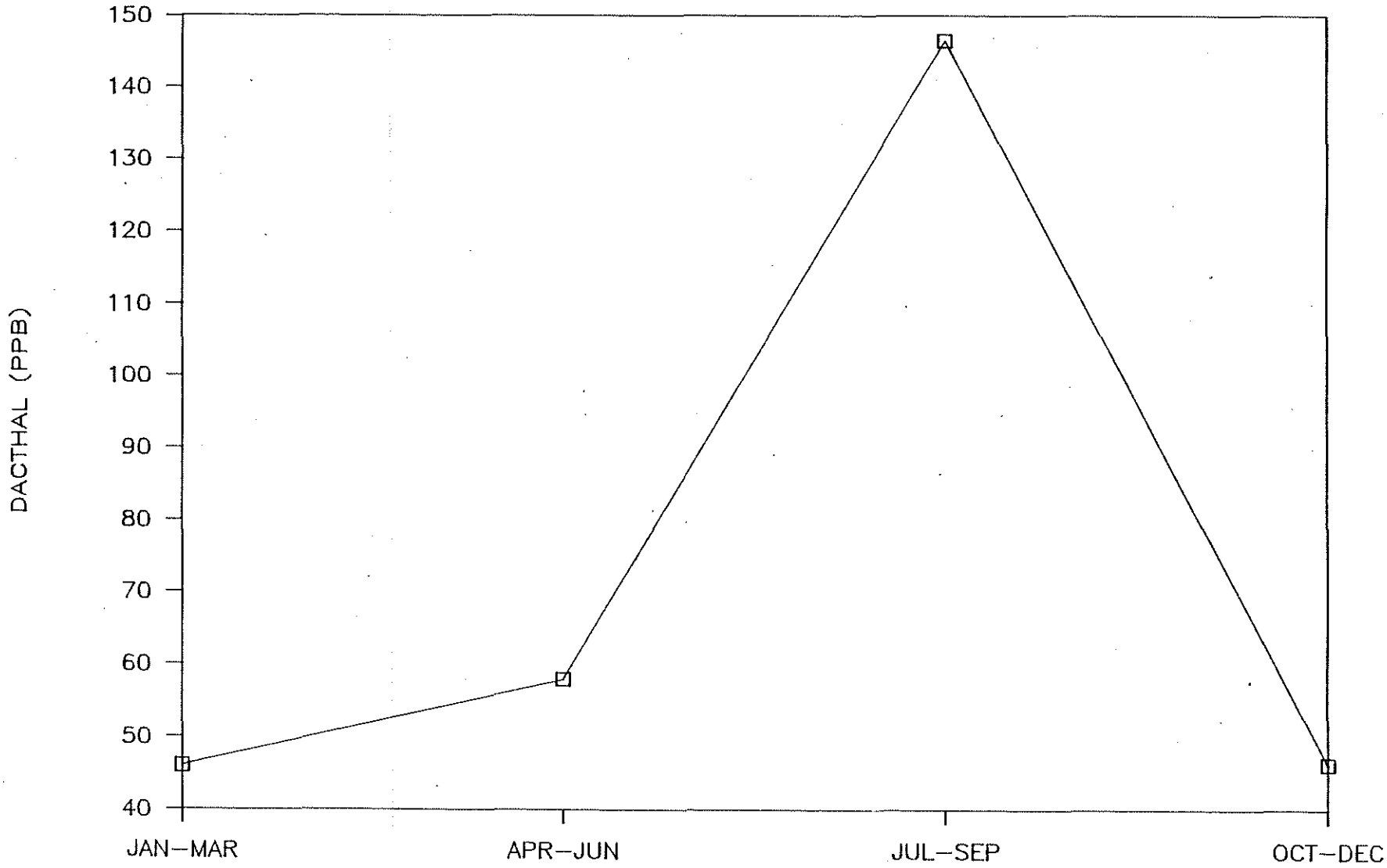


FIGURE 11

N. MALHEUR CO. GROUNDWATER

COMPOSITE AVERAGES – 156 WELLS

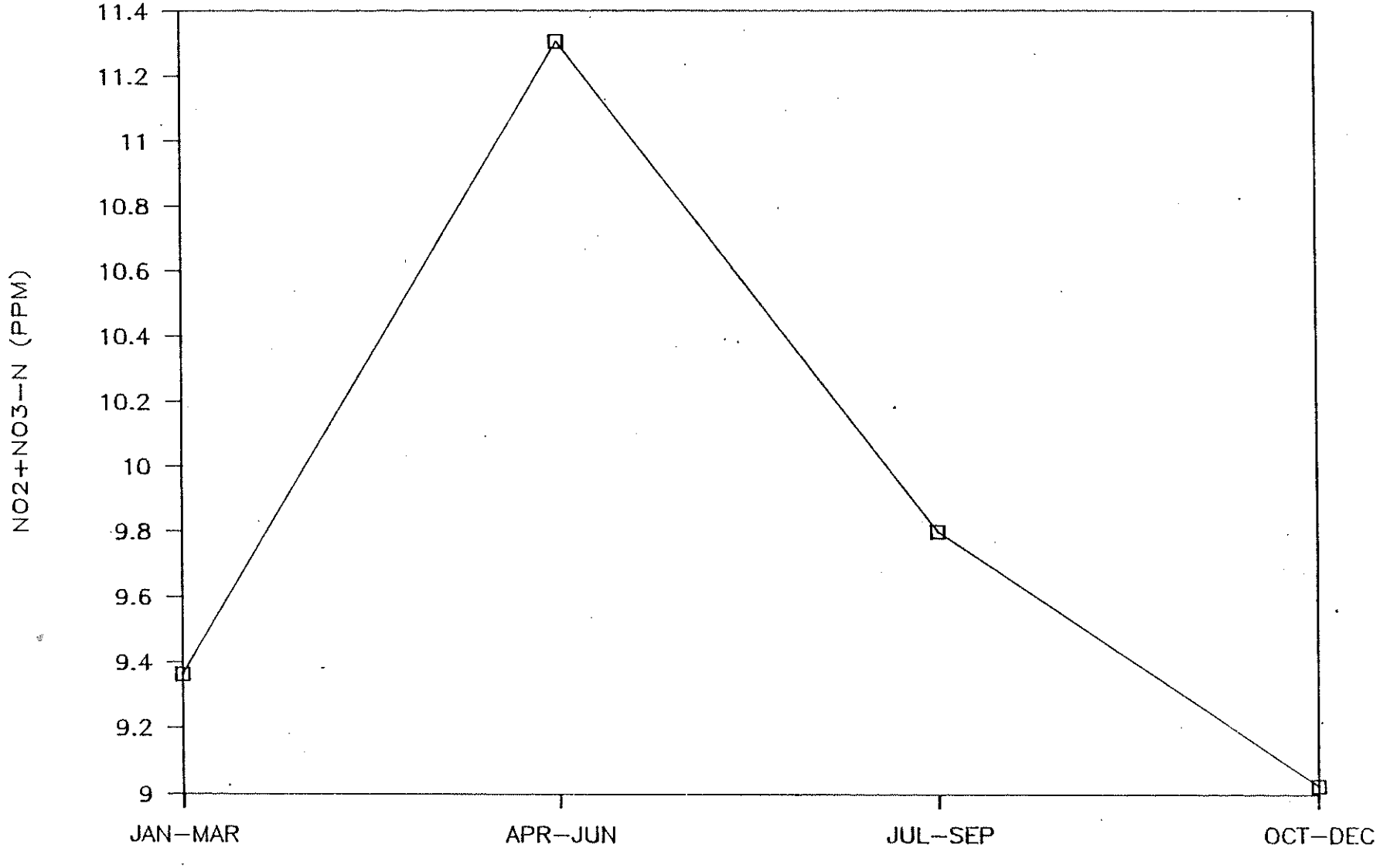


FIGURE 12

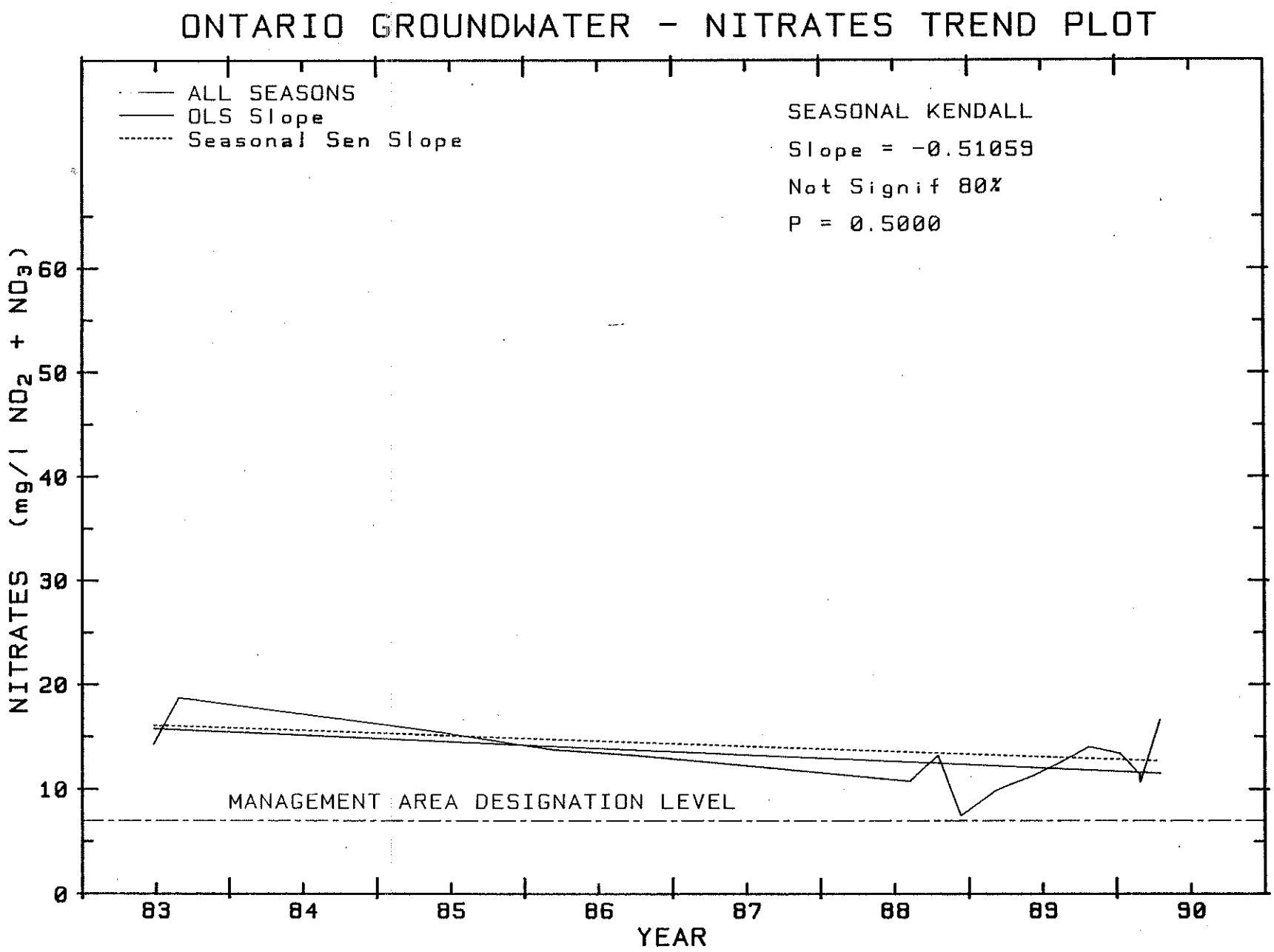
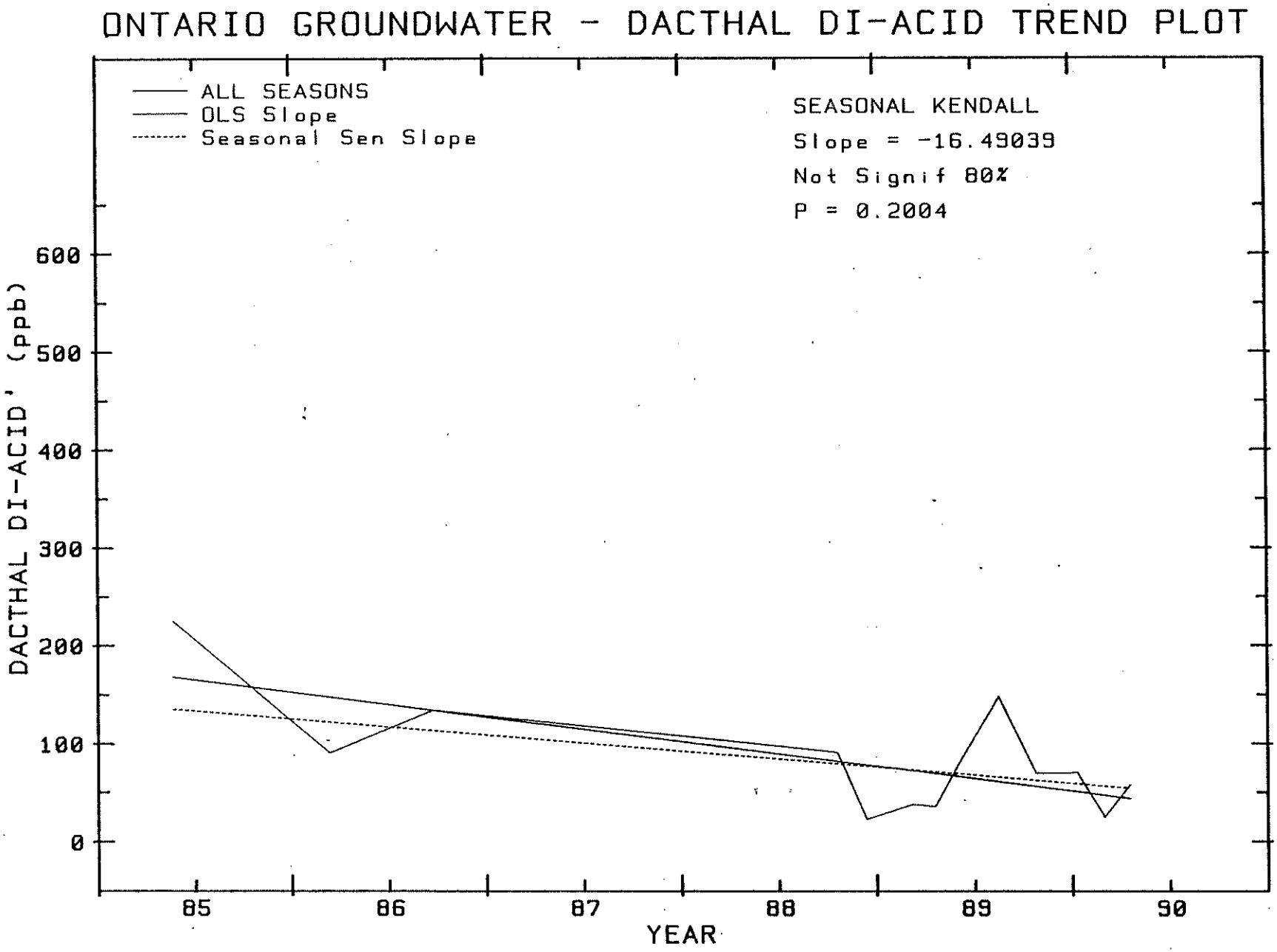

ONTARIO GROUNDWATER - NITRATES TREND PLOT
ALL SEASONS
OLS Slope
Seasonal Sen Slope
SEASONAL KENDALL
Slope = -0.51059
Not Signif 80%
P = 0.5000
NITRATES (mg/l NO2 + NO3)
0
10
20
30
40
50
60
MANAGEMENT AREA DESIGNATION LEVEL
83
84
85
86
87
88
89
90
YEAR

FIGURE 13



A-39

7.0 Water Quality Impacts

Information concerning environmental impacts on land use in Northern Malheur County resulting from the identified groundwater contamination is very limited. This is possibly because the groundwater contamination of concern is from agricultural chemicals and the primary land use in the area is agriculture. Unless nitrate levels are extremely high, any nitrate contaminated groundwater applied to land used for agriculture may be considered a benefit. The dacthal di-acid contamination has not appeared to adversely impact agricultural land uses to date. This may be due to the lack of effects, or the unknown effects, the di-acid metabolite has on the environment.

7.1 Drinking Water Impacts

There are five public drinking water wells within the project area that have needed to be addressed by the State Health Division due to elevated levels of nitrite/nitrate-nitrogen. The wells are operated by Golf Mobile City, Shadow Butte Golf Course, Malheur County Child Development Center, Annex School, and Pioneer School.

Three of these, Golf Mobile City, Shadow Butte Golf Course, and the Malheur County Child Development Center, have been required to minimize health risks associated with consuming the water by providing bottled water to the public.

Due to the nitrate/nitrite-nitrogen concentrations identified in the Pioneer School water well, the school has been required to construct a second well. The second well was completed much deeper than the original well and was thought to have intersected a different water source. Early water sample analysis indicated that the water was free of nitrite-nitrate/nitrogen and the dacthal di-acid metabolite. However, current water sample analysis data show that both nitrate/nitrite-nitrogen and the dacthal di-acid metabolite concentrations are increasing. This indicates that although the well may be obtaining its water supply from a deeper or different source, the contamination is migrating due to changing aquifer conditions or perhaps even pumpage of the well itself. In any case the complete and final impact on the facility's drinking water quality is not known.

The public water supply for Annex school has been identified by the State Health Division as fluctuating in and out of compliance. Under the current federal safe drinking water act requirements, the school has posted notice of the elevated nitrate/nitrite-nitrogen levels identified. The notice is to inform risk group members of the potential health risks associated with consuming the water. Notification of the health risk is required until a permanent solution is found.

A large number of private domestic and irrigation water wells have been affected by the contamination of the shallow groundwater aquifer. Unless the well water is consumed by a person identified as being in the high risk group (infants and pregnant women), the majority of the contaminated water wells are not posing a known threat to human health.

Although water treatment devices and bottled water were popular prior to the identification of the nitrogen and dacthal Di-acid contamination, increasing public concern of drinking water quality has lead many residences to install water treatment devices or use various types of bottled water. Reverse Osmosis treatment is the only device proven by this assessment to remove both the nitrate and Dacthal Di-acid contaminants found in the area's groundwater. Since 1986, over 80 units have been installed in the area (Personal comm. Charles Wonka). Current sales records from a local vender indicate approximate 4 units per month are sold in the area with sales increasing. In addition to treatment devices, local residents also consume over 3500 gallons of bottled water per month (personal comm. Charles Wonka). Currently, bottled water sales are increasing at approximately 33% per year.

Economic impacts have also surfaced during real estate transactions. The Federal Housing Administration's (FHA) and Veterans Association's (VA) current policy is to deny home mortgages due to the elevated nitrite/nitrate-nitrogen concentrations (FHA oral comm. 1990). Since approximately 65% of the mortgage loans obtained in Northern Malheur County are insured through the FHA or VA programs, obtaining future home mortgages for properties with water wells containing elevated levels of nitrite/nitrate-nitrogen is considered to be a potential problem for the property seller, buyer, and real estate broker (Century 21 oral comm.).

7.2 Treatment Options

From the information generated by this assessment, the most effective point of use device for treating water contaminated with nitrate/nitrite-nitrogen and the Dacthal di-acid is the reverse osmosis treatment device. This treatment has been shown to reduce very high levels of both nitrate and the dacthal di-acid to almost non-detectable levels. As described in section 7.1 over 80 units have been installed in the impact area and new installations are currently estimated at 4 per month.

Other treatment methods available for the removal of nitrate/nitrite-nitrogen from drinking water include ion exchange and distillation. This equipment requires frequent, careful maintenance and sampling to achieve and confirm effective operation. If a treatment device is desired, one with National Sanitation Foundation certification should be selected (Department of Human Resources, Health Division, 1988).

Boiling drinking water containing elevated levels of nitrate/nitrite-nitrogen will not remove or reduce the contaminant but may actually concentrate it. Bottled water, or another source of drinking water, should be used for those individuals without effective treatment devices who may be susceptible to methemoglobinemia (Department of Human Resources, Health Division, 1988).

8.0 Identification of Contaminant Sources

Several possible sources of nitrate/nitrite-nitrogen contamination have been identified in Northern Malheur County. These sources include; residential lawn care, food processing facilities, agricultural chemicals, on-site sewage systems, confined animal feed lot operations, and food processing facilities.

There is only one main source of the dacthal di-acid contamination, agriculture usage. A large volume (40,000 lbs/yr) of this pre-emergent herbicide (which breaks down to yield the di-acid contaminant found in the shallow groundwater) is used exclusively for agricultural production. Of the crops produced in Northern Malheur County, the largest amount of Dacthal is used for onion production (Rinehold and Witt, OSU, 1989).

8.1 Nitrate/Nitrite-Nitrogen

As discussed in section 6.1, naturally occurring nitrate/nitrite levels are considered to have been far below the levels currently being documented. The following sections describe possible sources of the elevated nitrate/nitrite levels found in the areas groundwater.

8.11 Residential Lawn Care

Turf lawns have been suggested to be potential contributors to the groundwater contamination through the use of residential fertilizer use. Over watering and over fertilization of home lawns can lead to nitrogen leaching. However, under normal fertilization and watering practices associated with home lawn care, a healthy turf acts as a filter preventing leaching of nitrogen fertilizer and allows time for biological breakdown.

Experimentation has shown that the "lack of significant amounts of nitrogen fertilizer by leaching coupled with the near cessation of fertilizer uptake in the grass within three weeks following fertilization, indicates that nitrogen fertilizer is rapidly converted to non-mineral forms. The large amount immobilized in the thatch suggests that this layer contains conditions suitable for a highly active microbial population" (Starr, DeRoo, 1981).

Unless a home owner is negligent in fertilizer and irrigation applications, nitrogen contamination expected from residential lawns is considered to be minimal relative to other potential sources in the region.

8.12 Food Processing Facilities

There are several food processing facilities in Malheur County which have the potential to cause groundwater quality degradation. Of these, none are located in the immediate vicinity of the project priority areas. These facilities are being regulated and continually assessed through existing wastewater permit programs. The DEQ, in cooperation with various other state and federal agencies, currently operate programs which seek to protect Oregon's water quality from known contaminating sources. No pollutant can be legally discharged into Oregon waters with out a permit from DEQ.

8.13 Cull Onion Disposal Pits

The commonly accepted method of disposing of cull onions in the past was to bury the culls in large earth trenches. This method was developed by local growers and shippers in cooperation with Oregon State University (OSU) and the Oregon Department of Agriculture (ODA) to break the life cycle of the onion maggot and reduce pesticide use. During a routine site visit in 1989, DEQ documented potentially contaminating nitrate/nitrite-nitrogen leachate at a concentration of 1440 mg/l present at the bottom of a stockpile waiting burial. Currently, OSU Extension Service is assisting local shippers in conducting research to determine the feasibility of alternative cull onion disposal methods, such as, land application.

8.14 On-Site Septic Systems & Confined Animal Feed Operations (CAFO)

As with food processing sources, pollution from septic systems and CAFOs are regulated and monitored through permits administered by the DEQ and ODA respectively. Although on-site septic systems and confined animal feed operations are potential pollution sources, they are not considered to be a major contributor to Northern Malheur County's groundwater quality problems. Calculations (Appendix C) of expected contributions from these sources reveal they contribute very little relative to other potential sources in the region (CAFO Guide, SCS, 1982).

8.15 Agriculture

Generally nitrogen fertilizer is applied close to the amount required to sustain a substantial crop (Vomocil, 1988). In certain situations however, excess nitrogen fertilizer is applied to reduce the limiting yield effect resulting from under nitrogen fertilization and in some cases to compensate for other deficiencies which affect crop yields. This practice creates groundwater quality problems when the applied nitrogen far exceeds the crop uptake and the excess is not fixed by the environment (Vomicil, 1988). This may allow remaining nitrogen to be available to contaminate surface water and groundwater.

When coupled with un-monitored nitrogen fertigation, (the practice of applying nitrogen fertilizer through irrigation water), furrow and rill irrigation methods allow transport, and possible accumulation, of nitrogen fertilizer as the water moves from one field to the next. The problem is accentuated when water with elevated levels of nitrogen fertilizer is used to irrigate a field which already has received nitrogen fertilizer applications. The net result is a substantial increase in the nitrogen fertilizer content of the soil profile and irrigation water leaving the field.

8.2 Primary Nitrogen Contamination Source Calculations

Simple calculations regarding the amount of nitrogen leached from each source identified above, indicate that agriculture is the most likely source of nitrogen impacts on the local environment.

Correlating nitrogen fertilizer inputs and expected removal of the various crop production practices used in the area, a determination can made to identify which crop is most likely to cause groundwater quality problems. An approximation of the effluent nitrogen concentration expected from a particular crop management practice can be determined using the following parameters;

* Commercial nitrogen fertilizer quantities generally applied for a specific crop (Vomicil, 1988),

* The amount of nitrogen the crop is expected to take up and remove (Vomocil, 1988),

* The anticipated maximum amount of nitrogen expected to be lost through denitrification,

* The relative evapotranspiration expected,

* And the amount of irrigation water applied, lost to evaporation or leaching, or consumed,

The values in Table 5 were obtained using a mathematical formula developed to determine the allowable irrigation application rate of water containing nitrogen without causing nitrate/nitrite nitrogen contamination of the groundwater (EPA, 1981).

The nitrogen loading rate is determined using the following formula.

$$C1 = \frac{[L \times (1-DF/100) \times C2] + 4.4 \times (N-D)] + (Q \times C3) + (S \times C4)}{L + P + ET + Q + S}$$

Where:

C1 = N concentration of leachate, mg/l.
L = Annual loading rate of reclaimed water, inches.
DF = Denitrification, in percent.
C2 = N concentration in reclaimed water, mg/l.
N = Amount of N fertilizer applied, lbs/acre/year.
D = N content of crop, lbs/acre/year.
P = Annual net precipitation, inches.
ET = Annual potential evapotranspiration, inches.
Q = Annual irrigation of unreclaimed water, inches/year
C3 = N concentration of unreclaimed water, inches/year.
S = Soil water, inches.
C4 = N concentration of soil water, mg/l.

The formula was designed for wastewater treatment systems to determine the maximum amount of water which could be applied, through irrigation, to a specific environment without causing nitrate nitrogen in the receiving ground water to exceed 10 mg/l.

TABLE 5

Relative Comparison Of Approximate Effluent Concentrations Expected From Select Crops Grown In Northern Malheur County

CROP	APPROXIMATE EFFLUENT CONCENTRATION (mg/l)
Onions	38.2
Grass Hay	21.2
Potatoes	12.7
Beets	12.7
Barley	11.7
Corn	9.5
Mint	8.5

By adapting this formula for normal agricultural operations, (setting the irrigation of reclaimed water to zero and substituting the rate of regular irrigation water for the application rate of unreclaimed water), the approximate effluent nitrogen concentrations expected from the major crops produced in Northern Malheur County can be determined. Comparing these values, a determination can made indicating which crop is most likely to cause groundwater quality problems.

As listed in Table 5, it is estimated that current management practices for onion production contributes a higher nitrogen concentration effluent relative to other major crops produced in Northern Malheur County.

The formula indicates that the total amount of nitrogen leaching to the groundwater is primarily determined by the amount of nitrogen applied and already in the soil and the amount of water percolating through the soil. A reduction in irrigation water will help retain the nitrogen in the crop root zone longer, and allow the crop to utilize the nitrogen rather than flushing the nitrogen past the root zone and into the vadose zone. However, according to the formula, a reduction in the amount of irrigation water will not decrease the expected nitrogen leaching concentrations since the water is providing dilution of the nitrogen. Theoritically, only a reduced amount of nitrogen present will reduce the expected effluent concentration.

For Northern Malheur County, the most appropriate way to reduce the amount of nitrogen leaching to the shallow groundwater is through a more efficient irrigation management program which reduces the amount of deep percolation as well as a more efficient nutrient management program which balances the amount of nitrogen fertilizer applied to the soil and the amount of nitrogen fertilizer removed by the crop.

8.3 Dacthal Di-Acid

The Dacthal di-acid contamination has two potential transport mechanisms. These are: 1) normal application of the herbicide or 2) point source leaks, spills, residue disposal, and other possible mishaps during distribution or application. No major distribution problems have been documented which may have caused the wide spread contamination found. Estimates from vender inventories indicate that over 40,000 pounds of Dacthal is sold in Malheur County each year. The herbicide is currently registered for use for a variety of agricultural crops such as melons, onions and potatoes. The most common use of the herbicide in Malheur County today is for onion production (Rinehold, Witt, 1989).

9.0 Consideration Of All Reasonable Alternatives For Amelioration

There is a limited choice of alternatives that will eventually reduce or eliminate the groundwater problems identified in Northern Malheur County. Any solution to reduce nitrogen in the ground water must reduce nitrogen fertilizer and irrigation water application rates. Nitrogen fertilizer and irrigation water should be applied at the right time and in the right amounts to allow greater efficiency of nitrogen use and create less leaching.

From the discussion in the preceding sections, it should be apparent that there are only two rather distinct alternatives which may be applied in the effort to reduce the agricultural chemical contamination of Northern Malheur County's groundwater. These are;

1) Successful implementation of a voluntary nutrient and irrigation management program. The program must be able to balance nitrogen fertilizer inputs and removal in order to avoid nitrogen impacting the groundwater. Educational programs and demonstration projects must be utilized to produce a social climate within the county that will strongly promote and encourage the voluntary adoption of these practices when assistance programs are not available as incentives.

2) State regulation of nitrogen fertilizer and irrigation water application rates. DEQ regulations on nitrogen use can be implemented to reduce the amount applied. This would ensure that the effluent nitrogen concentration reaching the shallow groundwater is below that which caused the groundwater management area declaration. DEQ regulations will be implemented only if future water quality monitoring does not indicate that reductions in contamination concentrations are occurring due to voluntary efforts.

