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5/27/1977

OREGON
ENVIRONMENTAL QUALITY
COMMISSION MEETING
MATERIALS

DEQ

State of Oregon
Department of Environmental Quality

Environmental Quality Commission Meeting

May 27, 1977

Albany City Library

1390 S. Waverly Drive

Albany, Oregon

9:00 a.m. A. Minutes of April 22, 1977 EQC Meeting

B. Monthly Activity Report for April 1977

C. Tax Credit Applications

PUBLIC FORUM - Opportunity for any citizen to give a brief oral or written presentation on any environmental topic of concern. If appropriate the Department will respond to issues in writing or at a subsequent meeting. The Commission reserves the right to discontinue this forum after a reasonable time if an unduly large number of speakers wish to appear.

9:15 a.m. D. Oregon-Portland Cement, Lime - Request for variance from rules for particulate emission limitations, OAR 340-21-015, 21-030, and 21-040 (Skirvin)

9:30 a.m. E. City of Happy Valley - Staff report on sewage disposal program (Gilbert)

9:45 a.m. F. Valley Landfills Inc., Corvallis - Request for variance from rules relating to landfills, OAR 340-61-040 (Bill Dana)

10:00 a.m. G. Field Burning - Public Hearing to consider amendments to the field burning rules to set the maximum acres to be burned during the 1977 field burning season, OAR 340-26-013 (Freeburn)

H. Smoke Management Program - Dept. of Forestry presentation on slash burning smoke management program (Ron Smith)

I. Vehicle Emission Testing Rules - Consideration of adoption of proposed amendments to rules governing motor vehicle emission inspection to include gasoline powered heavy duty vehicles, OAR 340-24-300 through 24-350 (Jasper)

J. Kraft Pulp Mill Rules - Consideration of adoption of proposed amendments to OAR 340-25-150 through 25-200 (Clinton)

K. Noise Control Rules - Consideration of adoption of proposed amendments to OAR 340-35-030, Tables B and D, NPCS-21 and 340-35-035 (Hector)

L. Noise Control Rules for Industry & Commerce - Staff recommendations on statistical noise levels defined in Table G, OAR 340-35-035(1)(a) (Hector)

M. Sulfur Content of Fuels Rule - Authorization for public hearing to review to adequacy of OAR 340-22-010(3) (Kowalczyk)

N. Sewage Works Construction Grants - Proposed revisions of Criteria for Priority Ranking of Sewage Works Construction Needs (Blankenship)

O. Sewage Works Construction Grants - Staff recommendations for use of remaining federal grant funds through end of federal fiscal year 1977 (Blankenship)

P. Water Quality Rules - Consideration of adoption of proposed rules dealing with water quality controls during situations of drought or other comparable natural disasters (Sawyer)

Postponed Q. Subsurface Rules, Lane County - Proposal to amend the Subsurface Sewage Disposal Permit Fee Schedule for Lane County, OAR 340-72-015

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Because of the uncertain time spans involved, the Commission reserves the right to deal with any item, except items D,E,F & G at any time in the meeting. Anyone wishing to be heard on an agenda item that doesn't have a designated time on the agenda should be at the meeting when it commences to be certain they don't miss the agenda item.

The Commission will breakfast (7:30 a.m.) at the Swept Wing Restaurant, 1212 S.E. Price Road, Albany. Lunch will also be at the Swept Wing Restaurant.

Original

MINUTES OF THE EIGHTY-SIXTH MEETING

OF THE

OREGON ENVIRONMENTAL QUALITY COMMISSION

May 27, 1977

On Friday, May 27, 1977, the eighty-sixth meeting of the Oregon Environmental Quality Commission convened in the Albany City Library, 1390 South Waverly Drive, Albany, Oregon.

Present were Commission members: Mr. Joe B. Richards, Chairman; Dr. Morris Crothers, Vice-Chairman; Dr. Grace Phinney; Mrs. Jacklyn Hallock; and Mr. Ronald Somers. Present on behalf of the Department were its Director, Mr. William H. Young, and several members of the Department's staff.

MINUTES OF THE APRIL 22, 1977 EQC MEETING

It was MOVED by Commissioner Somers, seconded by Commissioner Hallock and carried unanimously that the minutes be approved as submitted.

MONTHLY ACTIVITY REPORT FOR APRIL 1977

It was MOVED by Commissioner Somers, seconded by Commissioner Hallock and carried unanimously that the Monthly Activity Report for April 1977 be approved.

TAX CREDIT APPLICATIONS

It was MOVED by Commissioner Somers, and seconded by Commissioner Hallock that the tax credit applications be approved. Commissioner Somers noted that he was pleased that Hood River was cleaning up their smudge pots. Chairman Richards asked about application T-878. He wanted to know how the determination of granting 20% or less tax credit was made. Mr. Fritz Skirvin of the Department's Air Quality Division replied that this was a determination required by statute. The motion passed unanimously.

PUBLIC FORUM

No one wished to speak on any subject.

OREGON PORTLAND CEMENT, LIME - REQUEST FOR VARIANCE FROM RULES FOR PARTICULATE EMISSION LIMITATIONS, OAR 340-21-015, 21-030, AND 21-040.

Mr. Fritz Skirvin, at the request of Commissioner Somers, presented the conclusions and recommendations from the staff report on this matter. Chairman Richards asked that the Director's recommendation be changed to read, "...strict compliance is inappropriate because the cost of controlling emissions from Kiln No. 1 for the period from December 1, 1977 through December 1, 1980 would be unreasonable, burdensome [or] and impractical...". It was MOVED by Commissioner Somers, seconded by Commissioner Phinney and carried unanimously that the Director's recommendation be approved.

VEHICLE EMISSION TESTING RULES - CONSIDERATION OF ADOPTION OF PROPOSED AMENDMENTS TO RULES GOVERNING MOTOR VEHICLE EMISSION INSPECTION TO INCLUDE GASOLINE POWERED HEAVY DUTY VEHICLES, OAR 340-24-300 THROUGH 24-350.