10.0 Implementation of Ameliorative Actions

In order to ameliorate Northern Malheur County's groundwater quality problems by the use of efficient nutrient management practices, the practices must first be developed and implemented by the agricultural community. As indicated in section 9.0 there are two basic approaches available to accomplish this. There is the regulatory approach and the voluntary approach. Both of these have merits as well as drawbacks.

10.1 Regulatory Approach

The regulatory approach is not considered to be as desirable as a voluntary approach. It is also less practical. The regulatory approach would require obtaining financial and administrative resources to provide compliance monitoring and enforcement. The regulatory approach would not allow customized agricultural management practices to be used by growers only a blanket requirement for maximum nitrogen fertilizer applications. This would restrict growers by not allowing individual manipulation of farm practices in order to reach the common goal of nitrogen fertilizer application reductions.

10.2 Voluntary Approach

The more favorable approach is voluntary acceptance and implementation. Using this approach, the best available agricultural management practices ("BMPs") would be voluntarily implemented to insure groundwater quality amelioration. This approach will also allow each individual farm to have the opportunity to customize the available "BMPs" to yield a sequence or system of management practices complimentary to each individual farm operation.

For this plan "BMPs" shall include but not be limited to the management practices established by the SCS Technical Field Office, OSU Extension Service Recommended Fertilizer Application Guides, and any practices adopted by the Malheur County Groundwater Management Committee (Appendix D).

In addition, the OSU Agricultural Experiment Station has presented recommendations for further research and experimentation of potential "BMPs". These recommendations are contained in the report entitled "Northern Malheur County Groundwater Management Area Crop Production Practices And Groundwater Quality (Appendix E).

As new "BMPs" develop, or as existing "BMPs" are field tested, they will be reviewed and evaluated by the associated agencies involved with this project for their applicability in this program. If it is determined that the particular "BMP" being evaluated does not meet the needs of the county's groundwater management plan it will be excluded. "BMPs" developed and determined to be adequate for the county's groundwater management program will be promoted. Such periodic assessments should be performed annually, or as information becomes available.

10.3 Individual Farm Management Plans

As discussed in the preceding section, an individual farm plan, formulated using "BMPs" to create a nutrient management program which is customized for each individual farm's operational needs, is considered to be the best available solution to insure adoption and implementation of protective water quality management practices.

To help facilitate this, the SCS has developed a Field Office Technical Guide for nutrient, pest, and irrigation water management practices, which, when applied, will reduce the amount of agricultural chemicals contaminating the groundwater. To encourage adoption and implementation at the local level, the ASCS has and will continue to provide, where possible, cost share programs to help offset costs incurred by producers when implementing these practices.

Using this approach individual farm management plans should be formulated to meet the individual farmer's desired operation and should incorporate recommended nutrient, pest and irrigation management practices. The management plans should be approved by the local Soil and Water Conservation District. Technical assistance to develop and implement individual farm plans will be provided by the SWCD, the USDA Soil Conservation Service and the OSU's Cooperative Extension Service.

To insure adequate adaptation of a farm plan to each farm's operation, any particular "BMP" or "BMP" sequence which the grower believes is not appropriate and should not be included in the plan, may be revised to meet the farm's needs. The revisions must be shown to be technically sound, meet SCS guidelines (as reflected in the field guide) and must be approved by the Soil and Water Conservation District.

To encourage the acceptance and implementation of the farm plans, it will be necessary to perform periodic visits to individual farms to review and discuss the project. These visits will allow "feedback"as to whether expectations are being met and whether recommended "BMPs" incorporated in the plan are providing the groundwater protection required. If it is determined that a particular farm plan is inadequate, revisions can be made to correct the plan.

10.4 Customized "BMPs" For Northern Malheur County

Since the discovery of Northern Malheur County's groundwater quality problems, the agricultural industry and local community have explored, developed, and promoted farming methods designed to protect groundwater quality from the contamination sources identified. The following is a description of some of the activities recommended to be adopted as "BMPs" for Northern Malheur County.

10.41 Soil and Water Testing

Prior to applying nitrogen fertilizer, soil testing should be conducted to determine the amount of available nitrogen in the soil profile prior to planting a crop or applying additional nitrogen fertilizer. Nitrogen available in the soil profile should be considered and incorporated in the calculations used to determine the amount of nitrogen fertilizer to be applied.

In addition, irrigation water should also be tested periodically to determine the relative nitrate/nitrite contribution resulting from use of the water.

10.42 Banding Dacthal Applications

Dacthal will be applied by banding along the furrow, this is to replace the former practice of applying Dacthal by broadcasting. This practice reduces the amount of Dacthal applied by one third and subsequently reduces the amount of Dacthal Di-acid available to reach and impact the groundwater by one third.

10.43 Fertilizer Use Education Certification

Continuing education of farm operators, fieldmen and consultants who use or recommend fertilizers will be a high priority. Developing awareness and good stewardship practices through voluntary education should be the initial strategy to mitigate groundwater concerns. If the funds are made available, OSU Extension Service will take the lead in developing training material and educational curriculum regarding fertilizer use and groundwater protection. Extension, TVCC, and the private sector will work aggressively to deliver educational programs to all clients in the management area.

Certification of completion will be issued to those individuals who have successfully completed the program. Growers, producers, and land operators will be strongly encouraged to utilize certified individuals when applying fertilizer or obtaining fertilizer application recommendations.

10.44 Nitrogen Applications For Furrow Irrigated Potatoes

Nitrogen fertilizer applications when using furrow irrigation to produce Potatoes.

1. Sample soil to determine the nitrogen fertilizer deficiency to produce the crop.

2. Apply the balance of nutrients that the soil test results indicates is required to meet the total uptake of the crop.

3. Unless shown to be technically sound, nitrogen fertilizer shall not be applied after the last day of June during a growing season.

4. Unless shown to be technically sound, total nitrogen fertilizer applied during a given growing season shall not exceed 200 pounds of active nitrogen per acre.

5. Crop rotation patterns shall restrict potato production to a maximum of once every three years.

10.45 Nitrogen Applications For Furrow Irrigated Onions

Nitrogen fertilizer applications when using furrow irrigation to produce Onions.

1. Sample soil to determine the fertilizer deficiency to produce the crop.

2. Between planting and 125 days after planting, apply the nitrogen fertilizer deficiency, as determined by the soil test.

3. Unless shown to be technically sound, nitrogen fertilizer shall not be applied after the last day of July in a particular growing season.

4. Unless shown to be technically sound, total nitrogen fertilizer applied during a growing season shall not exceed 300 pounds of active nitrogen per acre.

5. Crop rotation patterns should restrict onion production to a maximum of two out of four years.

10.46 Nitrogen Applications For Furrow Irrigated Sugar Beets

Nitrogen fertilizer applications when using furrow irrigation to produce sugar beets.

1. Sample soil to 3 ft. or hard pan to determine the fertilizer deficiency to produce the crop.

2. If the soil test indicates the available nitrogen is less than the recommended rate of 8 lbs/ton (at harvest) apply the amount of nitrogen to reach the recommended rate.

3. Petiole sampling and testing will be performed periodically during the growing season to manage nitrogen applications.

4. Unless shown to be technically sound, total nitrogen fertilizer applied during a growing season should not exceed 300 pounds of active nitrogen per acre.

5. Crop rotation patterns shall restrict beet production to a maximum of once every three years.

6. Nitrogen fertilizer shall not be applied after July 15th during a particular growing season.

10.47 Nitrogen Fertilizer Applications For Established Turf Lawns

1. Nitrogen fertilizer applications for established turf lawns should not exceed 1 lb. active nitrogen per 1,000 sq. ft. of lawn.

2. Nitrogen fertilizer applications should be limited to four applications per growing season.

3. Nitrogen fertilizer applications shall be at least one month apart.

10.48 General Nitrogen Fertilizer Applications

1. Nitrogen fertilizer should only be applied in the spring or during the growing season.

2. Irrigation water containing nitrogen fertilizer should not exit a field.

3. Irrigation water containing nitrogen fertilizer should not accumulate and pond.

10.5 Implementation Schedule

The schedule for public review of this amendment has been determined in the Oregon State House Bill 3515. The entire process from public comment through rule adoption should take no longer than one year. Oregon State House Bill 3515 states, after completion and distribution of the draft action plan, a 60 day period of public comment shall be provided.

Within 60 days after the close of the public comment period DEQ shall complete the final action plan. Within 30 days after completion of the final action plan, SWMG shall accept or require revisions to the plan. Revisions must be completed within 30 days of the request.

Within 120 days after adoption of the plan by SWMG, each agency responsible for implementing all or part of the plan shall adopt rules necessary to carry out the agency's duties.

Participating state and federal agencies' responsibilities, as described above, shall be adopted upon approval of this plan by the Strategic Water Management Group (SWMG).

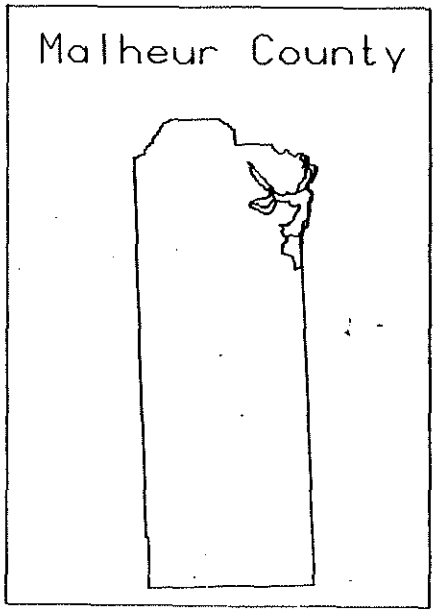
Priority areas have been established in relation to the contamination concentrations identified in the area and the location of the area relative to groundwater and surface water flow. These areas may be re-prioritized upon obtaining additional information on the contaminant concentrations found in the area's deep soil profile. This work is scheduled to be undertaken during 1990. A preliminary designation of priority areas is illustrated in Figure 14.

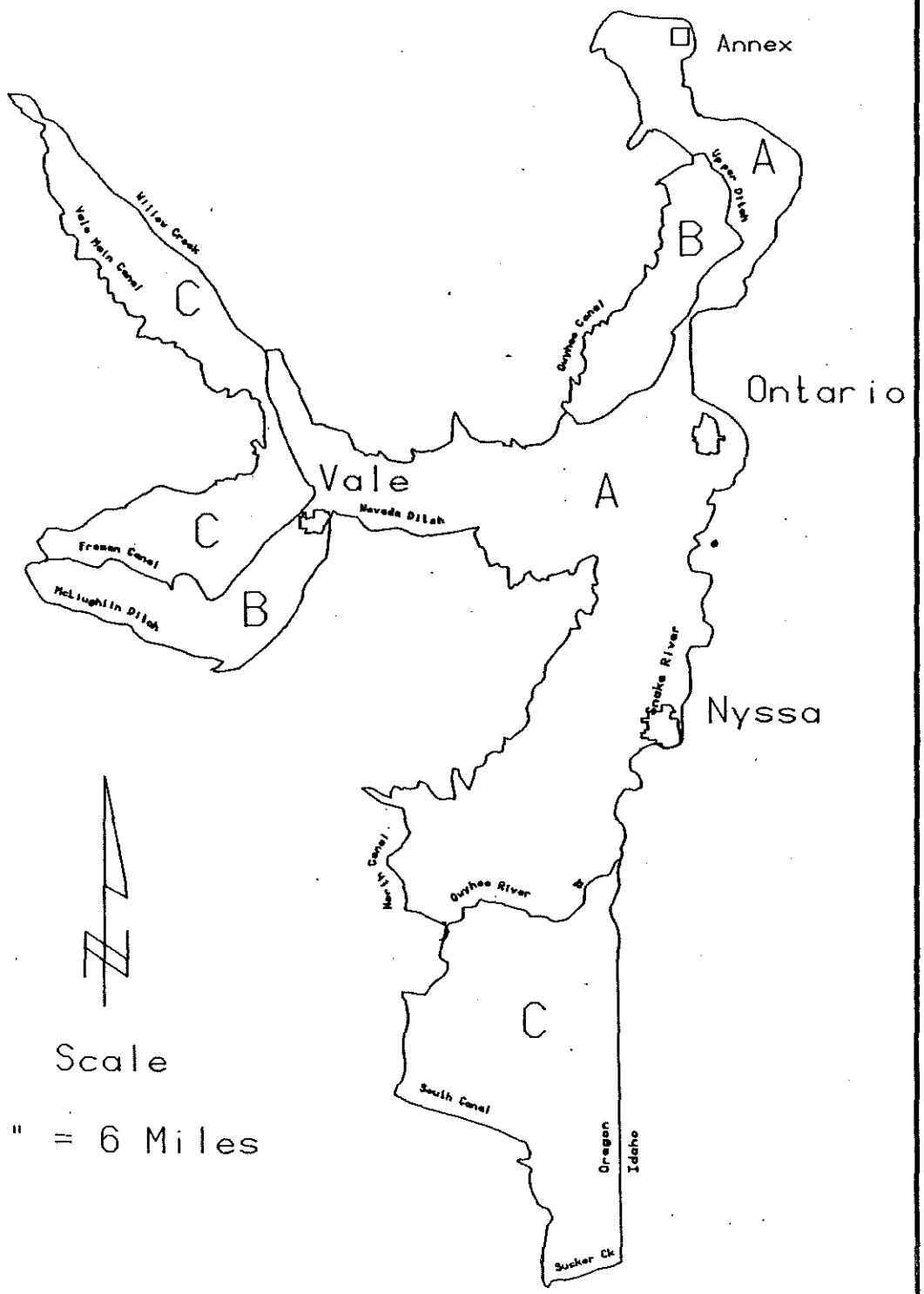
For the 1992 agricultural season, the farm plans will incorporate the existing "BMPs" considered to be groundwater protective. "BMPs" currently scheduled for development will be available for the 1993 agricultural season and these "BMPs" will be included in the farm plans for the 1993 agricultural season. After the 1993 agricultural season, newly developed "BMPs" and existing "BMPs" will be evaluated periodically as information comes available to determine the applicability of the "BMP" for this program.

Adoption of new "BMPs" specifically designed to aid in the protection of the regional groundwater quality will take place upon verification of the methods as "BMPs". To verify a "BMP", an evaluation of the "BMP" will be performed by each of the state and federal agencies participating in this strategy.

FIGURE 14

Priority Areas for Implementation





Scale

1" = 6 Miles

A-55

10.6 Schedule of Estimated Reductions in Contaminant Concentrations

As stated in the Groundwater Act of 1989, the ultimate goal of this plan is to reduce the levels of nitrite/nitrate-nitrogen found in the shallow groundwater supply to below the level which causes a Groundwater Management Area declaration, or 70% of the MML Standard of 10 milligrams per liter (mg/l), which is 7.0 mg/l.

A full discussion of factors influencing the expected rate of decrease in groundwater contaminant levels is contained in the Gannett report. From that discussion it would appear that contaminant level reductions should be evident in a few years if contaminant loading is being significantly reduced.

In order to evaluate the effectiveness of the management plan, an analysis will be conducted 5 years after adoption of the plan. If the analysis indicates that the 0.75 percentile level of the nitrate monitoring data for the entire management area is below 7 mg/l or a trend analysis indicates at the 80% confidence level that nitrates will reach the 7 mg/l level by July 1, 2000, the management plan will be considered to be successfully achieving its goals. If the 0.75 percentile has not dropped below 7 mg/l and a statistically significant trend can not be demonstrated at the 80% confidence level, that nitrate levels will drop below 7 mg/l by July 1, 2000, the management plan will be found to not be achieving its goals and will be reevaluated and revised accordingly.

11.0 Tasks, Duties, Roles, And Responsibilities

The following is a brief description of the roles and responsibilities to be undertaken by the participating agencies and organizations.

11.1 Malheur County Groundwater Management Committee

The Malheur County Groundwater Management Committee and Subcommittee have been appointed to assist the State of Oregon (SWMG) in the formation and implementation of a groundwater management plan. After the adoption of the plan by SWMG, the technical subcommittee will continue to periodically meet to review the implementation of the management plan and the progress made by the plan.

The technical subcommittee will periodically review and report plan implementation progress to the management committee. The management committee will review these reports and provide recommendations for plan revisions to the technical subcommittee. The technical subcommittee will further refine the proposed revisions and promote the objectives of the plan.

In addition to the technical subcommittee a research management subcommittee should be formed to provide oversight management and project approval of agricultural research activities occurring in Northern Malheur County. The research subcommittee will evaluate and review research projects to insure appropriate research projects are funded and duplication of efforts does not occur. This subcommittee shall be composed of at least three committee members and should be chaired through the SWCD.

11.2 Oregon State University Agricultural Experiment Station

The Oregon State University Agricultural Experiment Station serves as the principal agricultural research agency in the state. For Northern Malheur County Groundwater Management Program, the Agricultural Experiment Station will seek to test technological alternatives. Research projects will seek to provide practical information for groundwater quality "BMPs" including the following:

A. The influence of nitrogen fertilizer rates, placement, timing, and form.

B. Efficiency of nitrogen use by the crop, nitrate movement through the soil, and nitrogen losses to irrigation water runoff from various practices.

C. Phosphate and soil loss in irrigation water runoff from various practices

D. Effectiveness of irrigation water-applied nitrogen alternatives.

E. Water use efficiency in plant water stress research, and soil water monitoring.

F. Crop rotation patterns which will allow recovery of nitrogen residue in the soil.

G. When feasible, perform nitrogen analysis of water samples submitted by the local community.

11.3 Oregon State University Cooperative Extension Service

The Oregon State University, Cooperative Extension Service (CES), provides educational programs for a variety of commercial, home, and youth audiences emphasizing agricultural management practices, and environmental safety. For this project, OSU Extension Service shall develop, and provide educational programs to individuals, organizations, and the public to facilitate the acceptance and implementation of the groundwater protective agricultural management practices developed for Northern Malheur County.

Specifically, Malheur County Extension Service shall seek to:

A. Design and develop an educational program to provide state of the art information concerning soil fertility testing and fertilizer application.

B. Conduct a reduced fall fertilizer application demonstration project.

C. Conduct a slow release nitrogen fertilizer demonstration project.

D. Conduct a cull onion alternative disposal demonstration project.

E. Continue to conduct water quality education awareness programs.

11.4 USDA Agricultural Stabilization & Conservation Service

The US Department of Agricultural Stabilization & Conservation Service (ASCS), administers federal cost share programs which provide financial assistance to farmers for conserving soil and irrigation water and reducing farm-originated non-point source pollution to improve water quality.

For this program ASCS, in cooperation with DEQ, ODA, OSU, SWCD, and SCS, will develop policies for preferred "BMPs" and request national ASCS approval of the specified practices. Specifically the ASCS will:

A. Develop applications for nationally funded special water quality projects for determined areas.

B. Channel annual ACP (approved conservation practice) cost-share funds to practices prioritized by the state and county ASC committees.

C. Coordinate funding requests for ACP agricultural producers for implementation of USDA Non Point Source Water Quality Hydrologic Unit areas designated in Northern Malheur County.

D. Continue to administer the cost share programs to provide financial assistance to land operators in Northern Malheur County while implementing SCS-approved practices for nutrient management, pest management, and irrigation management. If program progress can be demonstrated then potential exists to establish these programs for continued use in Northern Malheur County.

11.5 USDA Soil Conservation Service

The Soil Conservation Service activities include implementation through the local Soil and Water Conservation Districts of technical and financial assistance programs relating to soil and water resources.

After formal research and development of "BMPs", SCS in cooperation with ASCS, DEQ, ODA, and OSU will perform public, group, and individual demonstration projects to insure the acceptance of the established "BMPs" by the industry and community. In addition SCS shall, in cooperation with ASCS and SWCD, provide technical and financial assistance that assist land operators in the planning and implementation of nutrient, pest, and irrigation management plans designed to protect groundwater and surface water quality through the use of "best management systems" for Northern Malheur County.

SCS personnel will assist in establishing a groundwater monitoring network which will provide water quality data to be used to describe conditions for regional water characterization and for the determination of progress resulting from the implementation of water quality protective management systems.

11.6 Oregon State Water Resources Department

The Water Resources Department (WRD), groundwater programs and activities mainly concern water supply. However, these programs directly affect groundwater management and protection. The Department is also involved in a number of programs to ensure water is used efficiently and without waste.

For this project the WRD shall provide hydrogeologic characterization as it relates to water quality and quantity and recommend solutions where problems exist or may develop, enforce well construction standards to protect the quality and quantity of the region's groundwater resource, and insure proper regulation and distribution of water in accordance with water rights and allocation. The WRD also shall cooperate with and assist other involved agencies in the planning and implementation of measures to improve the efficiency of water use in the area.

11.7 Oregon State Department of Environmental Quality

The Department of Environmental Quality, administers the Oregon State Groundwater Quality Protection Policy and implements the groundwater quality protection requirements for federal and state agencies, cities, counties, industry, and citizens.

For this project the DEQ shall establish a regional groundwater monitoring network and perform periodic water quality assessments to evaluate the performance of the management plan in reducing the groundwater contamination resulting from agricultural activities. DEQ will establish monitoring requirements for determining water quality status and establish and coordinate local monitoring efforts to obtain information on the groundwater quality.

11.8 Oregon State Health Division

The Department of Human Resources Health Division (HD), carries out the provisions of the federal Safe Drinking Water Act by establishing drinking water standards and certifying water and treatment systems and operators. HD is responsible for identifying health hazards, and issuing public notification on such hazards.

For this project the HD will perform all health risk assessments concerning groundwater quality and provide for the regulation and protection of all public water supplies within the management area.

11.9 Oregon State Department of Agriculture

As agricultural activities are potential non-point sources of pollution, ODA is involved with the identification of existing agricultural management practice problems and development and implementation of alternatives for such practices. ODA's network with OSU's Experiment Station and Agricultural Extension Service and the Soil and Water Conservation Districts, provide avenues for future research and development, demonstration projects and public education and information.

For this project, the Natural Resources Division of ODA will provide administrative and financial support to the Malheur County Soil and Water Conservation District. The Natural Resource Division shall review and evaluate all projects, practices, budgets, contracts or regulations of soil and water conservation districts and coordinate the district activities to ensure obligations are met.

11.10 Malheur County Soil and Water Conservation District

Primary activities of the Soil Water Conservation Districts (SWCD), include soil erosion control; conservation and development of water resources; control of water pollution from agricultural non-point sources; and protection, conservation, development and enhancement of the quality and productive potentials of land and water resources in Oregon. The SWCD is administered and coordinated by the Oregon State Department of Agriculture.

The Malheur County SWCD has been authorized under the amended Oregon State Statute 568.225 to participate in effectuating the policy set forth in the Oregon State Groundwater Quality Protection Act Of 1989. As such, the Malheur County SWCD is recognized by the State of Oregon to be the principal local agency responsible for implementing and coordinating water quality protection programs in Malheur County. As such, the SWCD shall investigate complaints and violations of this strategy and the Oregon State Groundwater Protection Act of 1989 in Malheur County, assist landowners in obtaining compliance, and compile and issue reports and assessments on such matters to the Oregon State ODA, DEQ, and Strategic Water Management Group.

For this project, the SWCD will coordinate activities which need to be taken by the plan. SWCD will establish schedules for; plan renewals and responses to plan applications, voluntary compliance actions, technical assistance, designated management agreements, intensive groundwater monitoring efforts, priority area activities, and water quality protection education programs.

The Malheur County Soil And Water Conservation District (SWCD) is developing and will be coordinating a soil investigation in select locations within the project area. The SWCD is receiving financial assistance from the Oregon State Department of Agriculture (ODA) to fund this project. The project has been developed to provide additional information for soil profile characterization. The project is being performed as a cooperative effort with the U.S. Soil Conservation Service and the Oregon State University. This work has been scheduled to be initiated during the fall of 1990.

12.0 Required Amendments of Affected Comprehensive Plans and Land Use Regulations.

This plan is not considered to require any adjustments to comprehensive plans or land use regulations in Malheur County. If adjustments are required, they will be expected to be readily accepted by the local governing authority.

Future comprehensive plans and land use regulations will be required to consider the current Groundwater Management Area Declaration. Comprehensive plans and land use regulations must not allow excessive nitrate/nitrite-nitrogen contaminants, solid or liquid, to be discharged to the environment in such a manner that threatens groundwater quality or have the potential to impact the water quality.

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October 2, 1990

EVALUATION OF DEQ PROPOSAL AND NERA REPORT

Prepared by Lawrence D. Schall, Ph.D.

I was asked by Oregon Waste Systems, Inc., a subsidiary of Waste Management of North America, to review the Oregon Department of Environmental Quality (DEQ) proposal dated July 25, 1990, which recommends a surcharge on out-of-state waste imported into the State of Oregon. This is an evaluation of that proposal. The evaluation will refer to an analysis of the DEQ proposal prepared by National Economics Research Associates (NERA) and dated September 17, 1990. The NERA study was prepared at the request of DEQ.

I am currently Chairman of the Department of Finance and Business Economics, and Professor of Finance and Business Economics, at the School of Business Administration, University of Washington, in Seattle, Washington. My resume appears at the end of this report.

The perspective taken in this report is that the charge on out-of-state waste should promote economic efficiency and be equitable. Particular importance is assigned to protecting Oregon's environment through measures that encourage landfill operators to adopt ecologically sound, and economically efficient, methods of operation.

Section I summarizes the findings and presents conclusions. Section II comments on the DEQ assumptions and Section III analyzes each of the costs identified by DEQ. Section IV summarizes the problems with the DEQ proposal.

I. SUMMARY AND CONCLUSIONS

It is economically efficient, and equitable, that out-of-state waste be charged for any net costs imposed on the State of Oregon. DEQ has made a start in identifying costs associated with out-of-state waste. However, it is clear from the NERA report and the additional points made here that a great deal of work remains to be done by DEQ in the following areas:

- factoring in the benefits produced by out-of-state waste operations and avoiding double counting
- correctly identifying and measuring costs, including identifying only those costs that are created by out-of-state waste
- developing the appropriate methods of charging out-of-state waste for the costs it imposes on Oregon

Addressing the above deficiencies will require a substantial reworking of the DEQ proposal.

Potential environmental damage is perhaps the single most important cost of waste disposal, especially for landfills lacking modern technology. Because of this, it is very important that the State of Oregon provide companies with incentives both to adopt safe and efficient technologies and to provide adequate coverage for potential liability. The DEQ's proposal fails badly in this regard. Each company should be forced to assume responsibility for the hazards its creates. This will encourage them to adopt environmentally sound technologies (since their insurance premiums will depend on the methods they employ) and will not penalize those companies that provide financial assurances and elect to use safe technologies. The single per ton charge proposed by DEQ -- a charge that is the same irrespective of financial assurances and technology adopted -- fails to achieve this objective.

Two general conclusions follow from reviewing the DEQ proposal and the NERA report. First, the per ton charge on out-of-state waste is very likely to be much less than the level that DEQ suggests in its proposal. In fact, as explained in Section IV of this report, the benefits from accepting out-of-state waste -- in terms of increased Oregon State host fees and taxes (property taxes, corporate income taxes, personal income taxes, personal property taxes) -- may significantly exceed the costs to the State of importing the waste. This conclusion would be further strengthened if the benefits from increased personal income in the State were also included. Every company should pay for the all the net costs it imposes on the State of Oregon, but should only pay for those net costs.

Second, DEQ should use the NERA report's recommendations, and the suggestions made in the present report, to greatly refine and improve its approach to estimating an appropriate charge on out-of-state waste.

The above comments summarize the findings of Sections II, III and IV. In Section II, the DEQ assumptions are examined since they are meant to form the basis of the DEQ proposed charge on out-of-state waste. In Section III, each of the DEQ cost categories is evaluated in light of both the DEQ assumptions and the goal of providing a system that is efficient, fair and conducive to environmentally responsible behavior by landfill operators. Section IV outlines the major problems with the DEQ proposal.

II. DEQ ASSUMPTIONS AND METHODOLOGY

In its proposal, DEQ makes the following assumptions:

1. The surcharge cannot be based on actual accounting costs, but, rather, on a reasonable estimate of potential costs that take into account a range of possible circumstances.

2. The estimate of "costs to the State of Oregon and its political subdivisions" is a distinct policy question from the decision on how the funds generated from the surcharge should be spent.

3. The amount of the surcharge is to be determined by a reasonable assessment of the costs to Oregon of accepting out-of-state waste. The amount shall not be inflated to discourage importation of waste, nor deflated to encourage importation of waste.

4. Current laws and statutes are presumed to exist. Alternative ways to address potential costs through changes in rule or statute were not considered.

5. Estimates of the cost of tax credits and other subsidies are based upon eligibility. It is presumed that private companies will generally apply for and receive the maximum subsidy for which they are eligible.

6. Costs that are covered through other fees or taxes are not to be addressed by the surcharge. Other specific fees considered include permit fees, PUC per-mile taxes, and host community fees. There should be no double counting.

7. Future cost increases in solid waste management should be anticipated, but have not been calculated directly into the cost estimates.

Assumptions 1, 2, 3, 6 and 7 influence the choice and measurement of costs that should be

covered by the surcharge, whereas assumptions 4 and 5 define the assumed legal environment and behavior of companies with respect to tax credits and other subsidies. I agree with NERA's observations concerning these assumptions. Specifically, assumption 1 is unclear and may also be inconsistent with assumption 7. Assumption 1 should state that the out-of-state waste charge should be based only on actual costs, and that this includes potential costs (e.g., the risk of an environmental damage). It is very important that great care be taken in identifying potential future costs and in estimating the probabilities of their occurence. Assumption 1, which argues that potential costs should be included among costs, conflicts with assumption 7 which states that future cost increases are not to be included. As NERA points out, assumption 4 is not optimal. DEQ should incorporate anticipated changes in laws and regulations in setting the charge on out-of-state waste.