Mr. William Jasper of the Department's Vehicle Inspection Section presented the staff report on this matter. Commissioner Somers asked what the status was of testing diesel-powered vehicles. Mr. Jasper said that diesel-powered vehicles were not included in these rules because the equipment needed to test these vehicles was not in hand and was expensive to purchase. Mr. Jasper also said that the amount of these vehicles and their emissions in the Metropolitan Service District was minimal. Mr. Jasper said also that most of the large diesel-powered trucks operate interstate and are out of DEQ's jurisdiction. It was MOVED by Commissioner Somers, seconded by Commissioner Phinney, and unanimously carried that the Director's recommendation be approved.

KRAFT PULP MILL RULES - CONSIDERATION OF ADOPTION OF PROPOSED AMENDMENTS TO OAR 340-25-150 THROUGH 25-200.

Mr. Charles Clinton of the Department's Air Quality Division presented the summary and conclusions from the staff report. Mr. Andre Caron presented a statement on behalf of the Oregon Kraft Pulping Industry. Mr. Caron suggested that the words "unless otherwise approved in writing" be added to Section 25-185 item 8; and that Section 25-200 be deleted. Staff agreed to accept the suggestions of Mr. Caron and include them in the proposed rule. Commissioner Somers MOVED, Commissioner Crothers seconded, and it was carried unanimously that the Director's recommendation be approved, including the two proposed amendments to the proposed rule.

CITY OF HAPPY VALLEY - STAFF REPORT ON SEWAGE DISPOSAL PROGRAM

Mr. Robert Gilbert of the Department's Portland Region Office, presented the staff report and slides of the Happy Valley area. Commissioner Hallock indicated that the CRAG decision on land use in this area should be made part of the record on this matter. Mr. James Carskadon, Happy Valley City Attorney, indicated that substantial improvements in the septic tank systems have been made by the residents of Happy Valley since 1972. Mr. Carskadon said that the City was in agreement with the Director's recommendations,

and that they were starting immediately to facilitate the six months program indicated in the recommendations. Mr. Terry Morgan testified on behalf of the Happy Valley Landowners Association. Mr. Morgan said that the slow action of DEQ on the sewage disposal problems in the City has resulted in a moratorium on building in the City since 1973. Mr. Morgan said he felt that the Commission's action would not affect the feelings of the City in promoting a no-growth policy. Mr. Morgan felt that the City would not approve a sewage disposal system which would allow growth in the City. Mr. Morgan asked the Commission to make sure that any approved sewage disposal plan would be adequate to meet future capacities. Commissioner Somers reminded Mr. Morgan that the Commission's rules prohibit the EQC from entering into land use planning. It was MOVED by Commissioner Hallock, seconded by Commissioner Somers and carried unanimously that the Director's recommendation be approved.

VALLEY LANDFILLS, INC., CORVALLIS - REQUEST FOR VARIANCE FROM RULES RELATING TO LANDFILLS, OAR 340-61-040.

Mr. William Dana of the Department's Solid Waste Division presented the conclusions and Director's recommendation from the staff report. Chairman Richards indicated that the Commission should make a finding that strict compliance would be burdensome and impractical. Mr. Dana agreed to include this finding in the recommendation. It was MOVED by Commissioner Somers, seconded by Commissioner Hallock and carried unanimously that the Director's recommendation be approved and include the finding indicated by Chairman Richards.

FIELD BURNING - PUBLIC HEARING TO CONSIDER AMENDMENTS TO THE FIELD BURNING RULES TO SET THE MAXIMUM ACRES TO BE BURNED DURING THE 1977 FIELD BURNING SEASON.

Mr. Scott Freeburn, of the Department's Air Quality Division, presented the staff report recommendations on this item. Mr. Freeburn said that at the time the staff report was written, there was not a consensus of opinion among the persons consulted as to what the acreage allocation would be. Mr. Freeburn said that since that time agreement has been made between agricultural interests and the Seed Council that the normal special allocation procedures outlined in current statutes would use up the 95,000 acre allocation. Mr. Freeburn said that the special allocation procedure should not be used this year, and that a proportional allocation procedure should be used to allocate the acreage to growers on an across-the-board basis. Mr. Freeburn distributed alternative language to the proposed rule. Mr. Bill Rose, Chairman, Oregon Field Sanitation Committee, spoke on behalf of the Committee. Mr. Rose said that the Committee recommended a percentage cut by all growers in allocating open burned acreage in excess of the permitted quantity. Mr. Rose said that an expected 1,500 acres would be sanitized by use of mobile field sanitizers this year. Mr. Rose said that supplemented grass seed straw had been proved to be an acceptable feed for cattle and will be utilized more because of the drought situation in Eastern Oregon. Mr. Thomas R. Miles, consulting engineer to the Oregon Field Sanitation Committee, presented to the Commission copies of the

Consulting Engineers Report to the Oregon Field Sanitation Committee covering 1975 and 1976 activities. Mr. Miles indicated the areas the Committee had been working on in harvest, storage, and uses of the grass straw and the mobile field sanitizers. Mr. Miles said that they are monitoring many of the alternative uses for the straw, and the effectiveness of the field sanitizers. Mr. Miles said he was preparing as a permanent record, a comprehensive paper on all of the work that has been done on the field burning problem since the inception of the Committee in 1969. Commissioner Somers MOVED, Commissioner Phinney seconded, and it was carried unanimously that the Director's recommendations be adopted, that findings be made that conform to the statutory requirement, and that the amendments to the proposed rule OAR 26-013 be a part of the amended rule.

SMOKE MANAGEMENT PROGRAM - DEPARTMENT OF FORESTRY PRESENTATION ON SLASH BURNING SMOKE MANAGEMENT PROGRAM.