In discussing assumption 3, NERA correctly states that those costs imposed on the state by waste regardless of origin should be equally charged to in-state and out-of-state waste. That is, the charge on waste should not discriminate. NERA also points out (on NERA report page 8 in the discussion of tax credits) that benefits to Oregon from out-of-state waste should be taken into account. As discussed in Sections III and IV of the present report, these benefits should be netted against costs in order to determine the appropriate charge (if any) on out-of-state waste.

Although DEQ takes care to list the assumptions it intends to use in determining the charge on out-of-state waste, the methods of analysis used by DEQ to determine the charge are frequently in conflict with these assumptions. This inconsistency will be apparent in the Section III discussion of the DEQ cost analysis.

III. EVALUATION OF DEQ'S COST ANALYSIS

DEQ lists seven categories of costs that it argues are created by out-of-state solid waste. The first six costs relate to solid waste management and the seventh is a collection of other costs. Each of these cost categories is considered below.

A. Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management, Paid for Through the Per-Ton Fee on Domestic Solid Waste A $.50 fee to cover these

costs is currently imposed on in-state waste but not out-of-state waste. DEQ proposes also to impose the charge on out-of state waste. There are two problems with DEQ's analysis.

The first problem is that two of the five costs covered by the $.50 charge are not associated with out-of-state waste. Including such costs conflicts with DEQ assumption 3 and is improper. The two costs not associated with out-of-state waste are the second and third in the DEQ list, specifically, the cost of programs to enhance statewide waste reduction and recycling and the cost of programs for management of household hazardous waste. While these are benefits to the State of Oregon, they are not costs driven by out-of-state waste imported into Oregon and therefore are not properly charged to out-of-state waste. The implication of this is that less than all of the $.50 fee should be imposed on out-of-state waste.

The second problem is that a charge on a per ton basis may not be appropriate. The costs imposed on the state by out-of-state waste may not be proportional to tonnage since there may be some fixed costs involved. For example, planning grants for local governments (the fifth cost listed by DEQ) may not increase in proportion to the added waste from out-of-state. Also, the DEQ cost to oversee the operation of a landfill is unlikely to increase appreciably, if at all, with tonnage. A more accurate analysis of the behavior of the relevant costs is required.

B. Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management Funded by the General Fund The DEQ proposes to charge out-of-state waste for risk reduction and waste management services funded out of the general fund. This is appropriate, but only for costs created by out-of-state waste. DEQ must establish that the costs included in this category are attributable to out-of-state waste. Also, as NERA correctly notes, the per ton charge recommended by DEQ assumes that cost varies only with tonnage, which may not be correct. A more accurate analysis of the behavior of this cost category is required.

C. Tax Credits and Other Public Subsidies. DEQ recommends those exporting waste to Oregon should pay Oregon for net tax credits going to subsidize operations in Oregon receiving out-of-state waste. As NERA observes, DEQ fails to take into account the benefits to Oregon from the importation of out-of-state waste. These benefits should be deducted from the tax credits to compute

the net tax credit cost, if any, to the State that should be recaptured through a charge on out-of-state waste. A correct analysis requires that benefits from out-of-state waste be netted agains costs to determine the net cost to Oregon of out-of-state waste. This point will be addressed again in Section IV of this report. It should also be noted that using a per ton charge to recapture tax credits assumes that the tax benefits and tonnage are proportional, which is not likely to be the case. An effort to determine how inaccurate this approach is would be warranted.

D. Solid Waste Reduction Activities Related to the Review and Certification of Waste Reduction and Recycling Plans Incremental review and certification costs caused by out-of-state-waste should be paid for by landfills receiving out-of-state waste. As NERA points out, however, the DEQ per ton charge assumes that costs vary only with tonnage. This is probably an incorrect assumption for review and certification costs. It may be no more, or even less, costly to review and certify a large community than a small one, even though the proposed DEQ charge to cover review and certification costs would be greater for the larger community. Also, given that to avoid double counting no cost produced by out-of-state waste should be included under more than one cost category, any review and certification costs included here should not also be included under cost B (Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management Funded by the General Fund).

E. Unfunded Environmental Liability Oregon currently has a $.50 per ton surcharge on all waste regardless of origin to cover environmental damage. The charge will be triggered if any of certain specified environmental problems or accidents arise. DEQ believes that the $.50 charge may be insufficient to cover the actual costs when they occur and that a larger surcharge will be necessary. Firm's receiving out-of-state waste can reduce or terminate operations if environmental damage occurs, thereby avoiding payment for the environmental damage; in this way, out-of-staters can avoid some or all of the responsibility for environmental damage that they cause through their waste disposal. DEQ would like to charge, currently, out-of-state operations an amount sufficient to cover the expected charges that will be avoided in the future by out-of-state operations that reduce tonnage in response to a surcharge for environmental damage. This is legitimate, as NERA acknowledges. Using a decision tree analysis, the expected costs can be computed (although, estimating the dollar magnitudes and

probabilities is not in practice an easy task).

NERA points out numerous major computational and conceptual problems with the two DEQ techniques for computing unfunded liability. I agree with NERA's criticisms of the DEQ proposal and will not repeat them here. However, I will focus on a fundamental flaw in the DEQ proposal that was only indirectly and partially addressed by NERA (through its recognition that only unfunded liability should be covered by a charge).

DEQ gives no credit to regional landfills for the financial assurances they provide (insurance and self-insurance) or for the state-of-the-art technology they are required to adopt, such as those to be required under Subtitle D of the Resource Conservation and Recovery Act. As NERA correctly states, it is unfunded liability that should be covered by the state charge, not the entire expected cost of the environmental damage. DEQ assumes that the unfunded liability is the same per ton of waste for all landfills, including small local landfills that have antiquated technology and negligible financial assurances. The unfunded liability per ton for regional landfills with safe, modern methods and substantial assurances is almost certainly far lower both because the superior technology reduces the likelihood of environmental damage, and because there is greater funding of the liability through the assurances. A fixed charge per ton in effect makes regional landfills overpay for the hazards they create, and allows the small local landfills to underpay for the hazards they create. This is economically inefficient, discriminatory and unfair.

The DEQ approach of a fixed charge per ton to cover unfunded liability produces undesirable incentives. If a company is not required to provide financial assurances to cover the environmental hazards it creates, there is little incentive to adopt environmentally safe methods. If its operations produce a catastrophe that it cannot pay for, all other landfills pay the bill through the fixed per ton charge. A far better approach than a per ton fee would be to require each firm to provide financial assurances sufficient to cover the hazards it creates, where the hazard depends on the technology used. If insufficient assurances are provided, the state could charge a fee to that firm which covers its unfunded liability. In this way, the total cost incurred by any company to cover potential harm to the environment is proportional to the hazards it creates. This will encourage landfills to adopt the

appropriately safe technologies and will also provide funding for potential environmental catastrophes.

F. Lost Disposal Capacity. Any added and necessary predevelopment costs created for the State by out-of-state waste operations should be borne by those operations. However, as explained below, there are several problems with the DEQ proposal, including a failure to explain how out-of-state waste produces incremental predevelopment costs for the State.

It should be noted first that, even if out-of-state waste does produce incremental predevelopment costs for the State, such costs almost certainly do not vary proportionately with tonnage, as DEQ assumes. NERA also addresses this issue. Predevelopment costs include screening, engineering, public involvement and legal costs, all of which are very unlikely to vary in proportion to tons of waste.

Second, as NERA explains, it is the incremental predevelopment costs incurred by the State created by out-of-state waste that should be recaptured through a charge (and only incremental predevelopment costs that are not recaptured by the State in some other way should be charged for). The incremental predevelopment costs are computed as the difference between the predevelopment costs that would be incurred by the State if out-of-state waste were imported minus the predevelopment costs that would be incurred by the State if no out-of-state waste were imported. The current burden on the State is the present value of that increment. Thus, for example, if the effect of establishing an out-of-state waste facility in Oregon is simply to cause the State of Oregon to incur a stream of predevelopment costs sooner rather than later, the economic burden created by the out-of-state waste is the increase in the present value of the stream of predevelopment costs due to bringing that stream of costs closer to the present. This present value equals the present value of the incremental predevelopment costs (defined above) occasioned by the out-of-state waste facility. It is not clear from the DEQ proposal whether DEQ recommends charging out-of-state waste for incremental predevelopment costs or for the entire predevelopment costs, which would be incorrect.

A third problem with DEQ's proposal is that it does not acknowledge that only predevelopment costs that are not recaptured by the State in some other way should be covered by the out-of-state fee. Whether the landfill is State owned or privately owned, any predevelopment costs of

that landfill should be recovered from that landfill's customers through the disposal charge for using the landfill. Not to charge customers results in an inefficient allocation of resources. Those who generate waste going to a particular landfill should be required to pay for costs of that disposal, including predevelopment costs. If this efficient pricing is adopted, it is unclear why the State of Oregon will have any unrecovered predevelopment costs. That is, there is a question as to why the cost of lost disposal capacity exists at all.

It might be added that the DEQ proposal seems also to be referring to land used up by out-of-state waste as a component of lost landfill capacity. If this is the case, it is incorrect. A private landfill must pay for the land it uses for the landfill, and the price of that land reflects the land's scarcity. It would be incorrect to charge the landfill again for the same land through a state fee to cover "lost landfill capacity." Furthermore, the cost of any land purchased by the State for a State owned landfill should be passed on to users of the landfill through charges to customers. In short, land costs are not proper costs to include in a State charge on out-of-state waste.

G. Other Costs. These costs are loss of image, publicly supported infrastructure, and nuisance and loss of "quiet enjoyment." The NERA conclusions appear reasonable. Image costs might be real but are hard to estimate. As NERA points out, estimating these costs as the cost of guaranteeing that Oregon is viewed as environmentally responsible based on the costs of its efforts is double counting. Using the cost of promotional campaigns designed to promote its environmental record is valid only if applied properly. It would not be proper to use all promotional expenses incurred by Oregon in promoting its image as an environmentally safe state since this is an open-ended quantity that is not necessarily related to the image costs imposed on Oregon by out-of-state waste. Only that portion of promotional expense needed to counter any image damage due to out-of-state waste should be included in a charge on out-of-state waste. Presumably, erosion of image arises because waste can cause air, soil or water pollution. Given that out-of-state waste goes almost entirely to regional landfills with state-of-the-art technology -- and therefore to landfills with an extremely low likelihood of environmental damage -- it is not clear that there is much in the way of image cost at all. NERA states that DEQ must do a better job of demonstrating that out-of-state waste does in fact tarnish Oregon's reputation

and discourage economic activity. That is, this cost may not exist or may be negligible.

Incremental infrastructure costs on the State that are not otherwise covered through charges on out-of-state waste should be charged to out-of-state waste. It is important that DEQ clearly establish the nature and magnitude of those incremental costs. DEQ must also demonstrate that out-of-state waste is not already paying for those costs through other fees, e.g., through fuel and road taxes. As NERA states, to do otherwise would be double counting.

NERA notes that measuring the value of lost enjoyment is difficult, and that the local host fees paid by out-of-state waste facilities may already cover such costs. NERA correctly concludes that it is unlikely there there are substantial costs in excess of those already charged for. Charging again would be double counting.

IV. SUMMARY OF PROBLEMS WITH THE DEQ PROPOSAL

The DEQ proposal has numerous problems, many of which were noted in Section III. The purpose of this section is to provide a focus on those deficiencies. Assuming that the objective is an economically efficient and equitable charge on out-of-state waste imported into Oregon, and a system that promotes environmentally sound decisions by landfill operators, the following problems with the DEQ proposal must be addressed.

1. Benefits produced by out-of-state waste are ignored by DEQ. In recommending charges on out-of-state waste, DEQ ignores the added taxes and fees, and the personal income gains for citizens of Oregon, resulting from the importation of out-of-state waste. As NERA observes (page 8 of the NERA report), such benefits should be taken into account. A 1989 study performed by ECO Northwest for Oregon Waste Systems estimates that the benefit to Oregon from host fees and increased taxes (i.e., host fees, real and personal property taxes, corporate income taxes, personal income taxes, and payroll taxes) produced by Oregon Waste Systems' importation of Washington State waste will be at least $2.6 million in the year 1992 alone. Assuming that approximately 400,000 tons of waste will be imported in 1992, this translates to a $6.50 per ton benefit to the State of Oregon from added taxes and host fees resulting from importing out-of-state waste. This $6.50 per ton benefit exceeds the high

end of the DEQ estmate of all costs imposed on Oregon by out-of-state waste ($3.50). In addition, ECO estimates that, conservatively, personal income in Oregon in 1992 will rise by $2.1 million as a result of the importation by Oregon Waste Systems of out-of-state waste.

As noted in Section III above, NERA comments at several points in its analysis of the DEQ proposal that DEQ fails to take into account benefits generated by out-of-state waste and ignores existing charges already imposed on out-of-state waste which cover many of the costs identified by DEQ. This can be viewed as double counting, which is inconsistent with DEQ's stated intention not to double count (its assumption 6).

2. DEQ uses computational approaches that are analytically incorrect. As NERA points out, there is double counting in one of DEQ's measurement techniques for estimating damage to Oregon's image due to receiving out-of-state waste. DEQ generally assumes the costs are proportional to tonnage and often this may not be the case. DEQ's computational approaches for estimating unfunded liability are incorrect. In its estimate of the cost of lost disposal capacity, it appears that DEQ may be computing total predevelopment cost and not incremental predevelopment cost due to out-of-state waste; it is also not clear whether DEQ is improperly including land costs.

3. DEQ proposes to charge out-of-state waste for costs not associated with out-of-state waste. Under cost A noted in Section III (Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management, Paid for Through the Per-Ton Fee on Domestic Solid Waste), DEQ proposes to charge for programs to promote Oregon's statewide waste reduction efforts and to pay for programs for management of household hazardous waste. Although these are undertakings that may benefit citizens of Oregon, they are not programs to cover costs created by out-of-state waste, and are therefore not appropriately charged to out-of-state waste. Similarly, it is not clear that all the costs included under cost B in Section III (Statewide Activities for Reducing Environmental Risk and Improving Solid Waste Management Funded by the General Fund) are associated with out-of-state waste.

In its estimation of unfunded liability, DEQ wants to charge regional landfills (which are those that receive most out-of-state waste) both for liabilities they have in fact funded through financial

assurances and for risks they have eliminated through the adoption of state-of-the art technologies. This is the effect of the DEQ proposal because the same per ton charge is recommended to cover unfunded liability regardless of the financial assurances provided by a landfill and regardless of the technology used. In effect, regional landfills with assurances and modern technologies are paying for potential hazards created by small local landfills (which for the most part receive in-state waste).

4. DEQ has not adequately demonstrated that certain costs exist and has done an inadequate job of measuring the costs. DEQ must better demonstrate that out-of-state waste tarnishes Oregon's image. DEQ's cost category "loss of quiet enjoyment" is very vague and difficult to estimate. It is also not clear that there is any cost of lost disposal capacity, assuming that users of landfills are properly charged for the waste that they produce.

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PRESENT POSITION

Chairman, Department of Finance and Business Economics, and Professor of Finance and Business Economics (Associate Professor, 1972-1976; Assistant Professor, 1968-1972).

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B.A. (1962), Economics, Magna Cum Laude, U.C.L.A.
M.A. (1967) and Ph.D. (1969), Economics, University of Chicago
Graduate study in Business at both U.C.L.A. and University of Chicago
Certified Public Accountant, State of Washington

HONORS AND AWARDS

First Interstate Bank Award, 1990
Professor of the Year, 1987, Graduate School of Business, University of Washington
Who's Who In Economics--A Biographical Dictionary of Major Economists, 1700-present (MIT Press 1986)
Burlington Northern Foundation Achievement Award, 1986
SeaFirst Bank Excellence Award, 1983
Professor of the Quarter, Fall 1976, Graduate School of Business, University of Washington
Bowman Lingle Fellow, University of Chicago, Academic Year 1967-68
NIMH Fellow, University of Chicago, Academic Years 1964-65, 1965-66, 1966-67
Pi Gamma Mu, U.C.L.A., 1962
Phi Beta Kappa, U.C.L.A., 1962

BUSINESS EXPERIENCE

Consultant to law firms and business firms, including Microsoft Corporation, General Telephone and Electronics, Safeco Corporation, and U.S. National Bank of Oregon; consultant to the U.S. Government.

Staff Accountant and Consultant, DeLoitte & Touche, CPAs (on partial leave of absence from University of Washington during 1974-75).

BUSINESS EXPERIENCE (CONTINUED)

Administrative Assistant, City of Los Angeles; conducted studies of operational effectiveness of administrative functions, 1962-63.

Partner in small business marketing corporation, distributing anticorrosion spray paint through 150 outlets on West Coast, 1959-1961.

TEACHING EXPERIENCE

Graduate and Undergraduate Courses Taught at the University of Washington, 1968-present:

Introductory Finance, Intermediate Finance, Advanced Financial Theory and Analysis, Advanced Corporate Finance, Doctoral Seminar in Finance, Microeconomic Analysis, Macroeconomic Analysis, Personal and Business Finance, Real Estate Valuation, and Taxes and Business Decisions.

Executive Masters in Business Administration Program, 1987.

Seminars for Business Owners and Executives:

-Financial Planning and Control for Small Business, University of Washington (1973-1983).

-Practical Management for Small Business, University of Washington (1974-1979).

-Executive Seminar Series: Financial Aspects of Profitable Business Strategy, University of Washington (1978-1981).

-Finance and Accounting for the Non-Financial Executives, University of Washington (1978-present).

-Management Program, University of Washington (1983-present).

-Finance seminars for various business firms and associations, including Rainier National Bank, McFarland & Alton CPAs, International Business Forms Industry, American Electronics Association, and ARCO Alaska.

PUBLICATIONS:

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"Commodity Chain Systems and the Housing Market," Journal of Urban Economics, September 1981.

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1982

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1983

Introduction to Financial Management, 3rd edition, McGraw-Hill, New York, 1983, 845 pages (with Charles W. Haley).

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PUBLICATIONS (CONTINUED):

1984

"Taxes, Inflation and Corporate Financial Policy," Journal of Finance, March, 1984.

"Cash Planning and Forecasting," in Microsoft Cash Plan, Microsoft Corporation, Bellevue, 1984, approx. 70 pages (with James Jiambalvo).

"Modern Financial Analysis, Business Profitability, and Economic Growth," Center for the Study of Banking and Financial Markets Digest, Summer, 1984.

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"Asset Acquisition and Lease Financing," Midland Corporate Finance Journal, Summer 1985.

1986

Introduction to Financial Management, 4th edition, McGraw-Hill, New York 1986, 790 pages (with Charles W. Haley).

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ASSUMPTIONS

1. Reasonable estimate of potential costs not actual costs.

NERA DEQ should be concerned with actual costs, which include potential costs based on future events.

Schall Great care should be taken in identifying potential costs and in estimating the probability of their occurrence.

This assumption conflicts with assumption #7 when potential costs are included in estimate.

2. Cost included in surcharge should not be limited to those directly related to waste management.

NERA So long as the surcharge correctly reflects the costs imposed by out-of-state waste, how funds are spent is irrelevant from an economic perspective.

3. Amount of surcharge shall be a reasonable assessment of costs to Oregon for accepting out-of-state waste.

NERA This should establish an efficient price that reflects the costs of services provided.

DEQ should impose the appropriate fee on both in-state and out-of-state if the costs are imposed by all waste generators regardless of origin.

Schall Fees on out-of state generators should not discriminate against out-of-state waste.

DEQ must take benefits resulting from out-of-state waste into account.

COSTS IDENTIFIED BY DEQ AND METHODOLOGY

A.1 Per-ton fee on domestic waste for statewide solid waste management activities.

Schall

Two of the five costs identified are not costs "associated with" out-of-state (enhance statewide waste reduction and manage household hazardous waste).

It is not clear that the costs should be based on per-ton formula because many of the costs do not increase because of greater tonnage.

Benedict

The EQC is prohibited from imposing an economic burden on the interstate movement and disposal of waste that reflects more than the value of waste disposal because the interstate transaction could be subject to multiple taxation.

Violates Commerce Clause because persons disposing out-of-state waste receive no benefit from Oregon waste reduction.

Costs for these programs are not incurred because of disposal of out-of-state waste.

These costs are specifically excluded from the surcharge ORS 459.294 which excludes costs imposed under ORS 459.294 and ORS 459.295.

A.2 Statewide activities paid for through general fund.

NERA

Correct calculation is state expenses divided by total tons disposed. Total tons includes both in-state and out-of-state waste.

This approach assumes costs vary only with tonnage, which is unlikely.

Schall DEQ must establish that the costs included in this category are attributed to out-of-state waste. A more accurate analysis of the behavior of this cost category is required.

Benedict DEQ establishes no basis apart from origin of waste for imposing a higher fee on out-of-state waste -- violates Commerce Clause per se (p.31).

An out-of-state waste disposal fee based on statewide activities will not be fairly apportioned to the value of in-state activities and will violate second proof of Complete Auto test which prohibits interstate transactions from being subject to multiple taxation.

A.3 Tax credits and other subsidies.

NERA Tax credits do not depend on whether the business enterprise serves in-state or out-of-state residents. More importantly, the state does not tax goods going out-of-state differently than in-state to offset tax credits.

A better calculation is present value of net tax credits divided by present value of tons disposed.

Note the cost of the tax credit net of benefits should be used. A surcharge will result only if their are net costs are greater than net benefits.

Schall Using a per-ton charge to recapture tax credits assumes that the tax benefit and tonnage are proportional, which is not likely to be the case.

A 1989 ECO Northwest Economic Analysis of the Arlington site showed benefits to Oregon of at least $6.50 per ton for out-of-state waste.

Benedict This is a per se violation of Commerce Clause because in-state waste will not pay the cost, but will receive the same benefits. The Supreme Court has held that "the commerce clause does not permit compensatory measures for the disparities that result from each state's choice of tax measures."

A.4 Certification of waste reduction and recycling plans.

NERA Note cost for certification plans may not vary by tonnage.

There will be variations in this cost over time that should be considered in establishing the fee.

Schall This is double counting if waste plan certification activities are included in general fund activities under Assumption A.2.

Benedict Fee is applied to out-of-state only and will be per se invalid.

A.5 Unfunded environmental liability.

NERA DEQ's calculations of damages do not include funds available to cover environmental problems.

The probabilities DEQ uses are affected by certain landfills which are currently not required to have financial assurance for environmental liability. These landfills may pose higher probabilities. The costs attributable to out-of-state waste should account for this distinction if possible.

There are a number of errors in calculating the costs of unfunded liability which are correctable with a new formula.

However, determining the value of total liability is not easy, and the values presented by DEQ were not documented.

Schall DEQ gives no credit to regional landfills for the financial assurances they provide or for the state-of-the-art technology they are required to adopt.

The costs are the costs of the unfunded liability, not the entire expected costs of environmental damage.

DEQ assumes the unfunded liability is the same per ton of waste for all landfills. This produces undesirable economic incentives because there is little incentive to motivate a landfill to adopt environmentally safe methods.

Benedict Because the fee is applied to out-of-state waste only it is a per se violation of Commerce Clause.

A.6 Lost disposal capacity.

NERA The cost should be determined by comparing the stream of expected costs assumed with out-of-state waste to be the stream of expected costs without out-of-state waste.

Another instance where costs may vary because of other factors in addition to tonnage.

Schall Costs do not vary proportionately with tonnage as DEQ assumes.

It is not clear whether DEQ recommends charging out-of-state waste for incremental pre-development costs or for the entire pre-development cost which would be incorrect.

Pre-development costs should be recovered from the landfill's customers through the disposal charge. Not to pass the costs through would create an inefficient allocation of resources.

Benedict Again, there is not basis for this charge except the origin of the waste and is per se invalid.

OTHER COSTS

Image

NERA Even if this can be shown, it will be difficult to measure.

Most image costs are double counting.

DEQ needs to better demonstrate that out-of-state waste does tarnish this state's image and discourage economic activity.

Schall Costs of promotional expenses to counter image damage should apply only to the portion of promotional expenses caused by out-of-state wastes.

Benedict Per se violations of Commerce Clause.

Publicly Supported Infrastructure

NERA This is a one-time cost to be spread over a number of years.

Schall DEQ must clearly establish the nature and magnitude of these incremental costs.

No double counting.

Benedict No basis for charge other than state of origin.

Loss of Quiet Enjoyment

NERA Estimating the value of lost enjoyment is not straightforward.

DEQ must more fully develop its cost estimate in this category.

Schall It is unlikely there are substantial costs in excess of those already charged for.

Benedict Per se violation Commerce Clause.

COMMENTS OF OREGON WASTE SYSTEMS, INC.
REGARDING DEQ PROPOSED SURCHARGE ON OUT-OF-STATE WASTE:
U.S. CONSTITUTION COMMERCE CLAUSE AND STATUTORY LIMITATIONS

LEGAL MEMORANDUM

PREPARED BY: James E. Benedict, Hill, Huston, Cable, Ferris and Haagensen and James S. Kincaid, Schwabe, Williamson and Wyatt

DATE: October 2, 1990

BACKGROUND

In 1989, the Oregon Legislature amended Chapter 459 of the Oregon Revised Statutes to, among other things, provide for the imposition of fees on the disposal of solid waste to support various programs operated by the Department of Environmental Quality (DEQ). In providing for the establishment and use of solid waste disposal fees, however, the Legislature treated out-of-state waste differently from the treatment accorded in-state waste.

1. In-State Fees. ORS 459.294 directs the Environmental Quality Commission (EQC) to establish and impose by July 1, 1990, fees on the disposal of waste generated in Oregon. The fees are to be sufficient to "assist" in funding programs for in-state waste reduction and minimizing environmental risks at solid waste disposal sites. The EQC is required to base the fees on the estimated or actual tonnage of in-state waste received at Oregon disposal sites. However, the fees may in no event exceed $0.50 per ton of waste disposed. Additionally, the revenue from the in-state waste disposal fees may be used for only programs specifically enumerated in ORS 459.295.

2. Out-of-State Fees. ORS 459.297 requires every

person who disposes of solid waste generated out-of-state to pay a surcharge as established by the EQC. Under ORS 459.298, the EQC is required to base the out-of-state waste disposal surcharge on the costs to the state of Oregon and its political subdivisions of disposing out-of-state waste which are not otherwise paid through other specified charges. The statute sets forth some general categories of costs that may be used in determining the out-of-state waste disposal surcharge, but, unlike in-state waste fees, the statute does not provide for a maximum surcharge.

Under ORS 459.297, the revenue from the out-of-state waste disposal surcharge may be used "to meet the costs of the department in administering the solid waste program under ORS 459.005 to 459.426." The EQC is required to obtain approval of its out-of-state waste surcharge from either the Joint Committee on Ways and Means or the Emergency Board, and ORS 459.297 requires the EQC to implement the fees by no later than January 1, 1991.[1]

3. Commerce Clause Limits EQC Authority. The DEQ by rule has proposed a surcharge on the disposal of out-of-state waste, ranging from $1.50 per ton to $3.50 per ton. The proposed surcharge is based upon the recommendation of the Solid Waste

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[1]There is an argument that ORS 459.297, on its face discriminates against the interstate movement of waste because under the differing legislative directives for determining the in-state and out-of-state waste disposal fees it is likely that a heavier tax burden will be imposed on out-of-state waste disposal. However, it cannot be determined with certainty whether the legislation, as applied, is discriminatory and violative of the Commerce Clause until after the fee schedules are established.

Advisory Committee. The DEQ is accepting public comment on the rule and then will forward the rule to the EQC for adoption as an administrative rule to be incorporated in OAR 340-60-120(6). In adopting the surcharge, the EQC must take into consideration the limitations on its authority under the Commerce Clause of the United States Constitution. The United States Supreme Court has held that the transportation and disposal of waste between the states is interstate commerce for purposes of the Commerce Clause. Thus, although Oregon may have the authority to impose fees on the disposal of waste generated in and outside Oregon, it may do so only in a manner that is consistent with the Commerce Clause.

This memorandum addresses the limitations under the Commerce Clause on Oregon's authority to impose fees on the disposal of waste generated outside Oregon. Section I summarizes the general analysis of the United States Supreme Court in evaluating state laws regulating interstate trade. Section II discusses the Supreme Court's analysis under the Commerce Clause to determine the constitutional validity of state revenue measures, and Section III applies this analysis to the categories of costs the DEQ is considering in recommending to the EQC fees for the disposal of out-of-state waste. Section IV concludes with a brief discussion on the EQC's statutory authority to impose fees on the disposal of out-of-state waste, and whether the proposed rule is consistent with this statutory authority.

ISSUE

What limitations does the Commerce Clause of the United States Constitution place on the authority of Oregon to impose fees on the disposal of solid waste generated outside Oregon?

CONCLUSION

1. A Higher Fee on Out-of-State than In-State Waste is Per Se Invalid. The Commerce Clause of the United States Constitution prohibits a state from imposing an impermissible burden on the free flow of interstate trade among the states. In general, the Supreme Court holds that a state law will be per se invalid if, in its legislative means or ends, it patently discriminates against interstate trade. Specifically, the Supreme Court has held that a state law is per se invalid if it discriminates against the interstate movement and disposal of waste on the basis of origin. The Supreme Court has made clear that conservation of landfill capacity is not a legitimate governmental interest for distinguishing out-of-state from in-state waste, and indicated that a state may not provide its residents with a preferred right of access to landfill capacity, or an economic advantage over out-of-state residents in obtaining access to landfill capacity. City of Philadelphia v. New Jersey, 437 US 617, 98 S Ct 2531 (1978).[2]

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[2]"[A] State may not award its own inhabitants a preferred right of access over consumers in other States to natural resources located within its borders. [citations omitted.] These cases (continued...)