Mr. Ron Smith, Willamette Area Director for the State Department of Forestry, made a slide presentation of the smoke management program. Mr. Smith indicated that a written description of the smoke management program was contained in the reports submitted to the Commission record. Mr. Smith said they would add additional communications equipment to make cooperation with DEQ better. Mr. Smith said that the only slash burning which would be done during the field burning season would be that which had to be done during the hot, dry summer months. Chairman Richards commended the Department of Forestry for their efforts in the smoke management program.

NOISE CONTROL RULES - CONSIDERATION OF ADOPTION OF PROPOSED AMENDMENTS TO OAR 340-35-030, TABLES B AND D, NPCS-21 AND 340-35-035.

Mr. John Hector of the Department's Noise Section, presented the Director's recommendation from the staff report. Mr. K. B. Haevernick of the Oregon State Snowmobile Association testified regarding the maximum noise levels indicated on the tables. Mr. Haevernick said that his Association did not feel that snowmobiles manufactured before 1975 would be able to meet the standards indicated. Mr. Haevernick said they had no opposition to the standards for snowmobiles manufactured after 1975. It was MOVED by Commissioner Somers, seconded by Commissioner Hallock and unanimously carried that the Director's recommendation be approved.

NOISE CONTROL RULES FOR INDUSTRY AND COMMERCE - STAFF RECOMMENDATIONS ON STATISTICAL NOISE LEVELS DEFINED IN TABLE G, OAR 340-35-035(1)(a).

Mr. John Hector presented the Director's recommendation on this item. Mr. Tom Donaca of Associated Oregon Industries, said that their failure to comment on suggested changes in the proposed rules should not be taken as assuming that they would not be concerned at some later date. Mr. Donaca said they will await the application of the post 1977 standards. It was MOVED by Commissioner Hallock, seconded by Commissioner Somers and carried unanimously that the Director's recommendation be approved.

SULFUR CONTENT OF FUELS RULE - AUTHORIZATION FOR PUBLIC HEARING TO REVIEW THE ADEQUACY OF OAR 340-22-010(3).

It was MOVED by Commissioner Somers, seconded by Commissioner Hallock and passed by unanimous consent that the Director's recommendation be approved.

SEWAGE WORKS CONSTRUCTION GRANTS - PROPOSED REVISIONS OF CRITERIA FOR PRIORITY RANKING OF SEWAGE WORKS CONSTRUCTION NEEDS.

Commissioner Hallock said that she had been contacted by Eldon Hout of LCDC who had some concerns about this item. The Commission felt that time should be given for the Department of Land Conservation and Development to comment on the proposed criteria. It was MOVED by Commissioner Somers, seconded by Commissioner Phinney and unanimously carried that the Director's recommendation be approved and that it not become effective until the day after the next Commission meeting.

SEWAGE WORKS CONSTRUCTION GRANTS - STAFF RECOMMENDATIONS FOR USE OF REMAINING FEDERAL GRANT FUNDS THROUGH END OF FEDERAL FISCAL YEAR 1977.

Mr. Tom Blankenship of the Department's Water Quality Division, introduced Mr. Robert Mahoney of Portland State University who provided input into the grants program. Chairman Richards said that the Commission appreciated Mr. Mahoney's help. Mr. Blankenship submitted to the Commission an addition to the staff report which was proposed use of FY 1977 sewage works grant funds administered through EPA. It was MOVED by Commissioner Somers, seconded by Commissioner Hallock, and carried unanimously that the Director's recommendation be approved.

WATER QUALITY RULES - CONSIDERATION OF ADOPTION OF PROPOSED RULES DEALING WITH WATER QUALITY CONTROLS DURING SITUATIONS OF DROUGHT OR OTHER COMPARABLE NATURAL DISASTERS.

Mr. Harold Sawyer of the Department's Water Quality Division, presented the staff report. In response to Chairman Richards, Mr. Sawyer said that the comments of OSPIRG were taken into consideration in drafting the proposed rule. Commissioner Crothers asked if this rule was necessary, considering the provisions made in the permits. Mr. Sawyer replied that the procedures do exist in the permits to provide for drought situations and that the rule may not technically be necessary. Commissioner Somers said that he did not think the rule would give the Department any more authority than it already had through the permit process. Commissioner Hallock felt that a decisional criteria should be written into the rule. Mr. Jan Sokol, of OSPIRG, testified with some suggested changes to the proposed rule. Commissioner Somers asked Mr. Sokol why he felt the rule was needed. Mr. Sokol replied that the Commission should have maximum flexibility in dealing with critical situations. Mr. Sokol said that he did not believe the existing rules were flexible enough to deal with critical situations. Mr. Tom Donaca, of Associated Oregon Industries, said that if power curtailment is necessary because of low water flows in other states which effect Oregon's power situation, it may result in industry being unable to operate certain pollution control equipment. Mr. Donaca

warned the Commission against limiting itself with a rule. Commissioner Crothers suggested that the Commission simply adopt a policy statement to deal with critical situations. Chairman Richards submitted for the record a letter from the League of Women Voters in support of the regulation. Commissioner Somers MOVED that the Director's recommendation be denied, and that a policy statement be developed to reflect the Commission's feelings to the staff as to how to react during critical situations. The motion was seconded by Commissioner Hallock and passed unanimously.

There being no further business, the meeting was adjourned.

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item B, May 27, 1977, EQC Meeting

April Program Activity Report

Discussion

Attached is the April 1977 Program Activity Report.

ORS 468.325 provides for approval or disapproval of Air Quality plans and specifications by the Environmental Quality Commission. Water and Solid Waste facility plans and specifications approvals or disapprovals and issuance, denials, modifications and revocations of permits are prescribed by statutes to be functions of the Department, subject to appeal to the Commission.

The purposes of this report are to provide information to the Commission regarding status of the reported program activities, to provide a historical record of project plan and permit actions, and to obtain the confirming approval of the Commission of actions taken by the Department relative to air quality plans and specifications.

Recommendation

It is the Director's recommendation that the Commission take notice of the reported program activities and give confirming approval to the Department's actions relative to air quality project plans and specifications as described on page 11 of the report.

Bill

WILLIAM H. YOUNG
Director

MJB:ee
5/11/77

Department of Environmental Quality
Technical Programs

Permit and Plan Actions

April 1977

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Air, Water and Solid Waste Management Divisions (Reporting Unit) — April 1977 (Month and Year)

SUMMARY OF PLAN ACTIONS

	Plans Received		Plans Approved		Plans Disapproved		Plans
	Month	Fis.Yr.	Month	Fis.Yr.	Month	Fis.Yr.	Pending
Air							
Direct Sources	15	137*	12	111		1	25
Total	15	137*	12	111		1	25
Water							
Municipal	126	959	117	873			31
Industrial	13	126	19	122		4	6
Total	139	1085	136	995		4	37
Solid Waste							
General Refuse	1	46	5	55	2	6	5
Demolition		8		6		1	2
Industrial	4	19	1	20			6
Sludge	1	3		2			1
Total	6	76	6	83	2	7	14
Hazardous Wastes		4		4			
GRAND TOTAL	160	1302	154	1193	2	12	76

* Includes 21 carry over from last fiscal year less 7 withdrawals.

DEPARTMENT OF ENVIRONMENTAL QUALITY

TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division — April 1977

Plan Actions Completed - 136

County	Name of Source/Project/Site and Type of Same	Date Rec'd	Date of Action	Action	Time to Complete Action
	MUNICIPAL SOURCES - 117				
10	GLENDALE STP	V030277	032977	VERB CMMTS	27
10	SUTHERLIN STP PLANS PRELIMINARY	V031577	032977	VERB CMMTS	14
10	MYRTLE CREEK C & K ESTAES	J031877	033177	PROV APP	13
15	ASHLAND BARTOW's SUBD REVISED	J033077	040177	PROV APP	02
20	SPRINGFIELD WAGEE's SUBD EUERGL PK SUBD	K032877	040177	PROV APP	04
24	SALEM EAST SCHAEFER ESTATES SUBD	J031877	040177	PROV APP	14
26	PORTLAND SE FLAVEL ST SE 87TH AVE	J032177	040177	PROV APP	11
26	PORTLAND SE FOSTER RD E OF SE 110 AVE	J032177	040177	PROV APP	11
03	CCSD NO. 1 SCOTT MT NO. 3	J032477	040477	PROV APP	11
20	EUGENE SS 300 E OF WHITBECK BLVD	K032877	040577	PROV APP	08
20	EUGENE LEXINGTON PK & LEX PK 1ST AD	032577	040577	PROV APP	11
20	EUGENE BONNER PLAT - BERTELSEN RD	K032877	040577	PROV APP	08
20	EUGENE BRIARWOOD SUBD	K032877	040577	PROV APP	08
02	CORVALLIS SOURZA SUBD EXT.	K032877	040577	PROV APP	08
34	USA SHARDAKS PARK 279	J032577	040677	PROV APP	12
34	USA SUN VALLY NO 4 - 280	J032977	040677	PROV APP	08
34	TUALATIN REVISED HI-WEST ESTATES - 2	J040477	040677	PROV APP	02
3	CCSD 1 PARKERS GLEN	J040477	040677	PROV APP	02
3	CCSD 1 WEBERS MEADOW	J040477	040677	PROV APP	02
30	MILTON-FREEW HILLVIEW HOMES REVISED	K040477	040677	PROV APP	02
21	YACHATS PACIFIC VIEW DR	K040477	040677	PROV APP	02
26	PORTLAND HIGHWOOD BLOCK 10	J032577	040777	PROV APP	13
34	USA HILLSBORO INTERTIE CONTR 41	V040577	040777	PROV APP	02
30	HERMISTON CASSENS 2ND ADD LAT EXT.	K033077	040877	PROV APP	09
24	SALEM BARRETT HTS EXT	J040477	040877	PROV APP	04
24	SALEM IRONWOOD ESTATES NO. 3 IMPS	J033177	040877	PROV APP	09

DEPARTMENT OF ENVIRONMENTAL QUALITY

TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division — April 1977

Plan Actions Completed (Continued) (136)

County	Name of Source/Project/Site and Type of Same		Date Rec'd	Date of Action	Action	Time to Complete Action
03	OREGON CITY	HAZELWOOD 6 IMPRVMNTS	K040577	040807	PROV APP	03
03	WEST LINN	ROBINWOOD ESTATES II	J040406	770411	PROV APP	05
29	MANZANITA	SOUTHSHORE ESTATES ADDENDUM	J040477	041177	PROV APP	07
4	WARRENTON	SOUTHSHORE ESTATES	J032277	041177	PROV APP	20
15	BCVSA	COOL POOLS 8 SAN SEW	J033077	041177	PROV APP	12
31	LA GRANDE	"X" AVE EXTENSION	K033177	041177	PROV APP	07
31	LA GRANDE	"O" AVE SS IMP	K033177	041177	PROV APP	07
20	SPRINGFIELD	BEJE PARK SUBD SP-244	K033077	041377	PROV APP	14
20	SPRINGFIELD	A & L DARR SUBD SP-246	K033077	041377	PROV APP	14
20	SPRINGFIELD	TAYLOR SUBD SP-245 S & &	K033077	041377	PROV APP	14
03	CANBY	DOUGLAS ADDTN	K040777	041377	PROV APP	06
20	EUGENE	RODGER BOOTHE PRIV SEW	K040877	041377	PROV APP	05
10	HWAY 138	GLIDE-IDLEYLD PARK PREL	V040677	041377	LETTER	07
23	ADRIAN	CHANGE NO 3	V041377	041377	APPROVED	00
14	GOV CAMP SD	GOVT CAMP C-410441 CH ORD 5	V041277	041377	APPROVED	01
24	KEIZER SD	TIMBERVIEW SUBD	J040477	041377	PROV APP	09
02	McMinnville	Crestwood Subd.	K040577	041477	PROV APP	09
15	BCVSA	RIDDLE RD EXT	J041377	041477	PROV APP	01
17	HARB FRUIT SD	JACKSONVILLE HWY EXT	J040777	041477	PROV APP	07
15	BCVSA	GARFIELD ST PROJ 76-11	J040777	041477	PROV APP	07
26	GRESHAM	SUNDERLAND HTS PH 2	J040777	041477	PROV APP	07
21	DEPOE BAY SD	SOUTH POINT RD	J040477	041477	PROV APP	10
26	GRESHAM	I SUNDERLAND HTS UNIT 3 IMPS	J032977	041477	PROV APP	16
6	OR STATE HWY	SUNSET BAY STATE PARK	V032177	041477	PROV APP	24
20	CRESWELL	COLINA VISTA ESTATES SUPPL	K041477	041577	PROV APP	01
30	PENDLETON	COLLEGE VIEW ADDTN	K040677	041577	PROV APP	09
6	COOS BAY	WISELEY'S LAT 19TH & OCEAN	BK040877	041577	PROV APP	07