The DEQ draft rule proposes that the EQC adopt an out-of-state waste disposal fee that is substantially higher than the fee imposed on the disposal of in-state waste. The imposition of a higher fee on the disposal of waste generated outside of Oregon than is imposed on the disposal of waste generated inside Oregon will be per se invalid under the Commerce Clause. There is no basis, apart from origin, to treat out-of-state waste differently. The costs the DEQ attempts to attribute to the disposal of out-of-state waste do not distinguish out-of-state waste from in-state waste.[3] To the extent these costs will be incurred, they will result from the disposal of both in-state and out-of-state waste, and are in no way specific to out-of-state waste only. Thus, a higher out-of-state waste disposal fee based on these costs will discriminate against interstate commerce, provide an economic advantage to persons disposing in-state waste, and therefore be per se invalid under the Commerce Clause.

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[2](...continued)
stand for the basic principle that a 'State is without power to prevent privately owned articles of trade from being shipped and sold in interstate commerce on the grounds that they are required to satisfy local demands or because they are needed by the people of the State.'" City of Philadelphia, 437 US at 628, 98 S Ct at 2531.

[3]These costs include (A) statewide solid waste management activities paid for through fees on domestic waste; (B) statewide solid waste management activities paid for through the general fund; (C) pollution tax credits; (D) waste reduction certification costs; (E) unfunded environmental liability; (F) lost disposal capacity; and (G) supposed image cost, publicly supported infrastructure costs and loss of quiet enjoyment. Each of these costs are discussed in Section III.A of this memorandum.

2. Out-of-State Waste Fee Must Satisfy Limitations on Revenue Measures. To ensure that interstate commerce is not impermissibly burdened and that interstate transactions are not required to pay more than their fair share of any in-state activity, the Supreme Court will hold a state tax on interstate trade invalid if the tax either: (a) does not have a substantial nexus with the state; (b) is not fairly apportioned to the value of the activity occurring within the state; (c) discriminates against interstate commerce; or (d) is not fairly related to the services provided by the state. Thus, even a state revenue measure that is facially neutral with respect to in-state and out-of-state interests may be held invalid if it does not satisfy each of the above-referenced requirements.

Under the Supreme Court analysis, Oregon's characterization of the disposal charge, whether as a fee, tax, surcharge or otherwise, makes no difference. See American Trucking Associations, Inc. v. Scheiner, 483 US 266, 107 S. Ct. 2829 (1987) (applying Commerce Clause analysis to state revenue laws, including those characterized as fees as well as taxes). Whatever the disposal charge is called, it will be governed by the same four prong analysis.

The DEQ staff has indicated that it intends to propose that the EQC base the out-of-state waste disposal fee on the following costs, among others: (a) solid waste reduction and recycling costs; (b) household hazardous waste reduction costs;

(c) landfill and solid waste management program costs; (d) costs of technical support to local and regional governments; and (e) grants to local governments. As discussed in Section III.B, the Commerce Clause prohibits the EQC from basing the out-of-state waste disposal fee, in whole or in part, on these costs.

First, if these costs are included in the surcharge imposed on persons disposing out-of-state waste, Oregon will be imposing a tax that reflects more than the value of the in-state activity of disposal. Thus, the interstate movement of solid waste may be subjected to multiple taxation from several jurisdictions. Including these costs in the out-of-state waste surcharge would violate the requirement that a state tax on interstate commerce be fairly apportioned to the value of the in-state activity.

Moreover, many of these costs are related to programs and activities that will benefit only Oregon residents. Thus, including these costs as a basis for establishing the out-of-state waste surcharge will violate the Commerce Clause requirement that the state tax be fairly related to the services provided by the state which benefit the persons or activity subject to the fee.

3. Statutory Authority. Finally, ORS 459.298 requires the EQC to base the out-of-state waste disposal fee on the costs to the State of Oregon and its political subdivisions to dispose of the out-of-state waste. The language employed indicates that the word "costs" refers to the actual out-of-pocket costs the State and its political subdivisions incur as a direct result of the disposal

of out-of-state waste. In contrast, as discussed in Section IV, the "costs" DEQ attempts to attribute to the disposal of out-of-state waste relate generally to the implementation of all of the Oregon solid waste programs. These costs will not be incurred as a direct cost of disposing out-of-state waste. Furthermore, some of these costs, such as lost disposal capacity and quiet enjoyment, image, and convenience fees are intangible costs that the State will not actually incur. Thus, aside from the limitations imposed by the Commerce Clause, there is a question regarding whether the EQC has statutory authority to base the out-of-state waste disposal fee on the costs identified by the DEQ.

DISCUSSION [4]

I. Commerce Clause Generally.

The Commerce Clause of the United States Constitution grants Congress the power "[t]o regulate Commerce with Foreign Nations, and among the several States, and with Indian Tribes." U.S. Const. art. I, § 8, cl. 3. However, even in the absence of controlling federal regulation, the United States Supreme Court has consistently held that the Commerce Clause limits and restrains the power of the states to regulate interstate trade. City of Philadelphia v. New Jersey, 437 US 617, 625, 98 S Ct 2531, 2535

[4]This memorandum discusses the out-of-state waste disposal fee only in the context of the Commerce Clause and ORS 459.298. Other statutory or constitutional bases regarding the validity of the fee or the methodology of establishing the fee are not addressed in this memorandum.

(1978) (holding Commerce Clause limits state regulation of interstate movement of waste). The Commerce Clause, granted Congress the power to regulate interstate commerce and curtailed the right of the States to do the same. Hughes v. Oklahoma, 441 U.S. 322, 326 (1979). As the Supreme Court has recognized, "[n]o other federal power was so universally assumed to be necessary, no other state power was so readily relinquished." H.P. Hood & Sons v. DuMond, 336 U.S. 525, 534 (1949).

Although the limitations on state authority do not appear in the express language of the Commerce Clause, the Supreme Court decisions make clear that state legislation regulating commerce may not impose an impermissible burden on the free flow of interstate trade among the states. See H.P. Hood & Sons, Inc. v. DuMond, 336 US 525, 69 S Ct 657 (1949); Raymond Motor Transportation, Inc. v. Rice, 434 US 429, 98 S Ct 787 (1978). One of the principal -- if not the principal -- functions of the Commerce Clause is to prevent the states from erecting barriers against each other's products and trade. See, e.g., Polar Ice Cream & Creamery Co. v. Andrews. 375 U.S. 361, 373-374 (1964); Michigan-Wisconsin Pipe Line Co. v. Calvert, 347 U.S. 157, 170 (1954).

In general, the Supreme Court applies a per se rule of invalidity if state legislation, in either its legislative means or ends, patently discriminates against interstate trade. City of Philadelphia, 437 US at 625-28, 98 S Ct at 2535-37. Patently discriminatory legislation is legislation that by its terms imposes

a greater burden on out-of-state interests than is imposed on in-state interests solely on the basis of origin.

Moreover, even if state legislation is not facially discriminatory and the state can demonstrate a legitimate governmental interest for the legislation, the Supreme Court will subject legislation that indirectly burdens interstate trade to Commerce Clause scrutiny and will apply a balancing approach to determine the validity of the legislation. Pike v. Bruce Church, Inc., 397 US 137, 90 S Ct 844 (1970) (holding that facially neutral statute is invalid if burden on commerce is excessive in relation to local benefits). Under Pike v. Bruce Church, Inc., facially neutral state legislation is invalid if: (a) the legislation places a burden on out-of-state interests to accomplish a legitimate public interest; (b) the legislation imposes more than an incidental burden on interstate commerce; and (c) the burden on interstate commerce outweighs the local benefits, or a less discriminatory means to achieve that public interest exists. Pike, 397 US at 144, 90 S Ct at 847.

City of Philadelphia v. New Jersey concerned a New Jersey statute that prohibited the importation of certain waste originating outside New Jersey. Finding waste an article of interstate trade, the Court held the statute per se invalid because, on its face, the statute imposed an impermissible burden on commerce by attempting to ban the disposal of out-of-state waste in the state of New Jersey. City of Philadelphia, 437 US at

623-24, 628-31, 98 S Ct at 2534-35, 2537-38. Recognizing that New Jersey may have had a legitimate purpose in enacting the statute, the Court emphasized that New Jersey may not accomplish this purpose by discriminating against out-of-state waste:

> ". . . whatever New Jersey's ultimate purpose, it may not be accomplished by discriminating against articles of commerce coming from outside the State unless there is some reason, apart from their origin, to treat them differently." City of Philadelphia, 437 US at 626-27, 98 S Ct at 2537.

The Supreme Court made clear that conservation of landfill capacity for the benefit of the jurisdiction's residents is not a constitutionally acceptable governmental interest, and held that a state may not provide its residents a "preferred right of access" to landfill capacity located within the state:

> "Also relevant here are the Court's decisions holding that a State may not accord its own inhabitants a preferred right of access over consumers in other States to natural resources located within its borders. West, Attorney General of Oklahoma v. Kansas Natural Gas Co., 221 U.S. 229, 31 S.Ct. 564, 55 L.Ed. 716; Pennsylvania v. West Virginia, 262 U.S. 553, 43 S.Ct. 658, 67 L.Ed. 1117. These cases stand for the basic principle that a "State is without power to prevent privately owned articles of trade from being shipped and sold in interstate commerce on the ground that they are required to satisfy local demands or because they are needed by the people of the State." Foster-Fountain Packing Co. v. Haydel, supra, 278 U.S. at 10, 49 S.Ct. at 4." City of Philadelphia, 437 US at 627, 98 S Ct at 2537.

As discussed in Section II, in evaluating the constitutional validity of state fees and taxes, the Supreme Court

applies a method of analysis under the Commerce Clause that is more encompassing than that followed by the Court in the City of Philadelphia v. New Jersey and Pike v. Bruce Church, Inc. decisions. However, the general principle in all of the Court's decisions is that a state may not provide its residents a preferred economic position over residents from other states. Compare City of Philadelphia, 437 US at 624-25, 98 S Ct at 2535 (per se rule of invalidity applied to economic protectionist legislation) with Boston Stock Exchange v. State Tax Commission, 429 US 318, 336-37, 97 S Ct 599, 609-10 (1977) (state tax legislation may not favor local commercial interests over out-of-state businesses). Thus, in establishing the surcharge applicable to solid waste disposal, the EQC is prohibited under the Commerce Clause from providing an advantage to persons who dispose waste generated in Oregon.

II. Commerce Clause Analysis of State Tax Laws.

For well over a century it has been "settled that no State can, consistently with the Federal Constitution, impose upon the products of other States . . . more onerous public burdens or taxes than it imposes upon the like products of its own territory." Guy v. Baltimore, 100 US 434, 439 (1880). See also Walling v. Michigan, 116 US 446, 455 (1886) ("[a] discriminating tax imposed by a state operating to the disadvantage of the products of other states when introduced into the first mentioned state, is, in effect, a regulation in restraint of commerce among the states, and as such is an usurpation of the power conferred by the Constitution

upon the Congress of the United States"). The Supreme Court has more recently restated the same principle: "a state may not tax a transaction or incident more heavily when it crosses state lines than when it occurs entirely within the state." Armco, Inc. v. Hardesty, 467 U.S. 638, 643 (1984).

In addressing the validity of state revenue laws under the Commerce Clause, the Supreme Court has consistently emphasized that the Commerce Clause creates an area of trade free from interference by the states. See American Trucking Associations, Inc. v. Scheiner, 483 US 266, 279, 107 S Ct 2829, 2838 (1987); Boston Stock Exchange, 429 US at 330, 97 S Ct at 606. Consequently, although interstate trade may be required to pay its way, a state may not tax a transaction in a manner that favors local enterprises because this would create preferential trade areas and destroy free trade among the states. Boston Stock Exchange, 429 US at 331, 97 S Ct at 607. Under the Supreme Court analysis, a state's characterization of the revenue measure, whether it be a tax, fee, surcharge or otherwise, makes no difference. Whatever the charge is called, it will be governed by the same analysis. See American Trucking Associations, Inc. v. Scheiner, 483 US 266, 107 S. Ct. 2829 (1987) (applying Commerce Clause analysis to revenue laws characterized as fees).

To ensure that interstate commerce is not impermissibly burdened and that interstate trade is required to pay no more than its own way, the Supreme Court has held that a state tax on

interstate trade is invalid under the Commerce Clause if the tax: (a) does not have a substantial nexus with the state; (b) is not fairly apportioned to the value of the activity occurring within the state; (c) discriminates against interstate commerce; or (d) is not fairly related to the services provided by the state. Complete Auto Transit, Inc. v. Brady, 430 US 274, 97 S Ct 1076 (1977); Maryland v. Louisiana, 451 US 724, 756, 101 S Ct 2114, 2133 (1981). This four-prong test is referred to by the Court, and hereafter in this memorandum, as the "Complete Auto test." Note that any revenue measure must satisfy each of the four prongs, and if it fails any one of the prongs, the charge will be unconstitutional. Thus, even a facially neutral state tax will be invalid unless the tax imposed on the interstate transaction is fairly apportioned to the value of the activity occurring within the state, nondiscriminatory in its treatment of in-state and out-of-state interests, and fairly related to the services provided by the state. American Trucking Associations, Inc. v. Scheiner, 483 US 266, 281, 107 S Ct 2829, 2839 (1987) (holding facially neutral flat taxes unconstitutional unless fairly apportioned).

The surcharge that the EQC will establish and impose on the disposal of waste generated outside Oregon must conform to the limitations of the Complete Auto test in order for the surcharge to be valid under the Commerce Clause. In its decisions, the Supreme Court has provided guidance on the meaning and application of the Complete Auto test requirements, and each are discussed generally

below as they pertain to the surcharge on the disposal of waste generated outside Oregon.

A. Substantial Nexus.

In general, the Supreme Court decisions indicate that the substantial nexus requirement means that the activity subject to the state tax must be sufficiently connected with the state to give the state jurisdiction to impose the tax. Complete Auto Transit, Inc., 430 US at 282-83, 97 S Ct at 1080; see also Tyler Pipe Industries, Inc. v. Washington State Department of Revenue, 483 US 232, 249-51 107 S Ct 2810, 2821-22 (1987) (holding wholesale tax on out-of-state manufacturer has sufficient nexus).

In Commonwealth Edison Company v. Montana, 453 US 609, 101 S Ct 2946 (1981), the Supreme Court considered the constitutionality of Montana's severance tax on coal mined in Montana. Although the parties did not dispute that the tax satisfied the substantial nexus requirement, the Court quoted with approval the Montana Supreme Court holding that severance of coal within Montana is a sufficient nexus to support the state tax. Commonwealth Edison Company, 453 US at 619, 101 S Ct at 2953. Similar to the severance of coal, solid waste disposal at a permitted Oregon landfill is an activity sufficiently related to the interests of Oregon to satisfy the substantial nexus requirement for imposing the disposal fees.

B. Fairly Apportioned.

The protection afforded by the Commerce Clause includes

the assurance that state "revenue measures maintain state boundaries as a neutral factor in economic decision making." American Trucking Associations, Inc. v. Scheiner, 483 US 266, 283, 107 S Ct 2829, 2840 (1987). Thus, the requirement for a state tax to be fairly apportioned to the value of the activity occurring within the state "is to ensure that each state taxes only its fair share of an interstate transaction." Goldberg v. Sweet, __ US __, 109 S Ct 582, 588 (1989) (holding Illinois telecommunication excise tax fairly apportioned). Under the Supreme Court decisions, a state tax will be considered fairly apportioned only if the tax is both internally and externally consistent under the Court's guidelines. Goldberg, __ US at __, 109 S Ct at 588.

In Goldberg, the Supreme Court defined the test for internal consistency, stating:

> "To be internally consistent, a tax must be structured so that if every state were to impose an identical tax, no multiple taxation would result. 43 US at 169, 103 S Ct, at 2942. Thus, the internal consistency test focuses on the text of the challenged statute and hypothesizes a situation where other states have passed an identical statute." Goldberg, __ US __, 109 S Ct at 589.

Because the internal consistency test looks solely at the text of the statute, this test by itself is insufficient to eliminate the risk of multiple taxation that may result from similar but not identical taxes imposed by other states. Thus, the Supreme Court also analyzes the tax for external consistency:

"The external consistency test asks

> whether the state has taxed only that portion of the revenues from the interstate activity which reasonably reflects the in-state component of the activity being taxed. [Citation omitted.] We thus examine the in-state business activity which triggers the taxable event and the practical or economic effect of the tax on that interstate activity." Goldberg, __ US __, 109 S Ct at 509.

Under the internal consistency test, the EQC rule establishing a fee on the disposal of out-of-state waste must be designed so that another state could not enact an identical tax that would subject the interstate movement of waste to multiple taxation. Because the taxable event of waste disposal can occur in only one state, the EQC rule will satisfy the internal consistency test so long as the fee is imposed on solely the act of disposal.

On the other hand, however, even if the EQC rule applies only to waste disposal, an impermissible risk of multiple taxation on the interstate movement of waste will exist if the amount of the disposal fee reflects more than the value of the in-state activity of disposal and, therefore, may fail the external consistency test. For example, if the fee on out-of-state waste disposal is based on the costs to implement an Oregon recycling program as well as the costs attributable to disposal, there is a significant risk of multiple taxation on the interstate movement of waste because another state could impose a recycling tax on waste generation or

collection.[5] Thus, contrary to the limitations of the Commerce Clause, the interstate movement of waste will be required to pay more than its fair share because it will be taxed at least twice to support various state recycling programs.

To summarize, the Commerce Clause requirement for a state tax to be fairly apportioned requires that the out-of-state waste disposal fee relate only to the value of the in-state activity so that there is no risk of multiple taxation on the interstate movement of waste. To be valid, the amount of the fee must reflect only that portion of the activity occurring in Oregon (disposal) as compared to the value of the entire interstate transaction.

C. Nondiscriminatory.

The third prong of the Complete Auto test provides that a state tax will be invalid under the Commerce Clause if it discriminates against interstate trade. Complete Auto Transit, Inc., 430 US at 279-80, 97 S Ct at 1078. In general, the central tenet of the nondiscriminatory requirement is that a state tax must provide equal treatment for similarly situated in-state and out-of-state taxpayers. Maryland v. Louisiana, 451 US 725, 741, 101 S Ct 2114, 2135 (1981). In Maryland v. Louisiana, the Supreme Court

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[5]It is likely that some out-of-state waste disposed in Oregon will be subject to a fee to pay for the costs of recycling before entering Oregon because Oregon does not permit the disposal of out-of-state waste in disposal sites located in an exclusive farm use zone (volume of more than 75,000 tons per year) or in regional disposal sites unless the originating jurisdiction has implemented a recycling program that is equivalent to the Oregon requirements. ORS 459.055; 459.305.

stated:

> "A state tax must be assessed in light of its actual effect considered in conjunction with other provisions of the state's tax scheme. 'In each case it is our duty to determine whether the statute under attack, whatever its name may be, will in its practical operation work discrimination against interstate commerce.'" Maryland v. Louisiana, 451 US at 758, 101 S Ct at 2134.

Under the Supreme Court decisions, the EQC rule establishing the waste disposal fees will be per se invalid if it facially discriminates against interstate commerce by imposing a disposal fee on out-of-state waste that is higher than the fee imposed on in-state waste. See Boston Stock Exchange v. State Tax Commission, 429 US 318, 334, 97 S Ct 599, 608 (1977) (holding New York transfer tax invalid because greater tax liability imposed on out-of-state sales than in-state sales); City of Philadelphia v. New Jersey, 437 US 617, 98 S Ct 2531 (1977).

The Supreme Court has applied the anti-discrimination prong to strike down literally dozens of tax statutes that discriminated against interstate commerce. See, e.g., New Energy Co. v. Limbach, 486 U.S. 269 (1988) (provision awarding fuel dealers tax credit against Ohio fuel sales tax for each gallon of ethanol sold, but only if ethanol was produced in Ohio or in a state that grants similar tax advantages for Ohio ethanol); Tyler Pipe Indus., Inc. v. Washington State Dept. of Rev., 483 U.S. 232 (1987) (exemption from manufacturing tax available only for locally manufactured products sold within the state, not for locally

manufactured products sold outside the state); Bacchus Imports, Ltd. v. Dias, 468 U.S. 263 (1984) (exemption from liquor sales tax for two locally produced beverages); Armco, supra (provision exempting local manufacturers from gross receipts tax); Westinghouse Elec. Corp. v. Tully, 466 U.S. 388 (1984) (franchise tax credit available only to extent products are shipped from within New York); Maryland v. Louisiana, supra (series of exemptions from and credits against Louisiana first use and severance taxes for gas consumed or produced in Louisiana); Boston Stock Exchange v. State Tax Commissioner, supra (provisions of transfer tax on securities transactions that expressly accorded preferential tax treatment to in-state sales); Halliburton Well Cementing Co. v. Reily, 373 U.S. 64 (1963) (use tax on cost of out-of-state labor to assemble equipment to be used instate invalid where cost of instate labor not similarly taxed); Best & Co. v. Maxwell, 311 U.S. 454, 456 (1940) (tax paid by out-of-state solicitors higher than tax on local merchants); I.M. Darnell & Son v. City of Memphis, 208 U.S. 113 (1908) (exemption from Tennessee property tax for Tennessee agricultural products, but not for agricultural products brought in from other states); Walling, supra (tax on liquors produced out-of-state and sold in-state); Guy, supra (user fee imposed on vessels carrying products of other states but not on vessels carrying Maryland products; Welton v. Missouri, 91 U.S. 275 (1876) (license tax imposed on peddlers of out-of-state goods).

For most, if not all of the components of the out-of-state surcharge, there is no reason apart from origin to treat out-of-state waste differently than waste generated in Oregon. See City of Philadelphia v. New Jersey, 437 US at 630-31, 98 S Ct at 2538. This is especially true because both in-state and out-of-state waste must meet the same pre-disposal recycling requirements. Oregon law prohibits the disposal of out-of-state waste at sites located in exclusive farm use zones and regional sites, unless the originating jurisdiction has implemented a recycling program that is equivalent to the Oregon program. ORS 459.055; 459.305. Thus, as discussed in Section I, if the EQC rule facially discriminates against interstate trade by imposing a higher fee on the disposal of out-of-state waste, the EQC rule will be per se invalid under City of Philadelphia and Complete Auto Transit, Inc.

The Oregon Department of Justice (DOJ) suggests that it is constitutionally permissible to impose a higher disposal fee on out-of-state waste than imposed on in-state waste, provided a rational basis for the difference exists. Although there is no difference between out-of-state and in-state waste, the DOJ contends that a higher out-of-state waste disposal fee is justified "to compensate for expenditures and assessments already paid by residents." See Memorandum to S. Hallock from L. Edelman, page 4 (January 19, 1989). Thus, the DEQ has based the out-of-state waste disposal fee on, among others, the costs to implement Oregon's

pollution tax credit program and the costs to certify or approve local government waste reduction and recycling programs, even though the in-state waste disposal fee does not include these costs.

In support of this argument, the DOJ relies on the Supreme Court's decision in Toomer v. Witsell, 334 US 385, 68 S Ct 1156 (1948), which concerned the enforcement of certain South Carolina statutes regulating commercial shrimp fishing. However, the DOJ's reliance on this decision is misplaced. The DOJ relies on a portion of the Court's analysis relating specifically to the application of the privileges and immunities clause of the United States Constitution. Toomer, 334 US at 394-99, 68 S Ct at 1161-64. In contrast, the Supreme Court has established a wholly different analysis under the Commerce Clause for determining the validity of state revenue measures regulating interstate commerce.

Although not mentioned expressly, if the DOJ analysis is an attempt to justify a higher out-of-state waste disposal fee as a constitutionally permissible "compensatory tax," the DOJ incorrectly applies the Supreme Court's concept of a compensatory tax. The Supreme Court's concept of a compensatory tax refers to mutually compensating taxes on substantially equivalent events. See Tyler Pipe Industries, Inc. v. Washington State Department of Revenue, 483 US 232, 241-47, 107 S Ct 2810, 2817-20 (1987); American Trucking Associations, Inc. v. Scheiner, 483 US 266, 286-88, 107 S Ct 2829, 2842-43 (1987); Boston Stock Exchange v. State

Tax Commission, 429 US 318, 332-34, 97 S Ct 599, 607-8 (1977). Oregon does not impose a tax on persons disposing in-state waste for the costs of pollution tax credits the cost of waste reduction and recycling certification or other in-state costs. Therefore, the disposal of out-of-state waste cannot be a substantially equivalent event that justifies a compensatory tax because no tax is imposed on in-state waste disposers.

Moreover, the fact that Oregon has chosen to fund pollution tax credits and waste reduction and recycling certification from the general fund through taxes on Oregon residents does not justify a higher fee on persons disposing out-of-state waste. The payment of taxes by residents and the disposal of out-of-state waste are not substantially equivalent events). See Tyler Pipe Industries, 483 US at 245, 107 S Ct at 2818 (holding manufacturing and wholesale sales are not substantially equivalent events). Furthermore, the purpose of the Commerce Clause and the concept of a compensatory tax is to ensure "[e]qual treatment of interstate commerce." Boston Stock Exchange, 429 US at 333, 97 S Ct at 608; Tyler Pipe Industries, 483 US at 245, 107 S Ct at 2818. To the extent that Oregon imposes a higher fee on the disposal of out-of-state waste to compensate for the costs of programs funded through general revenue, and persons disposing in-state waste are not also assessed a fee to compensate for those costs, Oregon is clearly discriminating against persons disposing out-of-state waste and providing an unconstitutional economic advantage to those

disposing waste generated within Oregon.

The DEQ staff has also considered imposing a "differential fee" on persons disposing out-of-state waste which would be based on the in-state waste disposal fee plus the difference between the in-state disposal fee and the cost of disposal in the jurisdiction where the waste was generated. This approach is not included in the proposed surcharge. However, if the EQC included in the final surcharge such a fee it would be invalid. This type of differential fee discriminates against interstate commerce because it does not treat the disposal of in-state and out-of-state waste equally. In fact, the sole basis for this type of fee is origin of the waste -- an impermissible basis for treating out-of-state waste differently.

In American Trucking Association, Inc. v. Scheiner, 483 US 266, 107 S Ct 2829 (1987), the Supreme Court held that a Pennsylvania truck marker fee violated the Commerce Clause because out-of-state trucks were required to pay the marker fee whereas Pennsylvania trucks were deemed to have paid the fee as part of their registration fee. Finding that this fee system discriminated against interstate trade, the Supreme Court stated:

> "Most importantly, even if the relative amounts of states' registration fees confer a competitive advantage on trucks based in other states, the Commerce Clause does not permit compensatory measures for the disparities that result form each state's choice of tax levels. American Trucking Associations, 483 US at 288, 107 S Ct at 2842-43. (emphasis added.)

A differential fee would impose a heavier tax burden on the disposal of out-of-state waste based solely on the jurisdiction in which the waste originated. This type of fee not only provides an impermissible economic advantage to persons disposing in-state waste, but is an overt attempt to discourage the free flow of interstate commerce. Thus, a differential fee, if adopted, would be per se invalid under the Commerce Clause.

There is no basis apart from origin to distinguish between waste generated in Oregon and waste generated outside Oregon. The EQC must treat the disposal of in-state and out-of-state waste equally. An EQC fee on out-of-state waste disposal will patently discriminate against interstate commerce and be invalid under the Commerce Clause if it imposes: (a) a fee to pay for the Oregon pollution tax credits or the waste reduction and recycling certification, and does not impose these fees on Oregon waste; (b) a differential fee based on the cost of disposal at the point of origin; or (c) any other cost that is equally applicable to the disposal of in-state waste but not imposed on in-state waste (e.g., unfunded environmental liability, publicly supported infrastructure, image, lost disposal capacity, nuisance and loss of quiet enjoyment, and solid waste management and regulation).

Moreover, a state tax law may be invalid under the Commerce Clause even where the law does not facially discriminate against interstate commerce if the tax imposed on out-of-state interests impermissibly burdens interstate commerce by making the

interstate transaction pay more than its own way. American Trucking Associations, 483 US at 281, n.12, 107 S Ct at 2839, n.12, Nippert v. Richmond, 327 US 416, 66 S Ct 586 (1946) (invalidating quoting facially neutral taxes which in effect discriminate against interstate trade).

D. Fairly Related to Services Provided by the State.

As indicated, a common theme in the Supreme Court decisions on the validity of state taxes is the limitation that a state may not impose on interstate commerce a tax burden that requires an interstate transaction to pay more than its fair share in relation to the in-state activity. See Complete Auto Transit, Inc., 430 US at 283, 97 S Ct at 1080; Tyler Pipe Industries, Inc., 483 US at 247, 107 S Ct at 2820 ("a tax violates the Commerce Clause 'when it unfairly burdens commerce by exacting more than a just share from the interstate activity.'"). Thus, the final prong of the Complete Auto test requires that the state tax be fairly related to the services provided by the state. Complete Auto Transit, Inc., 430 US at 279-80, 97 S Ct at 1078. The purpose of this requirement "is to ensure that a state's tax burden is not placed upon persons who do not benefit from the services provided by the state." Goldberg, __ US __, 109 S Ct at 592.

ORS 459.298 requires the EQC to base the out-of-state disposal fees "on the costs to the State of Oregon and its political subdivisions of disposing of solid waste generated out-of-state which are not otherwise paid for" under other Oregon

statutory provisions. Thus, the EQC does not have authority to impose a fee on out-of-state waste disposal that is not directly related to out-of-state waste disposal. However, in defining what costs are related to such waste disposal, the Commerce Clause further limits the EQC authority by requiring that the costs be related to services that will benefit the person disposing the waste.