DEPARTMENT OF ENVIRONMENTAL QUALITY

TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division — April 1977

Plan Actions Completed (Continued) (136)

County	Name of Source/Project/Site and Type of Same	Date Rec'd	Date of Action	Action	Time to Complete Action
34 USA	FOUR SCORE IMPS	K041277	041577	PROV APP	03
20 CRESWELL	COLINA VISTA ESTATES REVISED	K041377	041577	PROV APP	02
34 USA/DURHAM	MCCORMACK PL NO 3 549	J041377	041577	PROV APP	02
34 USA/ALOHA	WESTERN SLOPE SUB 283	J041377	041577	PROV APP	02
15 MEDFORD	KEITH SUBD IMPS	J041277	041877	PROV APP	06
26 LAKE OSWEGO S	SHORE HILLS	J041277	041977	PROV APP	07
24 SALEM	FOSTER'S SUB STS & STORM DR	J041277	041977	PROV APP	07
26 GRESHAM	KNOLL BROOK ESTATES	J041177	041977	PROV APP	08
24 SALEM	GADCO INDUSTRIAL PARK	J041577	042077	PROV APP	05
34 PORTLAND	SW 35TH AVE & BEAV-HILLS HWY	J41577	042077	PROV APP	05
24 SALEM	WILARK PARK WEST NO 3	J041277	042077	PROV APP	08
9 BEND	CLEAR SKY ESTATES	K041277	042177	PROV APP	09
24 SALEM	POLARIS ESTATES	J041577	042177	PROV APP	06
15 BCVSA	STEWART AVE EXT W	J041577	042177	PROV APP	06
18 MALIN	MEADOWGLENN TRACT 1137 EXT	K041377	042277	PROV APP	09
20 VENETA	1ST ADD FREEDOM	K041277	042277	PROV APP	10
26 LAKE OSWEGO	BRYANT WDS NO 6	K041277	042277	PROV APP	10
20 SPRINGFIELD	5TH ADD RAMBLING ACRES REV	K041377	042277	PROV APP	09
02 CORVALLIS	TAMARACK VILLAGE	K041877	042277	PROV APP	04
20 SPRINGFIELD	RAMBLING AC 5TH ADD. REVISED	K041377	042277	PROV APP	09
24 SALEM	LEE ST, 16TH TO MISSION	J042077	042577	PROV APP	05
03 CCSD #1	ROOSTER HILL	J041977	042577	PROV APP	06
31 LA GRANDE	CITY OF LA GRANDE MISC STRUC	K041577	042577	PROV APP	10
17 HARB FRUIT	NEAMAR DR	K041877	042677	PROV APP	08
08 BROOKINGS	CORAL SUBD	K041877	042677	PROV APP	07
21 NEWPORT	NW HURBERT ST PROJ NO 3-1977	K041577	042677	PROV APP	11
10 GREEN SD	WILLIAM CURWICK EXT	K041577	042677	PROV APP	11

DEPARTMENT OF ENVIRONMENTAL QUALITY

TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division — April 1977

Plan Actions Completed (Continued) (136)

County	Name of Source/Project/Site and Type of Same		Date Rec'd	Date of Action	Action	Time to Complete Action
10	WINSTON	1ST CHURCH OF NAZARENE EXT	K041577	042677	PROV APP	11
54	USA BEAV RC	CHANGE ORDS FOR SCH 1,2,3,4	V041877	042677	APPROVED	08
15	BUTTE FALLS	BUTTE FALLS SS C-410412 CH 4	V042077	042677	APPROVED	06
31	UNION	UNION SEW PROJ CHANGE #3	V041877	042677	APPROVED	08
30	UKIAH	ADDENDUM NO 1	V042277	042677	APPROVED	04
26	PORTLAND	SCHMEER II EX BILL NO 5	V041977	042677	APPROVED	07
26	PORTLAND	UMATILLA PS EX BILL A	V041977	042677	APPROVED	07
2	CORVALLIS	CHANGE NOS 15-21-45	V042577	042677	APPROVED	01
34	USA ALOHA	FALLATIN NO 2	K042177	042777	PROV APP	06
03	GLADSTONE	CHAROLAIS HTS II	K042177	042777	PROV APP	06
26	TROUTDALE	KIKU ESTATES	K042177	042777	PROV APP	06
10	MYRTLE CREEK	TRI-CITY TERRACE	K042077	042777	PROV APP	07
26	PORTLAND	SW 33RD PL & SW CAROLINA ST	K042277	042777	PROV APP	05
06	BANDON	BANDON N AVE SEWS #2177-E-76	J042277	042777	PROV APP	05
34	USA ALOHA	BURNS RIDGE 550	K041577	042777	PROV APP	12
23	ADRIAN	ADRIAN PROJ CH #4	V042677	042777	APPROVED	01
20	EUGENE	1ST ADD TO VELKOMMEN PARK	K042577	042877	PROV APP	03
20	EUGENE	3RD ADD TO MEADOWBROOK	K042577	042877	PROV APP	03
08	BROOKINGS	5TH ST BARBARA LM	K042277	042877	PROV APP	06
31	LA GRANDE	LA GRANDE MISC STRUCTS	K042677	042877	PROV APP	02
10	ROSEBURG	EXCELLO DR	J041577	042877	PROV APP	13
04	WARRENTON	SW BIRCH CT BTW SW 2ND & 3RD	J041877	042877	PROV APP	10
24	SALEM	CINNAMON HILL	J041977	042877	PROV APP	09
24	MARION CO	UNION OIL TRUCK STP 703	V032477	042877	VERB CMMTS	35
34	USA ALOHA	MEADOWBROOK SUB	J042777	042877	PROV APP	01
10	ROSEBURG	SUNBERRY HILLS PHASE II	J042777	042877	PROV APP	01
34	USA ALOHA	KAY JAY SUBD NO 2	K042877	042977	PROV APP	01

DEPARTMENT OF ENVIRONMENTAL QUALITY

TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division — April 1977

Plan Actions Completed (Continued) (136)

County	Name of Source/Project/Site and Type of Same	Date Rec'd	Date of Action	Action	Time to Complete Action
34 USA	DURHAM MERESTONE	K042877	042977	PROV APP	01
34 USA	DURHAM SUMMERFIELD PHASE IV	K042877	042977	PROV APP	01
30 PENDLETON	GLENDALE, CHULA VISTA & ADJ	K042777	042977	PROV APP	02
20 SPRINGFIELD	LAKSONEN PARK 8TH ADD	K042777	042977	PROV APP	02
20 SPRINGFIELD	PICANUT 1ST ADD	K042777	042977	PROV APP	02
20 SPRINGFIELD	FRANCISCO PARK	K042777	042977	PROV APP	02
20 SPRINGFIELD	EASTON 2ND ADD	K042777	042977	PROV APP	02
34 USA	DURHAM CONESTOGA PARK	K042877	042977	PROV APP	01
24 SALEM	SOUTH CENTRAL SALEM	J042077	042977	PROV APP	09
03 WEST	LINN HIDDEN SPRINGS RANCH #4	J041577	042977	PROV APP	14

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division (Reporting Unit) — April, 1977 (Month and Year)

PLAN ACTIONS COMPLETED (con't. - 136)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
INDUSTRIAL WASTE SOURCES - 19			
Clatsop	Barbey Packing - Astoria Fine Screening	3/23/77	Approved
Linn	Teledyne Wah Chang - Albany Zirconium Oxide Caustic Scrubber	3/28/77	Approved
Klamath	Wm. DeJong - Lorella Animal Waste Lagoons	4/ 4/77	Approved
Jefferson	Charles Graham Hog Farm Hog Manure Lagoon and Irrigation Preliminary Plans	4/ 4/77	Approved
Yamhill	Brewster Hog Farm - McMinnville Animal Waste	4/ 7/77	Approved
Linn	Teledyne Wah Chang - Albany Modification to Venturi Scrubber, Reduction Plant	4/ 8/77	Approved
Linn	Teledyne Wah Chang - Albany Spill Sump Treatment System	4/ 8/77	Approved
Clatsop	Pacific Fabricators - Warrenton Oily Wastes and Solids Removal	4/12/77	Approved
Baker	Oregon Portland Cement - Durkee Cooling and Truck Wash Water Recirculation	4/12/77	Approved
Douglas	Oregon Fish & Wildlife - Rock Creek Hatchery - Idleyid Park - Pollution Abatement Settling Pond	4/15/77	Approved
Umatilla	J. R. Simplot - Hermiston Starch Recovery System	4/15/77	Approved
Umatilla	J. R. Simplot - Hermiston Primary Treatment System	4/15/77	Approved

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division (Reporting Unit) — April 1977 (Month and Year)

PLAN ACTIONS COMPLETED (Continued) (136)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Lincoln	Georgia Pacific Pulp Mill - Toledo Secondary Treatment Process	4/20/77	Approved
Yamhill	Publishers Paper Company - Newberg Recirculation of Filter Backwash	4/20/77	Approved
Yamhill	Publishers Paper Company - Newberg Piping Modifications, Bleach Tower Overflow	4/20/77	Approved
Washington	Tektronix, Inc. - Beaverton Treatment Lagoon Modifications	4/22/77	Approved
Yamhill	Dehaan Dairy - Salem Manure Handling Facilities	4/22/77	Approved
Clatsop	Bioproducts, Inc. - Warrenton Fine Screening Effluent	4/28/77	Approved
Hood River	Luhr Jensen & Sons, Inc. - Hood River - Plating Waste, No Discharge	4/28/77	Approved

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division (Reporting Unit) — April, 1977 (Month and Year)

SUMMARY OF WATER PERMIT ACTIONS

	Permit Actions Received				Permit Actions Completed				Permit Actions Pending		Sources Under Permits		Sources Reqr'g Permits	
	Month		Fis.Yr.		Month		Fis.Yr.							
	*	**	*	**	*	**	*	**	*	**	*	**	*	**
Municipal														
New	0	0	2	3	0	0	7	6	2	5				
Existing	0	0	0	2	0	0	2	4	0	4				
Renewals	3	4	74	14	0	0	36	3	84	11				
Modifications	2	0	21	1	3	0	32	3	8	0				
Total	5	4	97	20	3	0	77	16	94	20	300	62	302	71
Industrial														
New	0	1	7	10	0	0	3	9	6	4				
Existing	0	0	1	3	0	0	6	11	1	2				
Renewals	0	0	51	11	0	2	29	12	49	6				
Modifications	2	0	34	2	5	0	45	4	11	0				
Total	2	1	93	26	5	2	83	36	67	12	431	88	438	94
Agricultural (Hatcheries, Dairies, etc.)														
New	0	0	2	1	0	0	4	0	1	0				
Existing	0	0	0	0	0	1	0	2	0	0				
Renewals	0	0	1	0	0	0	0	1	0	0				
Modifications	0	0	9	0	0	0	11	0	0	0				
Total	0	0	12	1	0	1	15	3	1	0	65	9	66	9
GRAND TOTALS	7	5	202	47	8	3	175	55	162	32	796	159	806	174