In Evansville-Vandenberg Airport Authority District v. Delta Airlines, Inc., 405 US 709, 92 S Ct 1349 (1972), the Supreme Court considered the constitutional validity of two state tax laws that imposed a flat fee on each passenger enplaning a commercial airline. The Supreme Court upheld these tax laws because the charges reasonably reflected "the use of facilities for whose benefit they are imposed." Evansville-Vandenberg, 405 US at 719, 92 S Ct at 1355. The Court also commented on the use and distribution of the revenue from these taxes, stating:

> "Yet so long as the funds received by local authorities under the statute are not shown to exceed their airport costs, it is immaterial whether those funds are expressly earmarked for airport use." Evansville-Vandenberg, 405 US at 722, 92 S Ct at 1357.

Thus, under the fourth prong of the Complete Auto test and in conjunction with the provisions of ORS 459.298, the EQC is required to base the amount of the out-of-state waste disposal fee on solely the costs associated with the disposal of the waste, and may not include in that amount the cost of services which will not benefit

the person disposing out-of-state waste.

E. Summary.

The Commerce Clause limits the authority of the EQC in establishing fees for the disposal of out-of-state waste by prohibiting the EQC from requiring the interstate movement and disposal of waste to pay more than its fair share of the activity occurring in Oregon. To ensure that the EQC does not impermissibly burden commerce, the Supreme Court requires that the fees: (a) have a substantial nexus with Oregon; (b) be fairly apportioned to the value of the disposal activity in light of the entire interstate transaction; (c) not discriminate against the interstate movement of waste; and (d) be fairly related to the services provided by the State of Oregon to the persons disposing out-of-state waste. As applicable, these limitations are discussed in Section III with respect to the costs included in the proposed surcharge on out-of-state waste.

III. Waste Disposal Fee Issues.

ORS 459.294 directs the EQC to establish fees for the disposal of waste generated in Oregon, and provides that the in-state waste disposal fees may not exceed a maximum amount of $0.50 per ton of waste disposed. Under ORS 459.295, revenue from the in-state waste disposal fees will be credited to and appropriated for the following DEQ activities: (a) Oregon household and small quantity generator hazardous waste programs; (b) Oregon waste reduction and recycling; (c) monitoring and

enforcement of groundwater protection standards at solid waste landfills; (d) local and regional solid waste planning; and (e) recycling and solid waste management grants to local governments.

ORS 459.297 provides that separate fees will be imposed exclusively on the disposal of waste generated outside Oregon. ORS 459.298 directs the EQC to base the amount of the out-of-state waste disposal fees on "the costs to the State of Oregon and its political subdivisions of disposing of" out-of-state waste provided these costs are not otherwise paid through other statutory fees cited. ORS 459.298, however, does not set a maximum permissible out-of-state waste disposal fee like that established for the in-state waste disposal fees under ORS 459.294.

The DEQ proposed surcharge includes a number of cost categories to establish the amount of the out-of-state waste surcharge. The DEQ proposed out-of-state waste disposal surcharge is higher than the fee imposed on the disposal of in-state waste. Imposing a higher fee on out-of-state waste disposal than is imposed on in-state waste disposal patently discriminates against interstate commerce and, therefore, is per se invalid under the Commerce Clause. Additionally, because the Commerce Clause prohibits a state from imposing a tax burden on an interstate transaction that exceeds the value of the activity occurring in the state, even a facially neutral fee on in-state and out-of-state waste disposal will violate the Commerce Clause if the out-of-state

waste disposal fee does not satisfy each of the requirements of the Supreme Court's Complete Auto test.

A. Fees Patently Discriminatory -- Per Se Invalid.

The EQC fee on the disposal of out-of-state waste will be per se invalid under the Commerce Clause if it patently discriminates against interstate commerce. City of Philadelphia v. New Jersey, 437 US 617, 625-28, 98 S Ct 2531, 2535-37; see also Complete Auto Transit, Inc. v. Brady, 430 US 274, 97 S Ct 1076 (1977). In City of Philadelphia, the Supreme Court held that a state law is per se invalid if it discriminates against the interstate movement and disposal of waste on the basis of origin. In its decision, the Supreme Court made clear that conservation of landfill capacity is not a legitimate governmental interest for distinguishing out-of-state from in-state waste, and indicated that a state may not provide its residents with: (a) a preferred right of access to landfill capacity in the state; or (b) an economic advantage over out-of-state residents in obtaining access to landfill capacity. City of Philadelphia, 437 US at 628-29, 98 S Ct at 2537.

The DEQ has identified several cost categories in attempt to support a higher disposal fee on out-of-state waste than imposed on in-state waste. If adopted by the EQC, however, this position on its face will patently discriminate against the interstate movement of waste, and will be per se invalid under the Commerce Clause because there is no basis apart from origin to distinguish

waste generated outside Oregon from waste generated in Oregon:

1. Statewide Activities for Solid Waste Management Paid Through the General Fund. The DEQ has included as a cost category for the surcharge, statewide activities for reducing environmental risk and improving solid waste management paid for through the general fund. The DEQ does not identify what activities it undertakes to reduce environmental risk. However, activities identified by the DEQ for this category include rulemaking and development of statewide policy, the cost to administer the solid waste program and statewide solid waste management planning. These costs are supported presently by the general fund. It is not clear that the activities identified relate to, or benefit waste from out-of-state that is disposed in the State of Oregon.

Each of the costs identified by the DEQ are costs that are likely to vary depending on the quantity of waste disposed at a landfill site. None of these costs can be solely attributable to out-of-state waste, but instead will be incurred because of the disposal of all waste. Thus, there is no basis apart from waste origin for imposing a higher disposal fee on out-of-state waste, and any attempt to do so is prohibited by the Commerce Clause.

A higher fee on out-of-state waste based on this basis will be per se invalid under the Commerce Clause. Persons who dispose out-of-state waste do not receive a benefit from landfill administration or planning that is any greater than the benefit received by persons disposing in-state waste. This DEQ cost

justification is an attempt to allocate a higher disposal cost to persons outside Oregon and provides a preferred right of access to Oregon residents. There is no basis for distinguishing out-of-state waste from in-state waste and, therefore, imposing a higher fee on out-of-state waste disposal under this rationale is violative of the Commerce Clause.

2. Pollution Tax Credit Costs. The DEQ proposed surcharge requires persons disposing out-of-state waste to pay a disposal fee that is higher than the in-state waste disposal fee to compensate Oregon for the costs incurred under the Oregon pollution tax credit program. Under ORS 468.150 to 468.190, solid waste disposal facilities, among others, may receive tax credits for improvements designed and used to control or prevent pollution. In general, the DEQ suggests that unless persons who dispose out-of-state waste are assessed a higher disposal fee to pay the cost of this tax credit program, Oregon will be subsidizing out-of-state waste disposal.

This DEQ justification for imposing a disposal fee on out-of-state waste which is higher than the in-state waste disposal fee is per se invalid under the Commerce Clause because it unquestionably discriminates against interstate commerce in favor of Oregon interests. Under the DEQ proposed rule, persons disposing out-of-state waste will be required to pay at least some, if not all, of the costs of the tax credit program. However, persons disposing in-state waste will not be required to pay these

costs, but will receive the same benefits received by persons disposing out-of-state waste.[6]

To the extent that the EQC considers it appropriate to charge persons using a disposal site to share the costs of the pollution tax credit program, it must treat in-state and out-of-state users equally. There is no difference between waste generated in Oregon and waste generated outside Oregon; and, therefore, Oregon is prohibited from treating the disposal of out-of-state waste differently than the disposal of in-state waste. Thus, this DEQ justification is simply an attempt to burden those outside Oregon with the costs to implement the pollution tax credits and is per se invalid because it facially discriminates against interstate commerce.

The Supreme Court has addressed specifically discriminatory tax credits and has held that taxes that discriminate against interstate commerce to be invalid. In New Energy Company of Indiana v. Limbach, 486 US 269, 108 S Ct 1803 (1988) the Supreme Court found invalid an Ohio statute that awarded a tax credit against an Ohio motor fuel sales tax for each gallon

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[6]Under the DEQ proposal, out-of-state waste generators are to pay the cost of tax credits, even if they receive no benefit from tax credits. As proposed, the DEQ considers the cost of tax credits to apply, even if the landfill did not apply for and receive a tax credit. Furthermore, publicly-owned landfills, are not eligible for pollution tax credits. Persons disposing out-of-state waste in these landfills are even more heavily discriminated against, because they will receive no benefit. Such costs cannot possibly be a "cost of disposing" of out-of-state waste within the meaning of the statute.

of ethanol sold by fuel dealers as a component of gasohol only if the ethanol was produced in Ohio. The Court found the tax invalid where the statute would not award a similar tax credit to fuel dealers selling ethanol produced in Indiana (or any state other than Ohio).

Moreover, the DEQ may not dispute the discriminatory effect of this type of fee because Oregon taxpayers pay for tax pollution tax credits. The Supreme Court has held that "the Commerce Clause does not permit compensatory measures for the disparities that result from each state's choice of tax measures." American Trucking Associations, Inc. v. Scheiner, 483 US 266, 288, 107 S Ct 2829, 2843 (1987) (holding Pennsylvania may not impose a discriminatory tax on out-of-state trucks to remedy a competitive advantage resulting from Pennsylvania truck registration fees). Thus, if the EQC finds that disposal facility users should pay the costs of the pollution tax credit program, all users of the disposal facilities must share this burden equally. Otherwise, the disposal fees will provide persons disposing in-state waste with an economic advantage and a preferred right of access to landfill capacity that is constitutionally invalid.

3. Solid Waste Reduction Activities Related to Review and Certification of Waste Reduction Plans. The DEQ seeks to recover as part of the surcharge on out-of-state waste the cost to the State of Oregon for the review and certification of the opportunity to recycle for programs for out-of-state jurisdictions.

Oregon law requires an out-of-state jurisdiction that sends more than 1,000 tons per year to a regional landfill, to obtain certification that it is providing in its jurisdiction an opportunity to recycle as required for Oregon jurisdictions. In addition, any community, whether in-state or out-of-state which sends more than 75,000 tons of solid waste per year to a disposal site located in an exclusive farm use zone must also submit a solid waste reduction plan that must be reviewed and approved by the DEQ. Although, certification of opportunity to recycle and approval of the solid waste reduction plans is required for jurisdictions both in the state of Oregon and outside the state of Oregon the proposed surcharge would impose a fee for DEQ review and approval only on out-of-state waste. This part of the surcharge that imposes a fee where no fee is charged for in-state certifications, will be per se invalid.

It is necessary to note that the DEQ derivation of the costs for statewide activities paid for through the general fund was determined by simply dividing all general fund supported DEQ costs by the total volume of in-state wastes. To the extent that DEQ must also certify and review opportunity to recycle reports and solid waste reduction plans for in-state waste it would appear that the costs for in-state programs would be included in that calculation. If the DEQ surcharge proposes a separate fee for recycling certification the DEQ would be recovering twice (double counting) for the cost to certify out-of-state waste recycling

programs.

4. Unfunded Environmental Liability. The proposed surcharge indicates that potential liability for a landfill failure exists in excess of existing in place mechanisms, e.g. financial assurance required of regional landfills, closure bonds, the 50 cents bond fund and the local government landfill remedial action cost recovery through collection rates. The DEQ suggests that persons disposing out-of-state waste should pay a higher disposal fee than in-state waste disposers because each increment of out-of-state waste accepted in Oregon adds to the probability and potential magnitude of an environmental problem at a landfill. Similar to the items discussed above, this justification for a higher out-of-state waste disposal fee is per se invalid because it treats out-of-state waste unequally solely on the basis of waste origin. Regardless of whether, if at all, an increment of waste adds to the potential risk of an environmental problem, an increment of in-state waste will have the same result as an increment of out-of-state waste. Thus, imposing a higher disposal fee on out-of-state waste simply allocates a heavier tax burden to out-of-state interests and grants a preferred right of access to in-state interests which is a per se violation of the Commerce Clause.

5. Lost Disposal Capacity. The DEQ supports its position for a higher disposal fee on out-of-state waste by contending that persons disposing out-of-state waste should pay for

lost disposal capacity that results from Oregon acceptance of out-of-state waste. Any loss of landfill capacity will occur whether the waste comes from within or outside Oregon. Apart from origin there is no basis for distinguishing out-of-state waste from in-state waste and, therefore, any higher fee on the disposal of out-of-state waste will be per se invalid.

6. Image. Another argument used by the DEQ to support a higher out-of-state waste disposal fee is the contention that Oregon's acceptance of out-of-state waste diminishes the perception that Oregon is on the leading edge of environmental issues and reduces Oregon's ability to attract new business.[7] Thus, the DEQ proposes that persons disposing out-of-state waste should pay a higher fee to support public relations and awareness programs that would minimize the adverse publicity, if any, that results from accepting out-of-state waste. As discussed, there is no legitimate basis to distinguish out-of-state waste from in-state waste, and any adverse impression resulting from waste disposal applies equally to both in-state and out-of-state waste. In City of Philadelphia, the Supreme Court held that a state is prohibited from imposing a heavier burden on interstate commerce because of waste origin. This attempt to justify a higher fee on out-of-state

[7]It must be noted that DEQ has no factual support for the conclusion that accepting out-of-state waste impacts Oregon image negatively. The impact could just as easily be considered positive, because Oregon which has two new regional landfills could be considered to have solved its "landfill crisis" which could improve the impression of Oregon.

waste falls squarely within the constitutional prohibition and, if adopted, will be per se invalid under the Commerce Clause.

7. Publicly Supported Infrastructure. The DEQ proposal identifies as an extra cost the costs to the publicly supported infrastructure for the transport and disposal of waste. Under the transport infrastructure category the DEQ looked at the need for spill response capability, maintenance of roads, railroad crossing, PUC activities and extra traffic patrolling. The DEQ indicated that the costs for this type of public infrastructure would likely be low because they are already paid through PUC mileage tax or local host fees. However, to the extent that they are not so paid the activities identified would apply for in-state waste as well as for out-of-state waste. In addition, the DEQ suggests that transportation planning in the Columbia Gorge corridor is necessary because of the volume of waste that may use this corridor. Both in-state and out-of-state waste will use this transportation corridor. Any planning activities will benefit both in-state and out-of-state waste. The surcharge will be invalid under the Commerce Clause because there is no basis upon which to justify imposition of a fee on out-of-state waste other than of origin of the waste.

8. Loss of Quiet Enjoyment. The DEQ also attempts to justify a higher disposal fee on out-of-state waste by arguing that acceptance of this waste will increase the amount of truck traffic through Oregon and result in a loss of quiet enjoyment to local

areas. The DEQ contends that imposing a higher out-of-state waste disposal fee will compensate for this loss of quiet enjoyment. This rationale, if adopted, will patently discriminate against interstate commerce and will be per se invalid. There is no difference between trucks (or trains) carrying out-of-state waste and trucks (or trains) carrying in-state waste. Thus, this basis for a higher out-of-state waste disposal falls squarely within the Commerce Clause prohibition because it imposes a higher cost on the interstate movement of waste with no justification except origin of the waste.

B. Fees that Violate Complete Auto.

As discussed above, there is no basis apart from origin to distinguish waste generated outside Oregon from waste generated inside Oregon. To the extent that the costs proposed by DEQ staff result in the imposition of a higher disposal fee on persons who dispose out-of-state waste than imposed on persons who dispose in-state waste, the fees will facially discriminate against interstate commerce, and thereby violate the second prong of the Complete Auto test.

Moreover, the Supreme Court has consistently held that a state tax law will not be upheld solely on the basis that it is facially neutral:

> "In its guarantee of a free trade area among the states, however, the Commerce Clause has a deeper meaning that may be implicated even though state provisions . . . do not allocate tax burdens between insiders and

> outsiders in a manner that is facially discriminatory." American Trucking Associations, Inc. v. Scheiner, 483 US 266, 281, 107 S Ct 2829, 2839 (1987).

Thus, even if the EQC rule imposes an out-of-state disposal fee that is in an amount equal to the fee imposed on the disposal of waste generated in Oregon, the EQC rule will be invalid if it fails to satisfy each of the requirements specified by the Supreme Court in the Complete Auto test. See Discussion, Section II.

The DEQ has proposed that the EQC adopt an out-of-state waste disposal fee that is based on costs relating to a number of DEQ programs. Regardless of whether the same costs are used to determine the in-state waste disposal fee, basing the out-of-state waste disposal fee on some of these DEQ identified costs is prohibited by the Commerce Clause:

1. Solid and Hazardous Waste Reduction and Recycling Costs. The DEQ has indicated that the amount of the out-of-state waste disposal fee should be based in part on the costs to plan, implement and administer the Oregon solid waste reduction and recycling programs, and the Oregon household and small quantity generator hazardous waste programs (collectively "waste reduction and recycling").[8] To be valid under the Commerce Clause, the EQC

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[8]The DEQ cannot justify the cost of waste reduction and recycling as the measure of the cost of lost disposal capacity. As discussed in Section III. 5, if the identified burden is lost capacity, the burden, if any, occurs simply from the disposal of waste regardless of where the waste originated. Thus, a higher out-of-state waste disposal fee will fail because it attempts to

(continued...)

out-of-state waste disposal fee must be fairly apportioned to the value of the activity occurring within Oregon "to ensure that each state taxes only its fair share of the interstate transaction." Goldberg v. Sweet, __ US __, 109 S Ct 582, 588 (1989); Maryland v. Louisiana, 451 US 724, 726, 101 S Ct 2114, 2133 (1931). Under this requirement, the EQC is prohibited from imposing an economic burden on the interstate movement and disposal of waste that reflects more than the value of waste disposal because the interstate transaction could be subjected to multiple taxation. See Goldberg v. Sweet, __ US __, 109 S Ct at 589 (explaining external consistency test for determining whether state tax is fairly apportioned).

A fee on the disposal of out-of-state waste that is based on the costs to implement Oregon's waste reduction and recycling

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[8](...continued)
impose a heavier burden on out-of-state interests than is imposed on identical in-state interests.

In addition, the DEQ cannot rely on Oregon's waste reduction and recycling programs to distinguish out-of-state waste from in-state waste. For most out-of-state waste shipments, Oregon law requires the jurisdiction in which the waste originates to have programs equivalent to Oregon's programs before the waste may be disposed in Oregon. Under ORS 459.305 and OAR 340-60-095, a regional landfill may not accept more than one thousand tons of waste from an out-of-state jurisdiction until that jurisdiction has implemented a recycling program equivalent to the Oregon program. Similarly, under ORS 459.055, a disposal site established in an exclusive farm use zone as a conditional use may not accept more than seventy-five thousand tons of waste from an out-of-state jurisdiction until that jurisdiction has a waste reduction program that, among other things, provides an opportunity to recycle, which meets or exceeds the Oregon requirements. Thus, because most out-of-state waste will be subjected to programs equivalent to the Oregon programs, there is no basis apart from origin to distinguish out-of-state waste from in-state waste.

programs reflects more than the value of the in-state disposal activity. Instead, such a fee would require persons disposing out-of-state waste to pay not only for their own in-state transaction, but also pay for Oregon programs that may be duplicated by the jurisdiction where the waste originated and already paid for by the person disposing the waste in Oregon. This EQC fee would create a significant risk of multiple taxation on the interstate movement and disposal of waste. Another state could impose a waste reduction and recycling tax on waste generation or collection. Thus, an Oregon out-of-state waste disposal fee that includes the cost of Oregon waste reduction and recycling programs is prohibited by the Commerce Clause because the fee amount would exceed the value of the in-state disposal activity in relation to the entire interstate transaction, and subject the interstate movement of waste to multiple taxation.

The DEQ suggests in its comments in support of the proposed rule, that even though out-of-state jurisdictions will receive no apparent benefit from payment for costs of Oregon household hazardous waste programs it is still a justifiable cost. The DEQ suggests that even where an out-of-state jurisdiction has a similar household hazardous waste reduction program that there is a cost because even the remaining household hazardous waste creates an incremental risk. This logic is circular. The logic suggests that money collected from the surcharge would then go to pay for additional Oregon programs to further reduce risk. This points out

clearly that the fee would not be fairly apportioned. That is so because in Oregon money would be going to remove the next increment of household hazardous waste, while the sending jurisdiction would be paying a fee but not receiving the benefit of removing the next increment of household hazardous waste from the out-of-state waste stream. The marginal cost of removing the next increment of household hazardous waste would be higher in Oregon and thus, by identity, surcharge would not be fairly apportioned. Further, to if money is spent in Oregon to remove the next increment of household hazardous waste, this further compounds the multiple taxation issue. To the extent the sending jurisdiction also wanted to reduce this additional risk and proposed a similar program to remove the next increment of household hazardous waste the possibility of multiple taxation continues.

The risk of multiple taxation can never be eliminated by spending more money in-state.

Additionally the fee will violate the Commerce Clause because persons disposing out-of-state waste receive no benefit from the Oregon waste reduction and recycling programs. The fourth prong of the Complete Auto test requires that the EQC out-of-state waste disposal fee be fairly related to the services provided by Oregon. Complete Auto Transit, Inc. v. Brady, 430 US 274, 279-80, 97 S Ct 1076, 1078 (1977). The Supreme Court applies this requirement "to ensure that a state's tax burden is not placed upon persons who do not benefit from the services provided by the

state." Goldberg v. Sweet, ___ US ___, 109 S Ct 582, 592 (1989); see also Evansville-Vandenberg Airport Authority District v. Delta Airlines, Inc., 405 US 709, 92 S Ct 1349 (1972) (holding flat fee on airline passengers valid so long as fee reflects use of facilities). Persons disposing out-of-state waste will not receive a benefit from any of the Oregon waste reduction and recycling programs and, therefore, an out-of-state disposal fee that is based on the costs to implement these programs will be invalid under the Commerce Clause.

2. Statewide Solid Waste Management Costs. The DEQ suggests that the out-of-state waste disposal fee should be based on several general Oregon solid waste management program costs, including: (a) statewide solid waste management; (b) future landfill and solid waste planning and siting costs; (c) statewide groundwater monitoring data management; (d) costs of technical support to local and regional governments; and (e) planning grants to local governments. An out-of-state waste disposal fee that is based, in whole or in part, on the above-referenced costs will not be fairly apportioned to the value of the in-state activity and, therefore, will be invalid under the second prong of the Complete Auto test.

As indicated previously, the Commerce Clause prohibits the EQC from imposing a fee on the interstate movement and disposal of waste that reflects more than the value of the in-state activity of disposal because the interstate transaction could be

subjected to multiple taxation. Goldberg v. Sweet, ___ US ___, 109 S Ct at 589. The costs identified above are not specific to solid waste disposal, but instead provide financial support to implement all Oregon solid waste programs. If persons disposing out-of-state waste are required to pay the cost of such local programs, the interstate movement of waste would be subject to multiple taxation because other states could impose generator or collector taxes for identical programs. Thus, because these costs do not specifically relate to the disposal of out-of-state waste, an out-of-state waste disposal fee based on these costs will violate the Commerce Clause.

C. Summary.

The Commerce Clause of the United States Constitution limits the authority of the EQC to impose a fee on the disposal of waste generated outside Oregon by requiring that this fee: (a) have a substantial nexus with Oregon; (b) be fairly apportioned to the value of the in-state activity of disposal; (c) not discriminate against interstate commerce; and (d) be fairly related to the services provided by Oregon which benefit the persons disposing out-of-state waste. Generally, the DEQ indicated that it will propose that the EQC adopt an out-of-state waste disposal fee that is higher than the fee imposed on persons disposing in-state waste. Because there is no basis apart from origin to treat out-of-state waste differently from in-state waste, a higher out-of-state waste disposal fee will be per se invalid under the Commerce Clause.

Moreover, even if the EQC rule establishing the out-of-state waste disposal fee imposes an amount equal to the in-state waste disposal fee, the EQC rule will be invalid if it attempts to tax persons disposing out-of-state waste for Oregon waste reduction and recycling programs and other general costs of Oregon's solid waste management programs which are not specific to the in-state activity of waste disposal. First, the EQC does not have statutory authority to base the out-of-state waste disposal fee on costs not directly related to waste disposal. Additionally, even if the EQC had authority to include these costs in the disposal fee, imposing this fee on persons disposing out-of-state waste would impose a tax burden on the interstate movement of waste that exceeds the value of the in-state activity (disposal) in relation to the entire interstate transaction. Such an out-of-state waste disposal fee would be invalid under the Commerce Clause because it could not satisfy the Supreme Court requirements under the Complete Auto test.

IV. Statutory Requirements for Determining Fee Amount.

ORS 459.298 requires the EQC to base the amount of the out-of-state waste surcharge on "the costs to the State of Oregon and its political subdivisions of disposing of solid waste generated out-of-state which are not otherwise paid for under" the statutory fees for: (a) permit application fees and financial assurance bonds; (b) in-state waste disposal fees; (c) fees for household and small quantity generator hazardous waste programs.

ORS 459.298 (emphasis supplied). The language employed by the Legislature indicates that the EQC is required to base the out-of-state waste disposal fee on the actual out-of-pocket costs that Oregon and its political subdivisions (hereinafter collectively referred to as "Oregon") incur as a direct result of the waste disposal.

In addition to the limitations imposed on the EQC under the Commerce Clause, many of the "costs" the DEQ has proposed for the out-of-state waste surcharge are not costs that Oregon will incur as a direct result of the disposal of out-of-state waste. Further, many of the costs are not costs incurred by the State of Oregon or its political subdivisions. Additionally, some of the "costs" identified by the DEQ are, or will be, paid through other statutory fees. Thus, as discussed briefly below, there is a question as to whether the EQC has the statutory authority to base the out-of-state waste disposal fee on many of the costs identified by the DEQ.

A. Costs that Oregon Will Not Incur.

The DEQ indicated that it intends to propose that the EQC base the out-of-state waste disposal fee on, among others, the following: (a) lost disposal capacity; (b) nuisance impacts and loss of quiet enjoyment; (c) image; (d) publicly supported infrastructure; and (e) unfunded environmental liability.

Each of the costs are simply supposed impacts to Oregon to which the DEQ attributes a numeric value. Oregon will not incur

a cost for these items. Neither will any of Oregon's political subdivisions. Because ORS 459.298 intends for the out-of-state waste disposal fee to be based on the actual costs to Oregon (instead of on values placed on hypothetical or theoretical impacts to Oregon which may never be incurred), the EQC has no statutory authority to include the above-referenced items in establishing the out-of-state waste disposal fee.

B. Costs Not Related To Out-of-State Waste Disposal.

As indicated, ORS 459.298 requires the out-of-state waste disposal fee to be based on the costs incurred by Oregon or its political subdivisions to dispose of out-of-state waste. The DEQ, however, suggests that the out-of-state waste disposal fee should be based on the costs to operate several general Oregon solid waste management programs, including: (a) future landfill and solid waste planning and siting costs; (b) costs of technical support to local and regional governments; and (c) grants to local governments. Neither Oregon nor its political subdivisions will incur these costs as a direct result from the disposal of out-of-state waste, as required under ORS 459.298. Instead, each of these "costs" relate to the implementation of general and comprehensive DEQ programs. To the extent that these costs do not relate specifically to the disposal of out-of-state waste, the EQC does not have statutory authority to include these costs in establishing the out-of-state waste disposal fee under ORS 459.298.

C. Costs Excluded Specifically by Statute.

The Legislature specifically directed that the amount of the surcharge should be based on "cost . . . not otherwise paid for under provisions of ORS 459.235 and 459.292 to 459.298, 459.411 to 459.417 and Sections 70 to 73 chapter 833 Oregon Laws 1989." ORS 459.298.

However, the DEQ proposed surcharge includes as a cost category an amount equal to the in-state waste surcharge. This is necessarily inconsistent with ORS 459.298 which specifically directs the costs paid under ORS 459.294 and 459.295 must be excluded. The DEQ is interpreting the statutory exclusion incorrectly. The DEQ interprets the exclusion as a mathematical process in which costs of out-of-state waste are to receive a credit for any monies obtained under ORS 459.294 or 295.235. In fact the statute requires that costs of the type paid for under ORS 459.295 be excluded. However, the DEQ has proposed that all costs the DEQ spends for programs under ORS 459.295 (or ORS 459.411 to 417) are costs of out-of-state disposal. Under DEQ's interpretation DEQ could spend three, four or five dollars per ton on these programs and although the amount which could be collected from domestic waste would be limited by statute to 50 cents per ton, the remaining amount could be collected from out-of-state waste. In the proposed rule the DEQ has chosen to set this category of the surcharge equal to the in-state fee. However, given the DEQ's faulty interpretation of the statute they could have set the surcharge at any amount based upon what they propose

or desire to spend on ORS 459.295 programs.

In fact, the Legislature intended that the surcharge apply to the costs not presently covered by permit fees collected under ORS 459.235 or from programs for which there is another funding source, i.e. the ORS 459.292 to 459.298 programs. The DEQ's inclusion in the surcharge of the 50 cents per ton, set as equal to the fee for domestic waste is inconsistent with the statute.

Because the DEQ has set the out-of-state waste surcharge equal to the domestic fee, the DEQ has included in the surcharge costs for ground water monitoring programs, and landfill planning and siting. ORS 459.298 limits the EQC's authority to include such costs by excluding costs not otherwise paid under ORS 459.235. ORS 459.235(2) provides that the amount of the fees for landfill disposal site permits:

> "shall be based on the anticipated cost of filing and investigating the application, of issuing or denying the requested permit and of an inspection program to determine compliance or noncompliance with the permit." ORS 459.235(2).

The statute is mandatory. Because all landfill siting and monitoring costs are required to be paid through the permit fees, the EQC is prohibited, by the specific provisions of ORS 459.298, from basing the amount of the out-of-state waste disposal fee, in whole or in part, on these costs.