* NPDES Permits
** State Permits

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Water Quality Division (Reporting Unit) — April, 1977 (Month and Year)

PERMIT ACTIONS COMPLETED (12)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Coos	Bohemia, Inc. Lakeside Lumber	4/11/77	State Permit Issued
Polk	Valley Concrete and Gravel Aggregate Plant	4/14/77	State Permit Issued
Marion	Mallories Dairy Dairy Waste	4/20/77	State Permit Issued
Jackson	Kogap Lumber & Plywood	4/20/77	NPDES Permit Modified
Linn	Pioneer Villa Sewage Disposal	4/20/77	NPDES Permit Modified
Linn	Werner & Frieda Fohrer Fairway Apartments	4/20/77	NPDES Permit Modified
Clatsop	Astoria Plywood Plywood	4/20/77	NPDES Permit Modified
Tillamook	City of Tillamook Sewage Disposal	4/20/77	NPDES Permit Modified
Marion	Stayton Canning Stayton Plant	4/20/77	NPDES Permit Modified
Hood River	Champion Building Products Dee Operations	4/27/77	NPDES Permit Modified
Coos	Peter Pan Seafoods, Inc. Union Seafoods Facility	4/27/77	NPDES Permit Modified
Josephine	City of Grants Pass Filter Plant	4/29/77	NPDES Permit Renewal Denied By EPA

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Air Quality (Reporting Unit) — April 1977 (Month and Year)

PLAN ACTIONS COMPLETED (12)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Direct Stationary Sources (12)			
Multnomah (878)	Schnitzer Steel Products. Wire incinerator.	3/29/77	Approved.
Multnomah (881)	Archer Blower. Paint spray booth.	4/7/77	Approved.
Jackson (882)	Boise Cascade Corporation, White City. Sawdust blower system.	4/12/77	Approved.
Linn (886)	Champion Building Products. Sanderdust baghouse.	3/21/77	Approved.
Klamath (887)	Jeld-Wen, Inc. Multi cyclone.	4/15/77	Approved.
Coos (888)	Georgia Pacific Corporation. Fiber metering cyclone.	3/21/77	Approved. (Tax Credit only).
Linn (893)	Teledyne Wah Chang. ZrO_2 caustic scrubber.	4/8/77	Approved.
Linn (894)	Teledyne Wah Chang. Zr reduction venturi.	4/8/77	Approved.
Yamhill (895)	Champion Bldg. Products, Willamina. Replacement sander system.	3/29/77	Approved.
Linn (898)	Teledyne Wah Chang. Spill pump & MIBK recovery.	4/8/77	Approved.
Jackson (902)	Timber Products Company. Baghouse for particleboard.	4/8/77	Approved.
Lane (910)	Weyerhaeuser Company. Bauer cyclone.	4/21/77	Approved. (Tax Credit only).

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Air Quality Division (Reporting Unit) — April 1977 (Month and Year)

SUMMARY OF AIR PERMIT ACTIONS

	Permit Actions Received		Permit Actions Completed		Permit Actions Pending	Sources under Permits	Sources Reqr'g Permits
	Month	Fis.Yr.	Month	Fis.Yr.			
Direct Sources							
New	2	20	1	20	10		
Existing		41	1	66	18		
Renewals	7	137	1	143	79		
Modifications	10	109	6	108	18		
Total	19	307	9	337	125	1680	1708
Indirect Sources							
New		20	3	21	11		
Existing							
Renewals							
Modifications		4		4			
Total	0	24	3	25	11	52	
GRAND TOTALS	19	331	12	362	136	1732	

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Air Quality (Reporting Unit) — April 1977 (Month and Year)

PERMIT ACTIONS COMPLETED (12)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Direct Stationary Sources (9)			
Baker	Ellingson Lumber 01-0003 Addendum	3/28/77	Addendum Issued
Baker	Baker Valley Rendering 01-0012 Renewal	4/6/77	Permit Issued
Douglas	International Paper 10-0056 Modification	4/6/77	Addendum Issued
Multnomah	Acme Trading & Supply 26-2070 Modification	3/30/77	Addendum Issued
Multnomah	Blasen & Blasen Lumber 26-2557 Change of Ownership	4/19/77	Permit Issued
Multnomah	Pacific Supply Coop 26-2976 New	4/8/77	Permit Issued
Polk	Agripac 27-8009 Modification	4/6/77	Permit Issued
Union	Hoff Ronde Valley Lumber 31-0013 Existing	4/6/77	Permit Issued
Yamhill	Champion Building Products 36-8008 Addendum	4/14/77	Addendum Issued

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Air Quality (Reporting Unit) — April 1977 (Month and Year)

PERMIT ACTIONS COMPLETED (con't. - 12)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Indirect Sources (3)			
Washington	Hillsboro K-Mart. Phase I - 667 spaces. Phase II - 900 spaces total.	4/11/77	Final permit issued.
Marion	State Farm Insurance. 321 additional parking spaces.	4/11/77	Final permit issued.
Washington	Conestoga Park. 555 space PUD.	4/15/77	Application withdrawn.