CITY OF HEPPNER

P. O. Box 756
HEPPNER, OREGON 97836
Telephone 676-9618, Area Code 503

September 24, 1990

Dept. of Environmental Quality
811 S.W. Sixth Avenue
Portland, Oregon 97204-1390

This letter is written on behalf of the City Council and residents of Heppner, Oregon, in opposition to the Solid Waste Out-of-State Surcharge to be imposed by the DEQ. Morrow County, and the City of Heppner have worked very closely with the DEQ regarding the development of Finley Buttes Landfill. We feel that this surcharge imposes an undue burden on not only out-of-state users, but Morrow County residents as well. The City of Heppner and Morrow County are working hard at upgrading the economic development of our area, and this fee is unnecessary.

This letter is to go into your public hearing record on September 25, 1990 at 7:00 p.m. in Arlington, Oregon to show the City of Heppner's opposition to this surcharge.

Sincerely,

Cara Costa

Cara Costa

CC/hs
cc: Morrow County Court
Judge Louis Carlson

MORROW COUNTY

COUNTY COURT

P. O. Box 788 -:- Heppner, Oregon 97836
[503] 676-9061

LOUIS A. CARLSON, Judge
Heppner, Oregon
IRVIN E. RAUCH, Commissioner
Lexington, Oregon
G.W. "Jerry" PECK, Commissioner
Boardman, Oregon
LO RAYNE M. BOWMAN
Administrative Assistant

To: Environmental Quality Commission Sept. 24, 1990

From: Irvin Rauch, Morrow County Commissioner

Subject: Out of state solid waste surcharges

With ORS 459.297 the legislature established surcharges on out of state waste. This was; I feel, short sighted, but is non the less still law. ORS 459.298 covers the amount of such surcharges by costs of certain required duties. ie

1. Solid waste management.
2. Issuing new and renewal permits for solid waste disposal sites. (DEQ already asses a substantial fee for this, and in fact list a substantial increase as one of their priority objectives.)
3. Environmental monitoring.
4. Ground water monitoring.
5. Site closure and post closure activities.

The law does state that the surcharges need not be limited to these activities exclusively; However it appears DEQ has sized upon this as an opportunity to launch a gigantic fund raising campaign. Again; ORS 459.297 states: The amount of the surcharge shall be based on the cost to the State of Oregon. It appears that there are many manufactured cost included. If all are assessed at the maximum this could come to $2,800,000. These proposed costs, real and imaginary, are divided into two groups. 1st Solid waste management including

50c for reducing environmental risk.
(Fair and equitable if applied to all waste deposited in Oregon, not just that generated out of state.)

25c for reducing environmental risk.
(Same thing and is an offset for costs paid from general fund.)

31c for tax credits.
(I see no way of determining this without history.)

05c for solid waste reduction activities related to the service and certification of waste reduction and recycling plans.
(Maybe the lawyers can interpret that.)

10c for unfunded environmental liability.
(There is no liability if DEQ is doing their job.)

07c for lost disposal capacity.

(The state has no right to asses this. The counties have already addressed this issue by granting frachises to landfill companies. This charge should not be assessed at all and if it was it should be turned to the counties. It is they who suffer loss of capacity.

It is my contention that 75c per ton is sufficient fees in this category.

2nd is other costs.

05c for image

10c for public infrastructure

02c for nuisance impact and loss of "quiet enjoyment"

(Mickey Mouse charges developed to enhance the treasury. This item is addressed on page 15 of the interoffice memo to Solid Waste Advisory Committee dated 7-12-90. Here again, this is a local concern and the state should mind their own business.)

There is already appropriated from the general fund, federal funds and fees, nearly 27 million dollars for hazardous and solid waste programs. 11 million or 16% increase over the last biennium. That is a growth out of line with the rest of the state

Most of this boils down to economics. DEQ wants more funds and we are trying to protect our source of revenue. Counties pioneered this source and spent many days negotiating to get fees that would not kill the goose. We manage to assess 25c only to have the state come in and arbitrarily place $1.50 to $3.25 surcharge. This can ony drive away a commodity that we are actively competing for.

PORT OF MORROW

MORROW COUNTY OREGON
P.O. Box 200, Boardman, OR 97818
(503) 481-PORT • 481-DOCK

September 25, 1990

Department of Environmental Quality

Re: Propsed rules relating to a surcharge on out-of-state solid waste disposed of in Oregon.

Morrow County has the fortunate opportunity to have sited a Regional Landfill to accommodate solid waste problems that are occurring in the North-West.

The landfill siting was put forth to the voters in Morrow County and generated the support of over 82% of those voting on the issue.

Opportunities, problems, and solutions to problems should not be defined or penalized by County or State lines. The Regional Landfills in Eastern Oregon were developed because they are solutions to other areas of the Northwest. The Counties that accept these should have the benefit of taking advantage of the opportunities these landfills can bring to our rural economy. In Morrow County, the County Court has addressed the issue of road impacts. The Port of Morrow will benefit by the handling of the containers that the Regional Landfill will bring by river transportation as well as the opportunity to handle the rail movement.

This creates additional jobs in our county. The facility pays taxes that everyone benefits from. The businesses and employees pay income taxes.

Regional landfills are being developed throughout the Northwest. A surcharge will most definitely be a major detriment in trying to develop the opportunities that the landfills can bring to Eastern Oregon.

If these surcharges are implemented, you will probably not collect any out-of-state fees, because that business will go elsewhere and we will lose again.

Eastern Oregon is taking care of Western Oregon's landfill problems, now don't keep us from taking advantage of this opportunity.

The "image" will most definitely be that of Portland's dumping site if you restrict us in Eastern Oregon from developing this business as an industry that employs people and pays those taxes that go along with doing business like other industries in this State.

Again, I urge you to not place these surcharges on this program as it will most definitely eliminate any benefit of having a regional landfill.

Sincerely,

Gary Neal
General Manager

POSITION PAPER

Waste Generated in the State of Oregon
(all categories)

The major categories of waste generated in Oregon are: low level nuclear, hazardous and solid. For the policy section of this paper solid and hazardous waste are discussed. The numerous sub-categories do not impact the basis for this paper.

POLICY I

There are issues, policy questions, problems and opportunities connected to both categories of waste that inter relate. To this point, Oregon has haphazardly addressed all waste issues separately. The time has come to look at the spectrum of the wastes that are generated in the state together, and make policy choices that are to our long term advantage.

In the area of Solid Waste disposal, Oregon now has the advantage of having the only permitted operating state of the art facility. Within three years Washington will have one also. The major volume of solid waste is in Washington and will undoubtedly flow to that facility. It remains to be seen if the existing facilities in Gilliam and Morrow Counties survive without Washington tonnage.

On page C 1 of the July 11, 1990 Memo to the DEQ Solid Waste Advisory Committee it says, "if the surcharge is too high -quote unquote- it could discourage the disposal of out of state solid waste. This might in turn indirectly discourage the establishment of new regional landfills (potentially with improved environmental standards) in Oregon, if the landfill developers anticipate that only minimal amounts of out of state waste would be disposed of. In state level of solid waste generation might not be sufficient to warrent the development of new landfills. Or in state solid waste disposal rates might have to be raised more to cover the costs of new landfills when they eventually become necessary, without the contribution of out of state disposal fees to construction and operation costs."

In the area of Hazardous Waste Disposal, Oregon now has the advantage of having the only permitted operating hazardous waste disposal facility in the region.

Within the next 5 years, Washington will have a hazardous waste incinerator. The major volume of hazardous waste is in Washington and will flow to that facility. Eventually a hazardous waste landfill will be constructed adjacent to the incinerator. It is certain if

This happens, Chem Security will close. Again leaving Oregon with the problems of funding, transportation and liability.

There are three basic issues that should focus the discussion on waste in Oregon; population, volume of generation, available funding.

ISSUE - Population
1. Oregon has the smallest population of the three Pacific Coast states; Washington, Oregon, California.

This fact sets the parameters of our ability to deal effectively with all waste in the state. How much waste is generated in Oregon? How much funding is available for disposal and regulation? Can we afford an approved hierarchy facility for each category?

ISSUE - Volume of Generation
2. Oregon generates the smallest amount of waste, in the three categories, of the Pacific Coast states.

SOLID WASTE
There are no specific figures available in Oregon for determining the amount of solid waste generated.

Even if we do not have accurate figures for tonnage, we can draw some base assumptions using Washington's figures. The numbers for the state of Washington are 5,123,185 tons per year. Washington has a population 50% greater than Oregon. Our solid waste generation is perhaps 50% less.

It is clear Oregon generates much less waste than Washington.

If a private company invests the money to develop a waste facility, they not only have to cash flow the investment, but also make a return for their stock holders. This means they must compete in the market place for contracts. They need volume.

While this is good news for governmental jurisdictions shopping for disposal, it may not be enough to make the return on investment for the company if there is not enough waste available within the state of Oregon.

One answer seemed to be to seek contracts outside of Oregon, in Washington. Because Oregon was first into the market with a completed operating state of the art facility there was a good chance this would be the way to find volume.

This hope is evaporating under the drive by DEQ to set fees on out of state waste.

The evidence of this is in the contract negotiated between Waste Systems (owner/developer of the Columbia Ridge facility) and the city of Seattle. The company has agreed to absorb half of all fees levied by Oregon DEQ and to develop a comparable facility in Washington by 1995. The caveat to this is that the company could continue to take Seattle's waste at the Columbia Ridge site at a lower rate in 1995. However, if they do not build the Washington facility, the company must reimburse the City for their share of all Oregon fees that have been paid. The company is now negotiating with Adams County, Washington to begin constructing the Washington facility.

Thus the waste volume that could off set the cost of developing a facility and run it efficiently and appropriately are going to be unavailable for Oregon.

HAZARDOUS WASTE

The Chem Security Hazardous Waste landfill facility in Gilliam County has been operational for 20 years. It is the main receiving site for hazardous waste in the northwest, EPA Region 10. Region 10 consists of Oregon, Washington, Alaska, and Idaho. The Confederated Tribes, the US government (Defense Dept., etc.) and the province of British Columbia all are in Region 10 and use the facility.

Over 80 percent of the regions hazardous waste is sent to Chem Security. Over 75 percent of that waste is generated in the state of Washington.

Oregon generates so little hazardous waste that it would be impossible to keep the facility open if it were restricted to disposal of Oregon generated hazardous waste.

All of the high tech firms in Oregon, as well as many other industries, use the Chem Security facility. Having access to the site within the state without having to incur both the transportation costs and liability risk is a plus for Oregon business.

Two recent actions will change this dramatically. One is the shift by EPA to using incineration as the most preferred method of disposal for hazardous waste. Every year more specific waste streams are listed hazardous and directed to incineration and away from landfill disposal.

The second action that will affect how hazardous waste is disposed of in Oregon is the agreement reached by the PNW Hazardous Waste Council.

This group met for over a year at the request of EPA to determine how many hazardous waste incinerators are needed in the Region. There is no hazardous waste incinerator in Region 10 at this time.

It was determined there is sufficient hazardous waste generated to justify siting one incinerator. Any others will be sited only if a need is determined to exist. A tremendous amount of new hazardous waste would have to be generated to site another one.

At this time Washington has several incinerator permit applications in process. Oregon has none. The only hazardous waste incinerator in the pacific northwest will be build in Washington.

Oregon business and communities will have to ship out of Oregon for incineration. We will eventually lose the Chem Security facility as well.

The incinerator must have a landfill for receiving the ash. There is no current plan to close Chem Security. The movement of waste to the Washington facility will draw off tonnage that would have gone to Chem Security. It is not practical or good business to then send ash back to Oregon for landfill disposal at Chem Security.

A landfill will be built for the ash adjacent to the incinerator. It will be much less expensive than transporting ash to Oregon.

The waste that could keep a hazardous waste disposal facility in Oregon will be lost to Washington. The decision on the incinerator has been made. Oregon, who had the advantage in hazardous waste disposal, has lost the advantage.

[redacted]

3. Of the three states, Oregon has the smallest amount of indigenous funding available for siting, development and regulation of appropriate disposal systems and facilities, as well as closure of of old facilities.

SOLID WASTE

There are several factors that impact the cost of disposal. One is the expense of appropriate technology. The day of the garbage dump for solid waste is gone. The need for landfills that use the latest methods is necessary, but also expensive.

Another factor is the cost of regulation. The siting process is long and involved. To develop and maintain environmentally safe disposal facilities that meet the new EPA regulations is an expensive process. An example is the Columbia Ridge facility. The cost to the private owner/developer, to get the permit for the site was 2 million dollars. The cost of developing the facility and the first cell, was 28 million.

The type of public/private partnership that METRO has with Oregon Waste Systems on the Columbia Ridge facility is one example of a way for local government to avoid the upfront expense of developing a landfill. The private company fronted the siting and development cost and took the liability risk. The local government got an environmentally sound state of the art facility and a long term contract without a huge drain on revenues

Given the above example, the new EPA approved landfills will require a predictable level of waste for disposal to cash flow the initial investment. Private companies have access to their investors money for development of facilities. Local government has only tax dollars to draw on.

There is not an infinite amount of money available in the state of Oregon to do all of these things that must be done. Local government must close old landfills, under the new regulations which include financial assurance. They must also site new facilities and build them. Concurrently those same taxpayers must also pay for the state regulatory process.

The revenue that might have come to the state from a reasonable out of state waste disposal fee from Washington, for up to 34 years, has been lost. These revenues could have been used to assist local government in Oregon to meet the new EPA requirements.

HAZARDOUS WASTE

The Oregon Department of Environmental Quality has been using the Chem Security facility to generate fees for years. The first fee levied was $10.00 a ton on all hazardous waste taken to the site. Then it was raised to $20.00 a ton. This next legislative session DEQ intends to raise it to $30.00 a ton.

At the current rate of $20.00 a ton, DEQ has been collecting $2,200,000 a year from the Chem Security facility. This has been used to fund Oregon's Super Fund program for clean ups.

It has been relatively easy to collect this revenue since the Chem Security site has been the only facility in the region. A hazardous waste incinerator in Washington will put an end to that source of revenue.

CONCLUDING THOUGHTS

As a small state with limited revenues and population, Oregon needs to

ask itself some tough questions about how we want to handle our waste disposal problems. And we need to ask them now.

II. Per-Ton Surcharge on Out-of-State Waste

This is a question that should have come from the Policy discussion on how Oregon handles all waste streams.

It is a question that should not be addressed in a vacuum. Various waste streams cross the Oregon-Washington border both as import and export. This question should be decided after bi-state or regional discussions have taken place on how all waste streams are handled on both sides of the border.

Oregon is setting a precedent by acting unilaterally and may well pay a retaliatory price down the road.

As long as Oregon has access to all types of disposal methods available in state for all waste streams, we can afford to risk retaliation. When and if Washington has the disposal facilities available, we must be prepared to bear the cost of their estimated funding requirements for their state programs.

I do not believe it is too late to address this issue on a regional or bi-state basis. However, since we seem to be set on this coarse, I submit the following specific comments on the proposal.

Costs Related to Solid Waste Management

DEQ staff position taken from 7-1-90 Memo to Solid Waste Advisory Committee

$.50	Statewide activities for reducing environmental risk and improving solid waste management, paid for through the per-ton fee on domestic solid waste.
$.25	Statewide activities for reducing environmental risk and improving solid waste management, paid for through general funds.

Both of these proposals are simply revenue offsets to existing funding sources. Once the in state revenues have been reduced, what is the impact going to be of reintroducing them when the out of state waste revenue is gone in 1994.

What specific state-wide "environmental risk" is possible? What activities in Burns, Roseburg or Tillamook would be impacted?

$.31 - .75 Tax credits and other public subsidies

DEQ staff memo 7-11-90

We agree with the NERA consultant report which states that "a surcharge will result only if there are net costs rather than net benefits.

$.05 - .15 Solid waste reduction activities related to the review and certification of waste reduction and recycling plans.

DEQ staff memo 7-11-90

We believe this is the only true cost that has been identified as stated on page C-4, of the NERA report. In the first paragraph the report says that the legislation is very explicit in that the surcharge is to go to DEQ to "meet the costs of the department in administering the solid waste program. This will come to about $50,000 annually, which is the cost to the department to meet the expenses of their solid waste program directly related to out-of-state waste.

On pagbe C-4, paragraph four, then it says that there are other tasks in the solid waste permitting and enforcement section which will increase in proportion to the volume of the additional waste. An example is used that a 400,000 ton increase represents a 20% increase in solid waste disposal in Oregon and therefore a corresponding cost increase for additional solid waste staffing effort. The question is: How does the tonnage increase, increase the work load? Does it change the figures that are submitted on a piece of paper from the operator or is the person at DEQ going to have to go plowing through the extra 400,000 tons of material to get their information.

On the same page in the second paragraph, the department says that the funds which they are estimating to be from 1.2 to 2.8 million in a bi-enium would be used to cover the departments increased work load due to the additional volume of out of state solid waste being disposed of in Oregon.

The 1.2 to 2.8 million dollar figure is a great deal higher than the $50,000 a year needed to fund one FTE position.

On page D-14 in discussing the impact-adverse impact-of the image of the state of Oregon, in the first paragraph that makes a statement that the permit fees for the facilities already includes the cost of site regulation by DEQ. This statement seems to me to say that they don't need any increased funding because they already get the funding to cover their costs out of the permit fee.

The answer to increased work load of one more FTE at DEQ is to increase the permit fee by $50,000. There is no need to go to the extreme lengths of this entire process to cover costs. Perhaps this process is to justify increased revenues.

$.10 - .50 Unfunded environmental liability
DEQ staff Memo 7-11-90

On page D-10 of the memo the staff says there "at lest two sites currently accepting out-of-state waste that are not regional sites" and need to be covered for unfunded environmental liability.

If this is accurate then DEQ needs to set regulations that prevent waste from being sent to an unsound environmentally questionable facility.

$.07-.42 Lost Disposal Capacity
DEQ Staff Memo 7-11-90

On page D-12, under the discussion of loss disposal capacity there is an assumption that Oregons capacity could be depleted by taking out of state solid waste. This assumes that every city in the State of Oregon would sent waste to either of the two regional sites in Morrow or Gilliam County.

A quick review of the cities and Counties that would be possibly financially able to ship waste ot either the Morrow or the Gilliam County sites from within the State of Oregon reveals that possibly six counties and their communities could send wast.

METRO serving the largest metropolitan area in the state currently already sends waste to the Gilliam County site. Lane County will be developing their own landfill and will be available for waste from the south valley and the coastal region. This eliminates that possibility for either Morrow or Gilliam. With those tonnages out of the question then is not much waste left in the state of Oregon that could long haul to either Morrow or Gilliam County.

Other Costs

$.05 - .35 Image
DEQ Staff Memo 7-11-90

The five cents to 35 cents that it would cost to "fix" Oregons image is no more necessary than a same amount that could be levied on Portland citizens to offset Oregons poor image because of the city's high crime rate. We agree with the NERA report on page 17. "If it can be shown that this reputation exists and does affect the publics

attitude toward Oregon, then there is a cost. However---this will be difficult to measure." The same is true for Portlands high crime rate.

$.10 - .50 Publicly Supported Infrastructure
DEQ staff Memo 7-11-90

On page C-4 in the last paragraph it says that "other state agencies may be subject to these increased costs due to the increased volume of waste". "But, pursuant to the statute they will not receive any of the surcharge funds to offset these costs." The memo discusses some of the things that might impact other state agencies. One of the examples is highway repairs due to garbage hauling or additional transportation planning costs. The PUC fees take care of those costs. It's referred to on page D-4- Quote from item 6 "the PUC per mile taxes would cover the costs on highways." On page D-1 the final paragraph, the quote from the department is "We have chosen to include transportation planning under the sub-category of Publicly Supported Infastructure." They have increased the range of that category by 50 cents a ton to cover those costs. However, again on page D-4 of the report they say there should be "no double counting" and the PUC per mile tax is used as an example of a fee already in place to cover the cost of transportation impact.

$.02 - .10 Nuisance Impacts and Loss of "quiet enjoyment"
DEQ Staff Memo 7-11-90

On page D-15 addressing the loss of "Quiet enjoyment" they say that it is very difficult to identify or quantify the loss of "quiet enjoyment". and it "probably is really relatively quite small." But then they also go on to say they need from two to ten cents a ton to take care of this unqunatifiable need.

The staff memo says the EQC will adopt a surcharge amount either from among this proposed range that we are addressing in this hearing, or another amount. On page D-18 the closing statement says "the surcharge may be reviewed at a later date and revised by the commission to reflect inflation and new information based on actually receiving out of state waste. This is open ended and sets the stage for the kind of continuing ever escalating fees that the department has set on the Chem-Security hazardous waste facility.

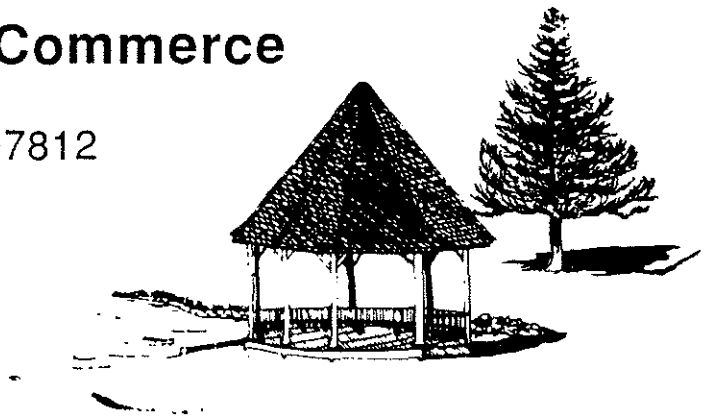
From the above it is abvious this is a very "flexible" process with few stable perameters. It's not wonder the City of seattle said to thank you.

It did not have to develop in this manner. A sound cooperative process could have been structured that worked to the benefit of Oregon. To bad it did not. We all are the looser.

Arlington Chamber of Commerce

On the Mall

Arlington, Oregon 97812



STATEMENT BEFORE THE
OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

September 25, 1990

The Arlington Chamber of Commerce would like to take this opportunity to go on record as being opposed to a surcharge on out-of-state waste coming into Oregon for disposal. On behalf of the members of the Chamber of Commerce, we feel such a fee is unwise.

Any surcharge, tax or fee proposed to meet the costs of the Department in administering the Solid Waste Program should be levied against all sources of waste, whether internal or external to the State's borders.

When those sources of funds necessary to create the money for a DEQ-administered program are collected solely from out-of-state waste producers, the adverse affects are staggering.

The company offering the disposal service is affected... and business suffers.

The loss of business results in a decrease in the monies spent both within the city and the county, resulting in a decrease in cash flow locally.... and business suffers.

The loss in business locally results in a decrease in available employment, lay-offs result.... and business suffers.

Increased unemployment causes a drain on the financial coffers of the State's unemployment division, resulting in the need to increase taxes....and the State suffers.

A surcharge, a fee, or any tax levied on waste generated solely out-of-state will certainly encourage those out-of-state generators to stop using the Arlington facility.

This will place Arlington, Gilliam County, and ultimately the State of Oregon, at a significant disadvantage for substantial amounts of out-of-state waste and the resulting out-of-state dollars.

Any decrease in waste from out-of-state will directly affect all of us. And as a group mandated to support business and the interests of those businesses in Arlington, Oregon, the Chamber of Commerce strongly opposes any such inequitable fee schedule. The $1.50 per ton to $3.50 per ton option **is no option at all** for Arlington.

The **only option** is equitable fees, levied in an equitable manner, to all customers of the Columbia Ridge Landfill and Recycling Center.

On behalf of the Chamber of Commerce, thank you for your time and your consideration of our comments.

Comments presented by: Cal Giesler

Cal Giesler, Chamber President

Landfill, the Contractor shall utilize the Back-up Landfill and notify the SWU orally and subsequently in writing of the reasons for and the anticipated duration of such emergency use. Such emergency use of the Back-up Landfill shall be deemed approved by the City unless the City responds in writing within 72 hours of receipt of the Contractor's written notice indicating that consent is denied by the City.

Section 430. Eastern Washington Landfill Option.

(a) The City shall have the option, subject to the provisions below, to dispose of the City's Waste at the Eastern Washington Landfill commencing on January 2, 1995.

(b) The Contractor shall do the following by December 31, 1993:

(i) Cause the project Final Environmental Impact Statement (EIS) for transportation and disposal at the Eastern Washington Landfill to be completed and issued;

(ii) Obtain from the applicable jurisdictions the required land use permits (excluding the health district operating certificate and building and grading permits) for the Eastern Washington Landfill; and

(iii) Notify the City in writing of the completion of the tasks in subsection (i) and (ii) above and of the reasonable and necessary costs incurred by the Contractor for such tasks, including the cost of design, preparation of the EIS, and legal and consultant fees (hereafter the "Contractor's Development Costs").

(c) The City, within 120 days of receipt of written notification from the Contractor as provided in subsection (b)(iii) above, shall elect whether to transport and dispose of its Waste at the Eastern Washington Landfill. If the City fails to notify the Contractor in writing of its election within the 120-day time period, the City will be deemed to have rejected the option to use the Eastern Washington Landfill.

(d) If the City elects to transport and dispose of its Waste at the Eastern Washington Landfill, the Contractor shall construct the Eastern Washington Landfill to meet the requirements of Section 440 of this Contract. The Eastern Washington Landfill shall be ready for receipt of City Waste by January 2, 1995. The base prices for transportation and disposal at the Eastern Washington Landfill are set forth in Section 500(a).

(e) If, at any time prior to the Contractor providing written notice to the City pursuant to subsection (b)(iii) above,

increased costs are directly attributable to changes in law by the State of Washington that increase the cost of Contractor's performance of this Contract or the performance of its subcontractors, employees, or agents; provided, however, that the Contractor's share of such increased costs in any year shall be limited to an amount equal to fifty cents ($.50) per ton of the City's Waste tonnage delivered to the Receiving Facility in that year (with such fifty cent cap being increased on April 1st of each year following commencement of operations by an amount equal to forty-five percent (45%) of the annual CPI adjustment computed in accordance with Section 520 of this Contract) and the City shall pay the remainder of such increased costs above the cap.

(e) The City shall pay fifty percent (50%) and the Contractor shall pay fifty percent (50%) of Contractor's reasonable, actual increased costs of performing this Contract when such increased costs are directly attributable to changes in law by the State of Oregon that increase the cost of Contractor's performance of this Contract or the performance of its subcontractors, employees, or agents.

(f) The City shall not pay the Contractor for any cost increases directly attributable to changes in law by the local government jurisdictions hosting the Landfill.

(g) The Contractor shall pay for those actual increased costs of performing this Contract directly attributable to changes in law that are not the responsibility of the City pursuant to this Section.

(h) Reimbursement to the Contractor under this Section shall be allowed only for costs incurred, whether for capital, operational or maintenance purposes, to ensure compliance with the change in law and with the terms of this Contract in a reasonable and cost-effective manner.

(i) The Contractor shall notify the City of anticipated cost increases required as a result of a change in law in advance of making such expenditures, including a general description of such changes in law and the estimated costs. The purpose of this notice is to provide the City with early warning of potential City obligations for such cost increases and to provide the City an opportunity to evaluate and comment, at the earliest practicable time, on the reasonableness of such cost increases.

(j) Upon incurring an increased cost of performing this Contract, Contractor shall submit to the City the following documentation to explain the cost increase:

1) identification of the change in law causing the cost increase;

EPA REGION 10

MUNICIPAL SOLID WASTE NEEDS ASSESSMENT

FINAL REPORT

prepared for:

U. S. ENVIRONMENTAL PROTECTION AGENCY
1200 Sixth Avenue
Seattle, Washington 98101

September 29, 1989

IV. REGIONAL OBSERVATIONS

1. Alaska, Idaho, Oregon and Washington communities face an extremely varied range of municipal solid waste management concerns and it will be important for EPA Region 10 to recognize this diversity as it develops programs and priorities.

Of all the EPA regions, Region 10 undoubtedly has the most varied array of municipal solid waste issues. Thus, in order to be effective, regional programs in municipal solid waste will need to reflect this diversity. At one extreme are remote Alaska villages, supported by subsistence economies, which must confront solid waste issues in the absence of a local government structure and/or no municipal tax base. At the other extreme are the international trading cities of Seattle and Portland. Seattle has become a national leader in recycling programs, while Portland is investing in innovative programs for MSW composting as well as pursuing long-haul disposal options.

In Washington and Oregon, two major factors contribute to this diversity:

- location in relation to the Cascades - the wet, west side sees more environmental problems associated with leachate from landfills than does the much drier east side, while at the same time being closer to recycling markets around the Puget Sound and in Portland.

- population density - the large urban areas are generally much further along in the process of shaping their future management practices than rural areas, both because the problems they face are that much greater - including those resulting from past disposal practices - and because the communities are large enough to afford the cost of improved solid waste management.

In Idaho and Alaska, the situation is more complex. Both states are largely rural, with a single major urban center and several smaller cities. Thus, these states clearly see the rural/urban contrast in solid waste management concerns. In addition, both encompass diverse physical environments (climate, topography, groundwater, rainfall, etc.) which complicate decision-making. Management choices in both states are economically constrained by distance from recycling markets, which means relatively more emphasis falls on disposal issues. Alaska, because of its climate, size and small population faces the most extreme range of solid waste management concerns and is more affected than the coastal communities of Washington and Oregon by a recent international treaty (MARPOL ANNEX V - generally referred to as MARPOL) requiring shoreline facilities to receive solid waste from ocean-going vessels.

2. **There is growing recognition throughout the Pacific Northwest that managing solid waste is no longer simply a process of collection and disposal, but requires the management of a diverse set of tasks including collection and marketing of recyclables and perhaps regional or even interstate collaboration.**

EPA's Agenda for Action encourages communities to think about waste management in terms of an integrated system of reduction, recycling, incineration and land disposal. Because of the diversity of factors influencing solid waste management in the region, such as distance to recycling markets and small populations, some communities have less potential than others to incorporate the various aspects of integrated waste management into their plans. Those communities which are more able to adopt a fully integrated approach to waste management are showing progress, though in varying degrees, toward that end.

In the Pacific Northwest, changes in municipal solid waste management are being driven by the cumulative effect of a variety of factors, such as implementation of the proposed Subtitle D criteria (generally referred to in this report simply as "Subtitle D"), MARPOL regulations, and a political commitment to recycling. However, change is not being driven by any widespread sense of a "capacity crisis" such as is being experienced on the East Coast.[2] Neither is it necessarily being driven by a realization of the environmental impacts of past solid waste disposal practices. While some larger communities are facing the consequences of past practices, and some smaller communities are aware of the need to upgrade disposal facilities, solid waste management is not generally perceived as an "environmental issue" in the same vein as hazardous waste management, for example. Rather, it emerges as a "local government" issue as jurisdictions seek the lowest cost way of complying with state and federal regulations, or as a "civic" issue as people press for recycling to either avoid disposal/siting questions, or to spur government to "do the right thing."

Reduction In the Northwest, people are interested in waste reduction, but recognize that packaging changes and many other reduction initiatives are best addressed on a national level because the buying power of any one community, or even the region as a whole, is insufficient to force change in mass marketing practices.

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[2] This needs assessment did not attempt to conduct either a formal capacity assessment, or an evaluation of the environmental impact of current or past solid waste management activities. However, in general, capacity concerns - the absolute lack of existing disposal options - do not appear to be the driving force behind most jurisdictions' deliberations on changing solid waste priorities.

Recycling Recycling is an important part of solid waste management efforts in the large communities, with Seattle providing a model program for urban recycling efforts and Portland pursuing innovative large-scale MSW composting technology. The success of recycling efforts in the region, however, has led to the current oversupply in the paper market. This oversupply creates a serious problem for the region, particularly as smaller communities and rural areas are considering recycling - either because it is perceived as the "right thing to do" or because of legislative mandates to provide opportunities to recycle. Efforts to make recycling a key management option may be limited in rural areas by the relatively low prices charged there for solid waste disposal; relatively high transportation costs to recycling markets concentrated in the Puget Sound and in Portland; and, in the case of paper, depressed markets. Nonetheless, recycling initiatives play an important role in changing people's perceptions about the waste they generate, and make them part of the overall solution and environmentally-sound waste management.

Incineration Incineration as a management option has received a mixed reception in the region. Smaller-scale incinerators (less than 100 tons a day) serve the needs of several Alaska communities, as well as two communities in the other states - Bellingham (WA) and Cassia County (ID). Marion County (OR) is operating a larger facility. Spokane (WA) is building a new large-scale MSW incinerator, while Tacoma (WA) is attempting to modify an existing facility to handle MSW. Several Puget Sound jurisdictions have rejected the incineration option in the face of local opposition. Those involved with incineration proposals sense the lack of support from the regulatory system for incineration, even though it has been placed as an equal to land disposal on various hierarchies of solid waste management options, and where, in specific instances, it may be the most environmentally-sound option available.

Land Disposal Landfilling remains the disposal option of choice for most communities in the region. It appears that a number of urban areas west of the Cascades would like to rely on large private disposal sites east of the Cascades for their land disposal needs. This trend will raise issues concerning transportation, the overall flexibility of the solid waste management system, and control over both the waste stream and the associated costs of managing it. Smaller jurisdictions in the orbit of these regional facilities are likely to use them as well. For more distant communities, smaller-scale regional landfills are being considered through cooperative projects involving a number of adjacent jurisdictions.

3. **Managing municipal solid waste is primarily a local government and tribal concern and most of these jurisdictions in the region have not developed sufficient staff or financial resources to plan, and pay, for recycling programs and for environmentally-sound disposal.**

In part, this reflects the lower priority which has traditionally been given to solid waste disposal, due to ignorance about the environmental impacts associated with solid waste disposal and the widespread belief that local dumps should remain a low-cost government service - that free dumping is akin to a "right." In part, it simply reflects the fact that small jurisdictions have small tax bases which currently provide enough for basic day-to-day governmental needs, but not enough money for long-term planning in solid waste.

There are a total of 119 counties in Idaho, Oregon and Washington. Two-thirds of the population lives in just 17 of these counties, and have populations ranging from 112,000 in Benton County (WA) on the Columbia River to over 1.3 million in King County (WA) on the Puget Sound. This means that one-third of the population - over 2.6 million people - are scattered throughout the remaining 102 counties: 20 have between 50,000 and 100,000 people; 26 have between 20,000 and 50,000 people; and, the remaining 56 counties have populations less than 20,000 - with 37 of these home to fewer than 10,000 people. In Alaska, the situation is more extreme, with Anchorage and Fairbanks home to over half of the state's population of some 500,000 people, with the remaining population scattered over a territory two and half times as large as Washington, Oregon and Idaho combined. In addition, there are thirty-one Indian reservations in the region, with eleven of these providing solid waste disposal on-site to a total of 23,000 people.

Because solid waste is a local community responsibility - at either the city, county (borough) or tribal level - increasing requirements for environmental protection on these small county or tribal landfills is raising the costs of operations beyond the current financial capability of many communities. If a community decides it cannot afford to comply with higher operating and closure standards, it is left with two options: use regional facilities (either multi-county or private facilities); or enter into a period of non-compliance with respect to environmental standards. Moreover, even the resources required to properly plan and site a regional facility (or negotiate with private facilities) are not always available in many of these communities, nor through state programs (or federal ones for Indian tribes).

4. **Even as smaller communities are now incorporating recycling into their solid waste management thinking, the success of recycling collection programs in some large cities brings the region face-to-face with the critical need for expanded recyclable materials markets.**

Just as additional levels of treatment have been required before municipal sewage can be discharged into the nation's waterways, more and more "treatment" of MSW prior to disposal in landfills or incinerators - in terms of recycling and separation of problematic waste streams - represents the future of solid waste management. However, the local governments in the region vary widely in their ability to implement this shift. Alaska, Idaho and the rural areas of Washington and Oregon generally are handicapped by the cost of shipping recyclables to markets or shipping problem wastes, such as medical wastes and tires, to appropriate handling facilities.

The urban areas of Washington and Oregon have access to markets and have been successful in encouraging recycling collection. Now, as existing markets are being overwhelmed by the success of current collection efforts, state and local governments are responding to the need to develop more outlets for recyclables. Also, as recycling becomes more and more of a factor in solid waste management, equivalency in recycling efforts between states and between communities will be more important, as some host communities make a commitment to recycling a prerequisite for use of regional disposal facilities.

5. **Each state in the region needs to insure that regulatory policies are sufficiently similar in application (both within the state and with its border states) so as not to encourage the movement of waste to take advantage of regulatory differences - whether between large and small facilities, between counties or between states.**

Seattle's recently announced decision to use an Oregon landfill for its disposal needs marks the first time in this region that large amounts of municipal solid waste might be moved long distances for disposal and across state borders. While some movement of waste has always occurred, and some wastes are routinely moved across state borders (e.g. Lewiston (ID) contracts to use the Asotin County (WA) landfill), this decision marks a turning point in the way decision-makers are thinking about solid waste disposal options. This new mobility of solid waste increases the importance of regulatory consistency across state lines, so that private firms in one jurisdiction are not "low bidders" for a waste disposal contract by virtue of the fact that they face less stringent environmental regulation than facilities in other jurisdictions.

In addition, the region appears to be developing a two-tiered approach to landfilling of solid waste - large, private disposal facilities and much smaller, local government facilities. The regulatory community is faced with the need to insure that it is able to effectively regulate large, sophisticated firms with technical resources beyond what is available to most regulators; and, to insure that smaller operations upgrade their facilities as much as feasible, given the resource constraints of the communities served. Thus, a "level playing field" is necessary, so that no jurisdiction, or type of facility, can benefit from differences in environmental protection requirements.

6. **The inherent complexity of Subtitle D implementation will be compounded by the potential for significant "mis-matches" between what the regulations require and what ability a community may have, in this predominately rural region, to comply. The wide variety of topography and climate found in Alaska, Idaho, Oregon and Washington, creates a challenge for EPA as it works with states in the development of acceptable state regulatory programs.**

The implementation of comprehensive new standards for the operation of MSW landfills will involve the states, in their enforcement role, and EPA, in its state program approval role, in a difficult regulatory arena. Given the current version of the Subtitle D criteria, many communities in the Pacific Northwest simply do not appear to be able to afford the costs of compliance. While pooling resources to fashion regional solutions may make economic sense, this process may raise political issues which are unlikely to be resolved quickly. Thus, some communities may be expected to remain out of compliance for some time. Closing facilities which are out of compliance does little for the environment (or public health) if no better facilities are available. Complicating this enforcement picture is the reality that there are "alternative" methods of disposing of garbage. If garbage rates - due to environmental compliance costs - rise above some "acceptable" limit, individuals and businesses may recycle more, but they also may choose alternate disposal options - perhaps going to cheaper legal landfills elsewhere or disposing of wastes illegally.

Illegal dumping is happening now in both urban and rural areas - garbage being burned in wood stoves to avoid disposal costs, or tossed along our highways. Rising garbage rates have spawned the growing number of "No Household Trash" signs on trash cans in public parks. Enforcing any solid waste regulation creates this predicament, and the predicament for the states is made that much more difficult because of the varied nature of solid waste management capabilities in Pacific Northwest communities.

Not only will basic compliance issues be raised with the expected implementation of Subtitle D, but these criteria raise the issue of how existing landfills will be closed out. Idaho and Oregon expect many smaller landfills to close rather than comply with new federal regulations. However, these landfills will be closing under the environmental protections found in existing state statutes, which may not be sufficient to protect the public (and the jurisdiction) from the impact of future environmental problems. In addition, communities that are struggling to meet the higher costs of better solid waste management for today's waste stream may have few resources to cope with cleaning up the problems of past practices.

7. **Solid waste options requiring the long distance movement of wastes expand the number of constituencies affected by local solid waste decisions to include those along transportation corridors and in the receiving state and locality; thus, it reduces the control of exporting jurisdictions over their solid waste stream and increases the legitimate interests that a state (or states) have in local solid waste decisions.**

As noted earlier, increasing costs of waste disposal means that waste can economically be shipped further in search of a final disposal site. More long-distance transport increases the number of people affected by solid waste management and also makes the management system more vulnerable to transportation disruptions. Relying on long distance disposal sites (outside the home jurisdiction or home state) means the loss of total local control over the waste stream, as the sending jurisdiction is affected by the policies and priorities of the receiving jurisdiction. This is an issue being debated in Washington and Oregon as major cities are contracting for intra- and inter-state disposal east of the Cascades. As Idaho counties and coastal communities of Southeast and Southwest Alaska consider regional alternatives within their states, they may be addressing this type of issue as well.

8. **The apparent growing reliance on private disposal facilities raises two questions:**

   - **What entity is responsible for maintaining the overall operational flexibility in the region's solid waste management system? and,**

   - **How can conflicts between the policies and priorities of a host jurisdiction (state, county or tribe) be reconciled with those of a profit-oriented private facility?**

Currently, the Pacific Northwest relies on a large number of local landfills. However, at least five of the region's ten most populous counties are considering sending all or a portion of their wastes to a few private landfills in eastern Washington and Oregon and closing existing local facilities. As the major urban areas begin to rely on a relatively few sites, the overall operational flexibility of the system to respond to unexpected events (rail strikes, etc.) is reduced. Solid waste would remain a local responsibility, but individual local decisions could now have region-wide repercussions. Who is responsible for insuring the overall integrity of solid waste management systems in the Pacific Northwest? This is clearly a question facing Washington and Oregon.

Furthermore, in each of the four states, some initiative to provide solid waste management options is being taken by the private sector - through proposals for private disposal facilities. A growing dependence on private facilities complicates any long-term local or multi-county planning, as the private facility is a free agent in terms of marketing its disposal services. So, while some communities will welcome private operations as economic development opportunities and feel comfortable with aggressive marketing, other communities (or states) may feel their ability to make policy decisions in the area of solid waste management has receded with the growing importance of private facilities in their jurisdictions.

9. **Various Pacific Northwest jurisdictions which are responsible for municipal solid waste management see the need for leadership by the federal government in: conducting research into a variety of technical areas which have broad applicability in proper solid waste management; establishing standards for the procurement of various products containing recycled materials; developing packaging standards to ban certain material (if appropriate), reduce the volume of packaging requiring disposal and/or improve the "recyclability" of discarded packaging materials.**

Two factors contribute to local and state interest in this type of federal involvement. First, the growing technical and financial complexity of environmentally-sound MSW management requires research and analysis beyond the capabilities of most state and local jurisdictions. Since much of this research would have broad applicability, the federal government is seen as the logical focus for this activity, so that it is done most cost effectively. Of particular interest to the Pacific Northwest states could be research into "smart burn" technologies to handle paper and other source-separated materials and small scale MSW incineration technologies for rural areas.

Second, many issues associated with waste reduction and recycling are often best dealt with on a regional or national level. For instance, initiatives to reduce the amount of packaging are best dealt with nationally, to avoid creating 50 different sets of regulations which would pose a difficult and costly burden on manufacturers. Similarly, researching and developing standards for the application of MSW compost is also best done at the federal level, to establish appropriate exposure levels and insure consistency among the states. A federal role in this area would complement the federal government's role in developing minimum standards for the operation of MSW incinerators and landfills.

10. **Within the Pacific Northwest, four issues are emerging which have regional or interstate implications: the transportation of municipal solid waste, as well as recyclables, across state boundaries for disposal, processing or marketing; the need for consistency in procurement policies from state to state; the need for equivalence in recycling efforts and disposal regulations between the states; and, how local jurisdictions sharing regional disposal facilities protect their collective interest in the emerging interstate solid waste management system.**

No longer is any community an "island" with respect to municipal solid waste management:

- newspaper from the four states in the Pacific Northwest moves to Oregon for processing or to the Puget Sound for export;
- glass and aluminum move to processing facilities in these two states as well;
- markets for recyclables may place various communities in the region in competition with each other, as they seek markets (including access to processing facilities) for their waste products;
- emerging regional landfills in eastern Washington and Oregon may attract wastes from throughout the region, as well as other states throughout the West; and
- waste is moving to areas with less regulation and/or more open land to avoid the costs of disposal at more regulated facilities.

These movements of material are being made in the absence of any collective, coordinated oversight of the environmental and economic issues involved.

As a result of this changing system, four major issues are developing which will require regional dialogue, if not regional solutions: responding to the problems associated with moving waste and recycled materials across state boundaries; insuring that procurement policies for recyclables, and other government-sponsored market development activities, are consistent enough among the states to create larger rather than more fragmented markets; insuring that each state has a similar enough commitment to waste reduction and recycling so that interstate disposal involves only residual waste volumes; and, finally, insuring that regulatory oversight of the entire system is sufficient, so that the collective interest of the entwined local jurisdictions are protected as waste moves to fewer and fewer regional disposal sites.

ASSOCIATION of OREGON SEWERAGE AGENCIES
PO Box 21042, Keizer, Oregon 97307-1042

November 1, 1990

Fred Hansen, Director
Oregon Department of Environmental Quality
811 SW Sixth Avenue
Portland OR 97204-1390

Dear Mr. Hansen:

SUBJECT: **WATER QUALITY STANDARDS TRIENNIAL REVIEW**

The Association of Oregon Sewerage Agencies (AOSA) supports the request of the Department to have the Environmental Quality Commission authorize the public hearings on the above referenced material.

In addition, I would like to express our appreciation to the Commission and to the Department for providing the opportunity for additional dialogue and clarification of issues. We believe that a meaningful exchange of information has taken place and that all parties have derived benefit. While we still have some concerns relative to the technical merit or desirability of certain policy implications, we believe they can be appropriately addressed in the public hearing process.

The Triennial Review process of developing "White Papers" and securing input prior to developing draft rules is a time consuming procedure. However, AOSA supports the continued use of this process for future issues. We believe that such a process will ultimately result in the development of sound environmental regulations which are clearly understood, achievable, and protective of the established beneficial uses. AOSA pledges its continued support and participation on future issues.

If we can provide any additional material or clarification of issues please contact me.

Sincerely,

Floyd W. Collins
Chairman

cc: Bill Hutchison

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: October 30, 1990

TO: Environmental Quality Commission

FROM: Lydia Taylor

SUBJECT: Mine Permitting

Attached is a summary from a document prepared for the Oregon Mining Council by their law firm. The document also contains copies of all statutes and regulations regarding mining. I asked Dave Barrows to send Henry a complete copy. If any others of you would like a copy of the complete document, please let me know and I'll see that you receive one.

STOEL RIVES BOLEY JONES & GREY

M E M O R A N D U M

October 25, 1990

TO: Oregon Mining Council

FROM: Jerry R. Fish and Stephen R. Brown

SUBJECT: Outline of Regulations Governing Mining Projects in Oregon

TABLE OF CONTENTS

I. INTRODUCTION.

This memorandum discusses the relationship among the federal, state and local laws governing mining projects in Oregon. Section II outlines the overlapping jurisdictions of various federal state and local agencies. Section III discusses the regulation of mining projects by key federal agencies. Section IV surveys the regulations administered by agencies of the State of Oregon. Section V offers a brief discussion of county land use laws as they apply to mining activities on federal land.

II. RELATIONSHIP AMONG FEDERAL, STATE AND LOCAL LAWS.

A. Federal Land.

The federal government of the United States owns legal title to the surface and minerals of approximately 52% of the land in Oregon. Federal law governs the location and maintenance of mining claims on federal land, while allowing for concurrent state laws and regulations that are not in conflict with federal law. See generally, California Coastal Commission v. Granite Rock Co., 107 S Ct 1419 (1987). The federal Bureau of Land Management ("BLM") has jurisdiction over nearly all federal mineral resources, regardless of whether the land surface is under the jurisdiction of the BLM, the Forest Service, another federal agency or is in private ownership. The BLM maintains mining claim records and adjudicates contests between the federal government and claimants concerning the validity of mining claims. This memorandum does not discuss the workings of the Mining Law of 1872, which authorizes U.S. citizens to explore and establish mining claims on federal lands, except as that law may limit the jurisdiction of state and local governments to prohibit mining on federal lands.

The BLM also regulates the impacts of mining on surface resources for mining operations on BLM land. The U.S. Forest Service regulates the impacts of mining on surface resources within national forests. While the BLM and the Forest Service have the authority to regulate mining activities to protect the surface resources, the right to locate and develop a valid mining claim is created and guaranteed by statute. Courts have held that the federal agency that controls the surface resources cannot prohibit the mining or impose severe regulatory constraints that amount to a prohibition. E.g., United States v. Weiss, 642 F2d 296 (9th Cir 1981) (Forest Service).

The BLM does not regulate the surface impacts of mining federal minerals where the surface is in state or private ownership, such as lands patented under the Stock

Raising Homestead Act of 1914. There are approximately 3.4 million acres of such lands in eastern Oregon. The surface impacts of mining on those lands would be regulated by the Oregon Department of Geology and Mineral Industries ("DOGAMI"), as discussed more fully in a later section.

Mineral development on federal lands is subject to a myriad of federal and state environmental laws. The role of state and local governments in regulating mining activities on federal lands was discussed by the U.S. Supreme Court in California Coastal Commission v. Granite Rock Co., 107 S Ct 1419 (1987). In that case, a mining company that owned unpatented mining claims on federal land within the coastal zone in California refused to apply for a permit from the California Coastal Commission before operating the mine. The company argued that federal regulation of the use of federal land for mining was so complete and pervasive that there simply was no room for state and county regulation.

The Supreme Court disagreed. The Court assumed, without deciding, that any attempt by a state or local government to determine the basic use of federal land is preempted by federal law. However, the Court held that regulation of a mining operation on federal land by a state or local government for the purpose of assuring that the mining is carried out in an environmentally sensitive manner is permissible unless there is a direct conflict between the requirements of federal law and a particular requirement of the state or local regulation.

The law in most western states, including the law in Oregon, had developed in a similar fashion prior to Granite Rock. That is, courts had held that a mineral developer on federal land must apply for state and local permits, and that such permit requirements may be preempted only if they directly conflict with federal laws or regulations of if they are so unreasonable that they effectively deny the right to mine or any other right granted by federal law. E.g., Elliott v. Oregon International Mining Co., 60 Or App 474, 654 P2d 663 (1982); State ex rel. Cox v. Hibbard, 31 Or App 269, 570 P2d 1190 (1977).

At the county level, a zoning requirement for a conditional use permit is primarily a form of land use control and not environmental regulation. On federal mining claims, the decision as to the proper land use for the federal land has been made by the federal government, and that decision preempts any attempt by the county to determine the appropriate land use. For example, in Elliott v. Oregon International Mining Co., supra, the Oregon Court of Appeals held that an Grant County, through its zoning ordinance, could not prohibit the

mining of reserved federal minerals beneath privately owned surface (patented under the Stock Raising Homestead Act of 1914).

Finally, Oregon law authorizes the state agencies to coordinate their review and permit processes, and the federal and local agencies will usually agree to join the state agencies in a coordinated, inter-agency project review.

B. Nonfederal Land.

The state and county governments may exercise their full regulatory power on where the surface and the minerals are owned by the state or by private parties (nonfederal land). The primary regulatory programs affecting mining projects are discussed in later sections of this memorandum.

Some federal laws such as the Clean Water Act (including wetlands regulation), the Clean Air Act and federal hazardous waste laws apply to both federal and nonfederal lands. Similarly, National Environmental Policy Act ("NEPA") analysis may be required for mining projects on nonfederal land if a permit from a federal agency is needed, such as a § 404 permit from the Army Corps of Engineers.

III. FEDERAL REGULATION OF MINING OPERATIONS.

A. Bureau of Land Management ("BLM").

The BLM manages the surface resources for mining projects on BLM land. BLM land comprises the majority of federal lands in the western United States outside the boundaries of national forests and national parks.

BLM surface management regulations allow increasing opportunity for BLM review and control as the surface impacts of mining operations increase. See 43 CFR Part 3800. Operations that "ordinarily result in only negligible disturbance of the Federal lands and resources" are considered to be "casual use" operations and can be conducted without notifying the BLM. Examples of "casual use" include activities that do not involve the use of mechanized earth moving equipment or explosives or do not involve the use of motorized vehicles off roads in areas designated as closed to off-road vehicles.

Operations more intensive than "casual use" that will disturb five acres or less, including access routes, require the operator to file a notice with the local BLM office at least 15 days in advance of operations. The notice must include information about the nature of the project and a statement from the operator that reclamation of all disturbed

areas will take place and that reasonable measures will be taken to prevent unnecessary or undue degradation of the land during operations. The operator does not need BLM approval before beginning operations in this category.

When an operation is proceeding pursuant to such a notice, the operator must plan and construct access routes to only the minimum width needed and follow natural contours where practicable. All tailings, dumps, wastes and similar materials must be disposed of in accordance with any applicable federal and state environmental laws and in a manner to prevent unnecessary or undue degradation of the land. Finally, "at the earliest feasible time," reclamation must take place. Reclamation shall include at least reshaping and revegetation of disturbed area; the saving of topsoil for reapplication after final reshaping of disturbed areas; measures to control erosion, landslides and water runoff; measures to isolate, remove or control toxic materials; and rehabilitation of fisheries and wildlife habitat. The BLM will monitor operations to insure compliance with all regulations, and the BLM must be notified when reclamation is complete so that an inspection of the area can be made.

If the operations involve something other than "casual use" and will disturb more than five acres of land or will take place in certain sensitive areas such as wild and scenic river corridors, areas designated for potential inclusion in the wild and scenic river system, wilderness areas, designated areas of critical environmental concern, and areas closed to off-road vehicle use, the operator must submit and receive BLM approval of a plan of operations before beginning operations. The information that must be in the plan is similar to the information required to be submitted in the notice described above. In addition, the plan must contain a map depicting the location of all operations, including access routes, and an actual description (rather than simply a statement of general intent) of measures to be taken to prevent undue degradation of the land, to reclaim disturbed areas and to maintain the area in "a safe and clean manner" during extended periods of nonoperation.

Following a 30-day initial review of the plan of operations by the BLM, including preparation of an environmental assessment, the local BLM officer will either (a) approve the plan, (b) invoke a 60-day extension for further review, (c) notify the operator of changes or additions that are necessary to meet the purpose of the regulations, or (d) notify the operator that preparation of an environmental impact statement ("EIS") is required under NEPA or that other studies required by law, such as by the Endangered Species Act

or the National Historic Preservation Act, must be completed before approval may be given.

If an EIS is required, it will be prepared according to regulations promulgated by the federal Council on Environmental Quality and found at 40 CFR Parts 1500-1517. The BLM will be the lead agency and will prepare the EIS in coordination with other federal, state and local agencies, including input from the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, the Oregon Department of Environmental Quality, the Oregon Department of Fish & Wildlife and others. It may be possible to consolidate review by state and local agencies with the BLM review, limiting the number of public hearings required. Meetings with federal, state and local officials at or about the time the plan of operations will be filed can facilitate coordinated review.

The BLM may require that the operator furnish a bond equal to the projected cost of reclamation. According to a Memorandum of Understanding between the BLM and the Oregon Department of Geology and Mineral Industries, the BLM will waive its bonding requirement if it finds the state bond acceptable.

B. U.S. Forest Service.

Although the BLM manages federal minerals, the Forest Service manages the surface resources of lands located in national forests. 36 CFR Part 228. The Forest Service surface management regulations are similar to the BLM regulations in that Forest Service review and control increases as the surface impacts of mining operations increase. For example, some activities such as the use of vehicles on existing public roads or Forest Service roads or prospecting and sampling that will not cause significant surface resource disturbance can be conducted without notifying the Forest Service District Ranger. Similarly, no notice is required for marking and monumenting mining claims.

More significant disturbances, including the use of mechanized earth-moving equipment or the cutting of trees, require the operator to file a notice of intention to operate with the District Ranger at least 15 days in advance of operations. A plan of operations will be required if the District Ranger considers the operations likely to cause significant disturbance of surface resources. The plan of operations will include a reclamation plan designed to prevent on-site and off-site damage to the environment and resources managed by the Forest Service. An environmental impact statement ("EIS") may also be required. The Forest Service will prepare the EIS in coordination with other federal, state and local agencies.

While the Forest Service has the authority to regulate mining activities to protect surface resources, the right to locate and develop a mining claim is created and guaranteed by statute. The Forest Service cannot prohibit the mining activity or impose such severe regulatory constraints that these amount to a prohibition. See, e.g., United States v. Weiss, 642 F2d 296 (9th Cir 1981).

C. Corps of Engineers § 404 Permit.

Mining projects that involve the discharge of dredged and filled material into waters and wetlands require a permit from the Army Corps of Engineers under § 404 of the Clean Water Act. The term "waters of the United States," is defined broadly in the Corps regulations to include intermittent streams, wetlands and uplands adjacent to these areas. See 33 CFR Parts 320, 323, 325-28, 330. Section 404 governs wetlands located on both federal and nonfederal land.

Section 404 also authorizes the Corps to issue general permits, called "nationwide" permits by the Corps, for categories of activities that cause only minimal adverse environmental effects. Regulations implementing the nationwide permit authority with a simple notification and review process are in 33 CFR Part 330.

The U.S. Environmental Protection Agency (EPA) has a review role and veto power in the § 404 permit process. If wetlands will be partially or completely obliterated, the Corps or EPA will require (1) proof that there is no alternative to the filling and (2) mitigation in the form of an equal amount of similar-value wetlands created elsewhere.

Depending on the circumstances, the Corps may have to prepare an environmental assessment or even an environmental impact statement before making a decision on a permit application. The Corps' NEPA review process can be coordinated with the BLM or Forest Service NEPA review process for projects on federal land.

D. Environmental Protection Agency.

The Environmental Protection Agency ("EPA") has ultimate control over the management of any activities that generate hazardous wastes. Most of EPA's authority has been delegated to the Oregon Department of Environmental Quality ("DEQ"). EPA has determined that wastes produced in typical mining operations are not hazardous wastes. EPA however, is currently in the process of developing regulations that will apply specifically to wastes generated at mining projects.

Regulatory concepts for the mining waste program have been circulated during the past few years under the name "Strawman", and have been reviewed by state governments and industry representatives. As with the hazardous waste program, ultimately the mining waste rules will probably administered in Oregon by a state agency. Until EPA approves state control, however, EPA will likely enforce the rules.

IV. REGULATION BY AGENCIES OF THE STATE OF OREGON.

A. Oregon Department of Geology and Mineral Industries.

1. Exploration Activities.

The Oregon Department of Geology and Mineral Industries ("DOGAMI") requires a permit for exploration activities disturbing more than one acre in any 12-month period, and for exploration drilling operations that reach depths greater than 50 feet. Exploration activities that disturb less than one acre are defined as "prospecting" and do not required an exploration permit. DOGAMI exploration permits require the reclamation of surface disturbances caused by exploration. In particular, the regulations provide for adequate abandonment of exploration drill holes to prevent contamination of aquifers.

2. Mining Operations.

DOGAMI requires an operating permit for mining operations will disturb more than one acre or 5,000 cubic yards of material during any 12-month period. An applicant for an operating permit must submit detailed information to DOGAMI regarding the property, the nature of the operation and environmental conditions in the area. The application must also include a plan of operations and a reclamation plan.

DOGAMI also requires a performance bond or other security of up to $10,000 per acre. If DOGAMI determines that hazardous or toxic metals or minerals concentrated by a mining project pose a threat to public health or the environment through contamination of surface or ground waters, the reclamation bond may increase up to $100,000 per acre or the actual cost of reclamation, whichever is less. In addition to the reclamation bond, DOGAMI regulations require an additional bond of up to $500,000 for projects involving cyanide leaching or other chemical processing. See ORS 517.750 to 517.955; OAR 632, Division 35.

B. Division of State Lands.

The Oregon Division of State Lands ("DSL") requires a permit for project that involves the removal, fill or movement of more than 50 cubic yards of material within the bed or banks of waters of the state (including any streams, ponds, wetlands and lakes) within one year. See generally, ORS 196.500 to 196.990; OAR 141, Division 85. DSL is currently in the process of developing new wetlands rules that will eventually produce a statewide wetlands inventory. DSL's application form requires information about the proposed project and a detailed explanation of the applicant's plans to restore the area to its "natural condition." Before issuing the permit DSL must allow an opportunity for public comment.

Upon receipt of a completed application, DSL notifies adjacent property owners, other interested parties and a variety of other governmental agencies. Notified parties have 45 days in which to comment on the proposal. If there are no major problems with the application and no significant opposition, the permit will be issued within 90 days of DSL's receipt of the completed application. To issue a permit, DSL must find that the permitted activity will be "consistent with the protection, conservation and best use" of the state's water resources. In making this determination, DSL must consider a number of factors, including the relative costs and benefits to the public of the proposed fill. In addition, DSL may impose conditions in the permit, even when the activity will occur on federal land.

DSL also requires certification of compatibility with local land use requirements. This typically means that the applicant must provide DSL with a copy of its conditional use or other land use permit obtained from the county. If land use approvals are required, the agency will completely process the permit and then hold it until the necessary land use approvals have been received.

An important issue in dredge and fill permit proceedings may be the effect of temporary water pollution on bird and fish populations and habitat. Concerns about fisheries may extend far downstream of the area of dredging or filling. In evaluating proposed mining projects, the impact of mining on sensitive bird or fish habitat will be considered.

C. Water Resources Department.

1. Water Appropriation Permits.

A permit is necessary to appropriate surface water from any stream or groundwater from wells or underground mine workings (up to 5,000 gallons of groundwater may be taken daily for industrial or commercial purposes without a permit).

The process for applying for a water right is similar for groundwater and surface water. Both types of uses require the applicant to submit information about the location and use of the water, the date work will commence and be completed on diversions or wells and the amount of water that will be used. In addition, the Oregon statute requires that a groundwater application include the "nature" of the mine and the methods of supplying and using the water.

A number of issues are relevant to the determination by the Water Resources Department ("WRD") whether to grant an appropriation permit. For instance in evaluating a groundwater application, WRD must evaluate the effect of proposed appropriations on existing wells, groundwater reservoirs, critical groundwater areas and surface waters and surface water rights.

Oregon's water appropriation statutes are found in ORS Chapter 537, as amended in 1989. WRD's regulations implementing the statutes are in OAR 690, Division 10. Separate regulations governing the drilling of wells are in OAR 690, Divisions 200 to 225.

2. Dam Construction Permit.

WRD requires a permit for the construction of a dam or other structure that will be 10 feet or more in height or will impound more than 3 million gallons of water. An applicant for a dam construction permit must complete an application form provided by WRD. The form must be accompanied by a map and plans and specifications prepared by a registered engineer. Processing of the application typically takes 30 to 45 days.

WRD's authority to regulate the construction of dams and reservoirs to store water for later beneficial use (for purposes other than hydroelectric power) is found in ORS 540.330 to 540.400 and generally in ORS Chapter 537. Implementing regulations are in OAR 690-20-021 to -039. In addition, OAR 690-20-029 contains certain minimum standards that must be met when constructing dams that are less than 10 feet in height and impound less than 3 million gallons of water, even though a permit is not required.

D. Department of Forestry.

1. Use of Fire or Powerdriven Machinery.

The Oregon Department of Forestry ("DOF") requires an annual permit for any activity in forest land that uses fire or any form of power-driven machinery. The permit is issued through an administrative process within 15 days of receipt. The permit may require the applicant to take certain fire prevention precautions and to carry firefighting equipment.

2. Clearing of Right-of-Way.

A separate permit is required if the applicant plans to clear a right-of-way in any forest land "where the clearing would constitute a fire hazard." Statutory authority for the permit is found in ORS 477.685; there are no implementing regulations.

E. Department of Fish and Wildlife.

The Oregon Department of Fish and Wildlife ("ODFW") requires a permit prior to use of explosives or "other substances deleterious to fish" in the waters of the state. The applicant must submit a written application describing the location of the project, the proposed date of blasting activity, the type and amount of explosives to be used, and the conditions under which the blasting will be done.

Upon receipt of the application, the ODFW district biologist will conduct an investigation to determine whether the proposed blasting can be conducted without serious negative effects on aquatic life. The department will generally act on any application within two weeks of receipt. Approval may be subject to conditions designed to minimize negative impacts on aquatic life. Statutory authority for this permit is found in ORS 509.140. There are no implementing regulations.

In addition to the blasting permit requirement, ODFW, along with the U.S. Fish and Wildlife Service, plays a major role in commenting on the effect on fish and wildlife of actions proposed by other state and federal agencies.

F. Department of Environmental Quality.

1. Water Quality Permits.

a. NPDES Permit. A National Pollutant Discharge Elimination System permit under the federal Clean Water Act is required in order to discharge wastewater into

waters from a point source. Applicants for NPDES permits must complete a comprehensive application form developed by the federal Environmental Protection Agency. The application requires a detailed description of the proposed uses of the water, an explanation of how the water will be treated prior to release, and a detailed discussion of the characteristics of the proposed wastewater. The application must be accompanied by flow diagrams and other illustrations and a description of the proposed treatment facility. The Department of Environmental Quality ("DEQ") implements the NPDES permit program in Oregon.

After receiving a completed application, DEQ will give notice to interested agencies and other individuals. If there is significant public interest in the application, DEQ may hold a public hearing. The permit will contain specific effluent limitations for various pollutants, compliance schedules and other conditions.

DEQ's authority to issue NPDES permits is found in the federal Clean Water Act and in ORS 468.740. Implementing regulations are in OAR 340, Division 45.

b. Water Pollution Control Facility Permit. A water pollution control facility permit ("WPCF permit") is required in order to dispose of wastewater on land or to inject it into the ground. DEQ provides a simple application form that must be accompanied by flow diagrams and an explanation of the characteristics of the groundwater in the proposed activity area. DEQ typically acts on WPCF permits within 60 to 90 days of receipt. In 1989, DEQ issued extensive rules governing groundwater quality that affect the WPCF permit. These rules are found at OAR 340 Division 40.

2. Air Discharges. An air contaminant discharge permit is issued by the Oregon DEQ and is required for establishment of a new air contamination source. Ore crushers, concentrations of engines running heavy equipment, and networks of dirt roads under heavy use are subject to this permit requirement.

An applicant for an air contaminant discharge permit must submit a form containing a description of the nature of his business and production processes. The application must be accompanied by a flow chart and a plot plan showing the location of the pollution sources in relation to other nearby land uses. The application must also describe the type and quantity of fuels that the applicant intends to use and information regarding emissions and the efficiency of the air pollution control equipment that the applicant intends to install.

If the air pollution discharges are in or affect what is known as a PSD (prevention of significant deterioration) area, further regulations and agency scrutiny apply. See OAR 340-20-245 and 340-31-100 to -130. DEQ acts on applications for permits for minor sources within 90 days and applications for significant sources within 90 to 180 days. The source of DEQ's authority to issue this permit is the federal Clean Air Act and ORS 468.310 to 468.330. Implementing regulations are in OAR 340-20-140 to -185.

3. Hazardous Waste Regulation. An identification number is required for any operation that generates toxic or hazardous wastes. Such wastes will not be accepted for proper disposal without the identification number. Mine overburden and tailings are not classified as hazardous waste (See Section III.D. above). Small quantities of hazardous waste will be generated by a mining project if the project uses solvents or other chemicals to maintain machinery or for other purposes. If hazardous wastes are generated, federal law, delegated to the state for enforcement, requires careful monitoring and control of such wastes until they reach their ultimate treatment or disposal facility.

DEQ's authority to regulate hazardous substances generated by the project is set forth in the federal Resource Conservation and Recovery Act ("RCRA") and ORS Chapter 466, as amended. Pertinent regulations include OAR 340, Division 100-102 and federal EPA regulations in 40 CFR Parts 124, 260-66 and 270. DEQ's regulation of hazardous wastes extends beyond the matter of obtaining the EPA identification number. The regulations place the responsibility of identifying wastes that will be generated, whether those wastes are toxic and what the project intends to do with those wastes on the operator.

4. Noise Regulations. All industrial and commercial operations in Oregon, including mining operations, are subject to noise regulations administered by DEQ. No permit is needed. Statutory authority for the noise regulations may be found in ORS Ch. 467, and the regulations are at OAR 340, Div. 35. According to the regulations, a new source located at a previously unused site cannot exceed the ambient noise levels by more than 10 dBA in any one hour. In addition, maximum noise levels between 7 a.m. and 10 p.m. cannot equal or exceed 55 dBA more than 50 percent of the time in any one hour, 60 dBA more than 10 percent of the time and 75 dBA more than one percent of the time. Between 10 p.m. and 7 a.m., maximum noise levels may not equal or exceed 50 dBA more than 50 percent of the time in any one hour, 55 dBA more than 10 percent of the time and 60 dBA more than one percent of the time. These measurements are to be made at the nearest "noise sensitive" property, defined to mean "real property normally

used for sleeping, or normally used as schools, churches, hospitals or public libraries." Variances may be granted to particular regulations under certain circumstances.

V. LOCAL GOVERNMENT LAND USE APPROVALS.

Exploration and mining operations, especially on state or private land, may require a conditional use permit under many county zoning ordinances. A conditional use application will generally be measured against the standards for development in the county's ordinance. Some county ordinances have provisions specifically relating to mining operations. Standards for approval typically relate to the compatibility of the mining use with other adjacent land uses. As mentioned above, counties may not prohibit mining use of federal lands or minerals which are open for such use under federal law. Furthermore, DOGAMI's has exclusive jurisdiction over the reclamation of mining projects, including enforcement of operating plans for the mine and processing facilities, regardless of whether the project is located on federal, state or private land. Therefore, the scope of county regulation is limited for projects on federal land.

Conditional use applications usually require a public hearing. The decision of the local planning commission is appealable to a county court or board of commissioners. This decision may in turn be appealed to the state Land Use Board of Appeals ("LUBA"). LUBA appeals must be decided within 120 days of LUBA's receipt of a Notice of Intent to Appeal.

LUBA decisions may be appealed to the Oregon Court of Appeals within 21 days of the LUBA decision. The Court of Appeals must decide land use cases with "the greatest possible expediency." The Court of Appeals' decisions may be appealed to the Oregon Supreme Court. The Supreme Court's review is discretionary and is not subject to time limitations.

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY INTEROFFICE MEMORANDUM

DATE: November 2, 1990

TO: Environmental Quality Commission

FROM: Lydia Taylor

SUBJECT: Northwest Pulp and Paper letter of complaint

Doug Morrison, Northwest Pulp and Paper, informed me late last week that he would be sending a letter of complaint to the Director regarding their non-receipt of public notice on three Oregon mill permit renewals. (He FAXed a copy of the letter on October 29th).

After talking with Mr. Morrison, I checked with staff about his complaint. Northwest Pulp and Paper Association is not on, nor do we show they have ever requested to be, on our standard mailing list for permit public notices. They are on the mailing list for all rule modifications and Commission meetings. We will modified our permit mailing list to include them.

The whole effluent toxicity monitoring conditions proposed for inclusion in the permits are required under 54 Federal Register 23868 (June 2, 1989) and the Technical Support Document for Water-Quality Based Toxics Control (1985, 1990 EPA). The monitoring is needed to determine compliance under Oregon Administrative Rules on toxicity. It is our standard practice to include new monitoring requirements at time of permit renewal.

Jerry Turnbaugh, our staff person who is preparing the permit renewals for International Paper (Gardiner), Georgia Pacific (Toledeo) and Weyerhaeuser (North Bend), worked closely with all three mills during permit drafting to ensure their participation in the development of the permit requirements. Georgia Pacific did not actively participate, but asked to be kept informed by phone. Weyerhaueser said that they would rely on NCASI's participation to represent their interests. International Paper was the most active participant and the resulting permit requirements met their approval.

Jerry set up a meeting with International Paper, the DEQ Industrial Waste Section manager and lab staff, EPA Manchester Lab staff, Oregon ops and Region 10 EPA staff and staff from NCASI (the paper industry scientific and research arm). International Paper worked on, and agreed to, the proposed permit monitoring conditions.

THE GREAT STOVE CHANGEOUT

AREA TARGETED FOR WOODSTOVE CHANGEOUT

PRESS RELEASE

Southern Oregon has been chosen by the solid fuel industry for a pilot program to replace obsolete woodstoves. The goal is to reduce wood smoke pollution in the Rogue Valley and Klamath Basin, two of the worst air sheds in the country.

Local woodstove retailers in Medford, Grants Pass, and Klamath Falls are offering consumers up to $200 trade in when replacing their uncertified stove with a new, clean burning model. These new stoves reduce up to 85% of the wood smoke and greatly increase the efficiency.

"Replacing the huge number of old stoves with these new units is a key to cleaning up our airshed in southern Oregon," says project coordinator Ann Bauer of Portland. "The new stoves reflect technological advances in clean burning not available even two years ago. With a potential energy crisis looming, people are likely to burn wood for the same reasons they did the last time around: economy, choice, and warmth. Now it's more important than ever that wood burners use the cleanest, most efficient appliances available."

Jim Hermann, President of Earth Stove Marketing, Inc. notes "This oil thing has been a wake up call on the energy front. We've been living in an artificial world of cheap oil, but now the party's over. Asking people to do something that's irrational (stop burning wood) doesn't work. People must get on the right side of the issue and push a program forward that's already in everybody's best interest. And that program is to promote the use of clean burning appliances while eliminating the old ones."

For more information contact Ann Bauer, 246-4436, or Jim Hermann, 692-3991.

Grants Pass, OR
DAILY Courier 6A
Friday, September 7, 1990

Woodstove trade-in cash being offered

By Dan Dillon
of the Daily Courier

The solid fuel industry has targeted Southern Oregon for a pilot program to replace obsolete woodstoves.

The goal, according to organizers, is to reduce wood smoke pollution in the Rogue Valley and Klamath Basin, two of the worst airsheds in the country.

Meanwhile, the state Department of Environmental Quality is conducting the second of two hearings in Grants Pass next Thursday to discuss steps it will recommend to clear the air surrounding Grants Pass.

Woodstove retailers in Grants Pass, Medford and Klamath Falls are offering consumers up to $200 trade-ins between Sept. 15 and 30 when they swap their uncertified stoves for new, clean-burning models.

The new stoves reduce up to 85 percent of the wood smoke and increase efficiency compared to some of the more archaic designs.

"Replacing the huge number of old stoves with these new units is a key to cleaning up our airshed in Southern Oregon," said Ann Bauer of Portland, project director for the woodstove promotion.

"The new stoves reflect technological advances in clean burning not available even two years ago," she said in a prepared statement. "With a potential energy crisis looming, people are likely to burn wood for the same reasons they did the last time around: economy, choice and warmth. Now it's more important than ever that wood burners use the cleanest, most efficient appliances available."

A Clean Air Fair Sept. 15 in Medford will kick off the sale.

The DEQ hearing Thursday will outline strategies that are being considered.

The general plan, devised by a local committee and the DEQ, calls for setting up an advisory committee to tell residents when weather conditions are likely to trap pollutants.

Grants Pass is one of four Oregon communities classified as nonattainment areas by the federal Environmental Protection Agency because it has exceeded air-quality standards on four days since 1987.

Officials estimate that if 25 percent of the local homes comply with the voluntary ban, the city will meet the standard. Thus, voluntary compliance would avert the need for mandatory controls like those adopted in Jackson County and several of its cities

Trade deal offered for cleaner woodstoves

Owners of old woodstoves can get a $200 trade-in when they buy clean-burning certified woodstoves from dealers in Medford, Grants Pass and Klamath Falls.

The two-week deal, which starts next Saturday, is a pilot project of the Wood Heating Alliance, a national trade association, said Ann Bauer, project coordinator for the alliance.

She said the purpose of the project, called "the Great Woodstove Changeout," is to encourage replacement of obsolete woodstoves with efficient models that reduce smoke pollution.

"If this is successful, we'd like to duplicate it nationally," Bauer said.

She said all 14 woodstove dealers in southern Oregon have agreed to participate in an effort to encourage people to buy the more efficient stoves, which reduce pollution by up to 85 percent.

The group will donate the old, uncertified stoves for scrap, she said.

"Replacing the huge number of old stoves with these new units is a key to cleaning up our airshed in southern Oregon," Bauer said.

"The new stoves reflect technological advances in clean burning not available even two years ago."

Pellet stoves are not available as part of the deal, although individual retailers may choose to include them, she said.

New woodstoves range in cost from about $650 to $1,600, depending on size. Pellet stoves generally sell for $1,400 to $2,200, Bauer said.

Clean Air Week includes exhibits, talks, rides

A panel discussion Monday at the Rogue Valley Medical Center on energy alternatives and the opening of air quality exhibits at the Medford Center kick off "Clean Air Week" in Medford.

Activities, which include a public hearing Wednesday on a proposed state master plan to reduce Rogue Valley smoke pollution, culminate Saturday with the Clean Air Fair at Hawthorne Park.

"The week is designed to look at all the things that go into improving our air quality — what can be done at every level, from government to industry to the private citizen," said Paul Wyntergreen, regional director of the Oregon Environmental Council.

Here's a rundown of the week's events:

Monday — At 11:30 a.m., the Coalition to Improve Air Quality, a local citizens group, will meet at the Medford Center, where there will be a tour of air quality exhibits. Jackson County Commissioner Sue Kupillas, Medford Mayor Jerry Lausmann and Ashland Mayor Cathy Golden will read proclamations.

From 7 to 9 p.m. there will be a panel discussion on "Our Energy Future and its Impact on Clean Air," at the Smullin Center Auditorium of the Rogue Valley Medical Center.

The event is sponsored by the School of Social Science at Southern Oregon State College. Panel members will include Shep Buchanan, an economist for the Bonneville Power Administration; Fred Hansen, director of the state Department of Environmental Quality; Gary O'Neill, regional air and toxics director for the Environmental Protection Agency, and Alex Sifford, energy resource specialist for the state Department of Energy.

Bob Harrison, an SOSC history professor who recently returned from Saudi Arabia, will be the moderator.

Wednesday — A DEQ public hearing is set for 7 p.m. at the Smullin Center on a proposed "state implementaton plan" for Rogue Valley smoke pollution. The plan details how the Medford-Ashland area will meet federal standards for PM10 (particulate matter 10 microns or smaller.)

A hearing on the same subject was held Aug. 6.

Friday — A kickoff for the Clean Air Fair at Hawthorne Park, with demonstrations of vehicles powered by solar and compressed natural gas. Also, there will be a demonstration of conventional and clean-burning woodstoves and how smoke can be reduced with proper woodstove operation.

Saturday — Clean Air Fair, sponsored by the Oregon Environmental Council, will be held from 9 a.m. to 5 p.m. in Hawthorne Park.

There will be entertainment, a hot air balloon, electric car rides and demonstrations of a variety of products and programs, such as weatherization, heating equipment, alternative transportation, solar technology, yard waste chippers and mulching lawnmowers.

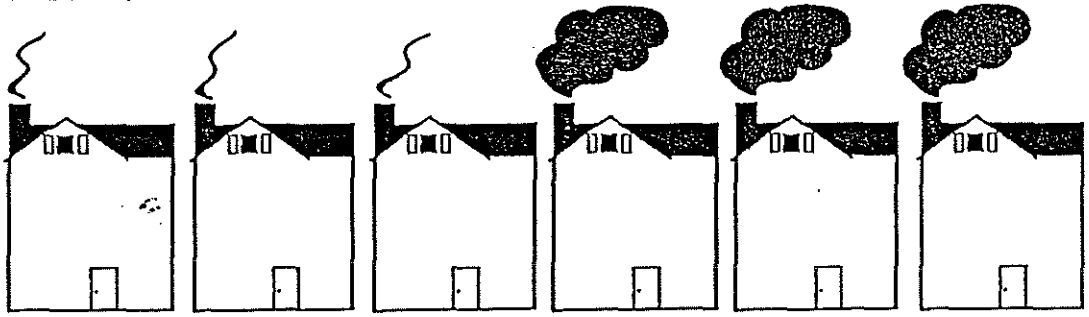
Boy Scouts will operate a bicycle-powered ferris wheel. Rogue Valley Transit will provide free bus rides for the day.

People can also join one of four bicycle tours sponsored by the Oregon State University Extension Service.

The round-trip tours will begin at the fair and go to White City at 9 a.m., Central Point at 11 a.m., Phoenix and Talent at 1 p.m. and Jacksonville at 3 p.m.

KDRV-TV, KRWQ-Radio and the Medford Center are co-sponsors of the fair.

"IT'S CLEAR
Who Participated in the
"GREAT STOVE CHANGEOUT"
THIS YEAR"



Get up to $200

trade in allowance on certain models of high efficiency, clean burning woodstoves. See one of the following local participating dealers.

THE GREAT STOVE CHANGEOUT

WOOD HEATING SUPPLY
906 S.W. 6th St.
Grants Pass, Or 97526
476-8464

CHIM-CHIMNEY SWEEPS
P.O Box 1293
Grants Pass, OR 97526
476-0941

SMOKEY'S
757 S.E. 6th St.
Grants Pass, Or 97526
476-2174

CASCADE BLOCK
1559 Dowell Rd.
Grants Pass, Or 97527
476-4328

RUDY'S
220 S.W. G St.
Grants Pass, Or 97526
479-8877

Woodstove Alliance
Ad #3, CV 0924, CW 0925, DC 0921,
3x7, LIN

:0 remains urned over

BANGKOK, Thailand (AP) — etnam gave a visiting U.S. ilitary team 20 sets of re- ains that may be those of nericans missing in action om the Vietnam War.

The action Thursday was the rgest return of remains since sets were handed over June , 1989, and part of a continu- g effort to resolve the fates of mericans who did not return om the war.

Nickel Ads

WANTED

YOUR OLD WOOD STOVE

Up to $200.00 trade in for your obsolete, dirty-burning, inefficient wood stove.

The Wood Heating Alliance is sponsoring a program to upgrade the heating systems of Southern Oregon homeowners. If you have a wood burning stove that is not tested and certified by the federal Environmental Protection Agency and the Oregon Department of Environmental Quality, you may qualify. Please contact one of the participating wood heat specialists listed below.

THE GREAT STOVE CHANGEOUT

ALLADIN VALLEY RENTAL
3580 Shasta Way
Klamath Falls, OR 97603
882-6686

HOUSE OF FIREPLACES
6831 South 6th St.
Klamath Falls, OR 97603
882-1581

CENTER PIVOT
6032 Washburn Way
Klamath Falls, OR 97603
884-4272

BIG R
6225 S. 6th Street
Klamath Falls, OR 97603
882-5540

Mail Tribune
Thursday, Sept. 13, 1990
Page 2A

OREGON ENVIRONMENTAL COUNCIL

CLEAN AIR FAIR

Hawthorne Park, Medford — September 15, 1990 — 9:00 a.m. - 5:00 p.m.

Make a Clean Break from Skyrocketing Fuel Prices. Come See . . .

- ☐ Weatherization Products
- ☐ Composters
- ☐ Dry Wood
- ☐ Bicycles
- ☐ Hot Air Balloon Rides
- ☐ Solar and Other Alternative Vehicles
- ☐ Health Services
- ☐ Pellet Stoves
- ☐ Woodstoves
- ☐ Solar Energy Products
- ☐ Weatherization Loans
- ☐ Wood Chippers
- ☐ High Efficiency Heaters
- ☐ Super Good Cents Program
- ☐ Residential Tax Credits from the Department of Energy

A Celebration of Life and Breath

KDRV 12

KRWQ 99 & 100 FM STEREO

"STROLLING MUSICIANS, GOOD FOOD, DOOR PRIZES, AND MANY OTHER ATTRACTIONS WILL MAKE THE DAY INTO AN ENJOYABLE OUTING."

FREE . . . *like the air*

IT'S FRESH AIR Time!

THE GREAT STOVE CHANGEOUT

"Clean Air Fair"

Hawthorne Park Saturday, Sept. 15th

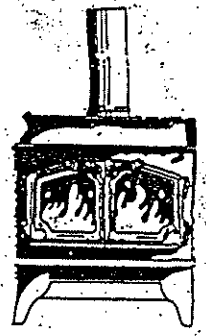
Up to $200 off on Trade in Allowance!

TRADE IN YOUR OLD STOVE
ON A NEW ONE AT

THE STOVE PLACE

SPA • POOL • MARINE
4044 CRATER LAKE AVE. MEDFORD
772-3094

The STOVE & SPA PLACE
BODY HEAT HEADQUARTERS



Look for the Yellow Sign and Swimming Pool

Possibly the Best Selection of Pellet Stoves in Southern Oregon & Northern California!

KRWQ-FM & KMED-AM

86 FOURTH ST. • BOX 388 • GOLD HILL, OR 97525 • 503-772-4170 • 503-474-3026

CLIENT: GREAT STOVE CHANGE OUT SPEC. DATE:

COOP: START DATE: 9-17-90

ACCT. EX.: CFR END DATE: TFN

☐ REEL ☐ CASSETTE ☐ CART KRWQ CART #: 226 KMED CART #: 553 LENGTH: 30

:15 SOUTHERN OREGON IS A SPECIAL PLACE. NOW YOU CAN MAKE IT EVEN MORE LIVABLE AND SAVE MONEY, BY REPLACING YOUR OLD WOODSTOVE WITH A NEW CLEAN BURNING MODEL. GET UP TO TWO HUNDRED DOLLARS TRADE IN FOR YOUR OLD WOODSTOVE WHEN YOU EXCHANGE IT FOR AN EFFICIENT, CERTIFIED UNIT BEFORE SEPTEMBER THIRTITH. THE WOOD HEATING ALLIANCE AND LOCAL RETAILERS ARE SPONSORING THE GREAT STOVE CHANGE OUT. BURN CLEAN, SAVE MONEY..TUCK YOUR OLD STOVE UNDER YOUR ARM AND HEAD TO YOUR LOCAL PARTICIPATING DEALER FOR UP TO TWO HUNDRED DOLLARS TRADE IN.

:30 THE GREAT STOVE CHANGE OUT.

:45

:60

STATION AFFIDAVIT OF PERFORMANCE

THIS ANNOUNCEMENT WAS BROADCAST _____ TIMES COMBO / KRWQ ONLY / KMED ONLY
THE TIMES THIS ANNOUNCEMENT WAS BROADCAST AS ENTERED IN THE STATION'S LOG(S) WERE
BILLED TO STATIONS CLIENT ON OUR INVOICE DATED _____
AT HIS EARNED RATE OF.

$_____ EACH FOR _____ ANNOUNCEMENTS, FOR A TOTAL OF $_____
$_____ EACH FOR _____ ANNOUNCEMENTS, FOR A TOTAL OF $_____
$_____ EACH FOR _____ ANNOUNCEMENTS, FOR A TOTAL OF $_____

CODE #_____

CLIENT WOOD HEATING ALLIANCE

SALES Shawn LENGTH :30

CO-OP "$200 TRADE-IN"

AIR DATES 9/17/90

KDRV TV
SUNSHINE TELEVISION INC.
1090 KNUTSON AVE. - MEDFORD, OR 97504
503 / 773-1212

KDRV 12

VIDEO	AUDIO
CG WHITE LETTERING ON BLACK: A SPECIAL ANNOUNCEMENT FROM THE WOOD HEATING ALLIANCE WASHINGTON, D.C. GRAPHIC: THE GREAT STOVE CHANGEOUT SHOW CLOSE-UP BURNING WOOD IN STOVE SHOW SCENES OF POLLUTION IN ROGUE VALLEY CG: LOCAL WOOD STOVE DEALERS IN MEDFORD, GRANTS PASS, AND KLAMATH FALLS DVE ON $200 TRADE-IN (SHOW UNCERTIFIED STOVE BURNING) SHOW NEW ST[illegible] CU WOOD STOVE FIRE CG: CONTACT YOUR LOCAL WOOD STOVE DEALER DVE IN GRAPHIC: GREAT STOVE CHANGEOUT CG: $200 TRADE-IN APPLIES WHEN TRADING IN NON-CERTIFIED WOOD STOVE FOR NEW CERTIFIED STOVE ONLY. LIMITED TIME OFFER.	A SPECIAL ANNOUNCEMENT FROM THE WOOD HEATING ALLIANCE... SOUTHERN OREGON HAS BEEN CHOSEN FOR THE GREAT STOVE CHANGEOUT... A TEST PROGRAM TO REPLACE OBSOLETE WOODSTOVES! THE GOAL IS SIMPLE... TO REDUCE WOOD SMOKE POLLUTION IN THE ROGUE VALLEY AND KLAMATH BASIN. COME INTO YOUR LOCAL WOODSTOVE RETAILER IN MEDFORD, GRANTS PASS OR KLAMATH FALLS... AND GET up to $200 TRADE-IN WHEN YOU REPLACE YOUR OLD UNCERTIFIED STOVE WITH A NEW, CLEAN BURNING STOVE. FOR MORE INFORMATION, CONTACT YOUR LOCAL WOOD STOVE DEALER! DON'T MISS THE GREAT STOVE CHANGEOUT... HURRY, THE ~~$200~~ allowance TRADE-IN IS A LIMITED TIME OFFER!!!

This announcement was broadcast a total of _____ times at the dates and times coded _____ on our attached invoice #_____ dated _____ as entered in the station's programming. This announcement was billed to this station's client at a total cost of $_____.

_____ KDRV
Signature of Station Official

Kathy Garner, Acct. Assistant
Typed Name and Title

State of Oregon
County of Jackson
Signed or attested before me on

_____

by_____

_____
NOTARY PUBLIC - OREGON
My Commission Expires _____