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Solid Waste Division (Reporting Unit) — April 1977 (Month and Year)

PLAN ACTIONS COMPLETED (8)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Lane	Central Receiving Station. Existing site. As Build Plan.	4/4/77	Letter of acknowledgement.
Lane	Eugene Chemical Company. Existing site. Operational Plan.	4/7/77	Approved.
Klamath	Sprague River. Existing site. Operational Plan.	4/7/77	Provisional approval.
Klamath	Bly Disposal Site. Existing site. Operational Plan.	4/7/77	Provisional approval.
Klamath	Merrill Disposal Site. Existing site. Operational Plan.	4/7/77	Disapproved.
Klamath	Beatty Disposal Site. Existing site. Operational Plan.	4/7/77	Disapproved.
Douglas	Lookingglass Transfer Station. New site. Construction Plan.	4/7/77	Provisional approval.
Sherman	Sherman County Landfill. New site. Operational Plan.	4/29/77	Approved.

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Solid Waste Division (Reporting Unit) — April 1977 (Month and Year)

SUMMARY OF SOLID AND HAZARDOUS WASTE PERMIT ACTIONS

	Permit Actions Received		Permit Actions Completed		Permit Actions Pending		Sites Under Permits	Sites Reqr'g Permits
	Month	Fis.Yr.	Month	Fis.Yr.				
General Refuse								
New		10		6	4	(*3)		
Existing	1	1	4	26	22	(*22)		
Renewals		8		14	2			
Modifications	1	7	2	15	1			
Total	2	26	6	61	29		190	191
Demolition								
New		2		3				
Existing	1	1	1	3				
Renewals		2		1	2			
Modifications	1	1	1	2				
Total	2	6	2	9	2		14	14
Industrial								
New		4		6	1			
Existing	2	3		7	8	(*4)		
Renewals	2	13	1	14	4			
Modifications	1	4	1	4	2			
Total	5	24	2	31	15		86	91
Sludge Disposal								
New	1	3		3	1			
Existing								
Renewals		1		2	1			
Modifications		2		3				
Total	1	6	0	8	2		7	7
Hazardous Waste								
New Authorizations	27	100	16	90	11			
Renewals								
Modifications								
Total	27	100	16	90	11		1	1
GRAND TOTALS	37	162	26	199	59		298	304

* Sites operating under temporary permits until regular permits are issued.

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Solid Waste Division (Reporting Unit) — April 1977 (Month and Year)

PERMIT ACTIONS COMPLETED (26)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
General Refuse (Garbage) Facilities (6)			
Wallowa	Wallowa Disposal Site. Closed facility.	4/18/77	Permit revoked.
Clatsop	Elsie Disposal Site. Existing facility.	4/19/77	Permit issued.
Morrow	Heppner Disposal Site. Existing facility.	4/19/77	Permit issued.
Morrow	Lexington Disposal Site. Existing facility.	4/21/77	Permit issued.
Lane	Glenwood Transfer Station. Existing facility.	4/26/77	Permit amended.
Clackamas	MDC - Tire Hawg. Existing facility.	4/27/77	Permit issued.
Demolition Waste Facilities (2)			
Multnomah	Hidden Valley Landfill. Existing facility.	4/11/77	Permit amended.
Klamath	Langell Valley Landfill. Existing facility.	4/25/77	Permit issued.
Industrial Waste Facilities (2)			
Clackamas	Park Lumber Co. Existing facility.	4/6/77	Permit issued. (renewal)
Coos	Elkside Lumber Co. Existing facility.	4/7/77	Permit amended.

Sludge Disposal Facilities - none

DEPARTMENT OF ENVIRONMENTAL QUALITY
TECHNICAL PROGRAMS

MONTHLY ACTIVITY REPORT

Solid Waste Division (Reporting Unit) — April 1977 (Month and Year)

PERMIT ACTIONS COMPLETED (Cont.) (26)

County	Name of Source/Project/Site and Type of Same	Date of Action	Action
Hazardous Waste Facilities (16)			
Gilliam	Chem-Nuclear Systems, Inc. Existing facility.	4/1/77	Disposal authorization amended (solvent).
"	" "	4/8/77	One (1) dispsoal authorization approved and one (1) amended (plating sludge and formaldehyde resin).
"	" "	4/12/77	Disposal authorization approved (solvents).
"	" "	4/18/77	Disposal authorization approved (solvents, soldering oil and flux).
"	" "	4/18/77	Eleven (11) verbal authorizations for small quantities of chemical wastes were confirmed in writing.

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. C, May 27, 1977, EQC Meeting

Tax Credit Applications

Attached are review reports on 14 requests for Tax Credit action. These reports and the recommendations of the Director are summarized on the attached table.

Director's Recommendation

It is recommended that the Commission act on the tax credit requests as follows:

Issue certificates for 13 applications: T-857, T-858, T-859, T-868, T-869, T-870, T-878, T-879, T-883, T-885, T-886, T-887, T-888, T-892.

Bill

WILLIAM H. YOUNG
Director

/cs
5/13/77

Attachments
Tax Credit Summary
Tax Credit Review Reports (13)

Contains Recycled

TAX CREDIT APPLICATIONS

Applicant/Plant Location	Appl. No.	Facility	Claimed Cost	% Allocable to Pollution Control	Director's Recommendation
Thomsen Orchard, Hood River	T-857 (AQ)	Orchard Fan	$ 10,574.00	80% or more	Issue
W. C. Laraway, Hood River	T-858 (AQ)	Orchard Fan	7,945.00	80% or more	Issue
Frank Lariza Hood River	T-859 (AQ)	Orchard Fan	11,369.00	80% or more	Issue
Bickford Orchards, Inc. Hood River	T-868 (AQ)	Orchard Fan	10,369.00	80% or more	Issue
Bickford Orchards, Inc. Hood River	T-869 (AQ)	Orchard Fan	10,369.00	80% or more	Issue
Bob G. Willis, Hood River	T-870 (AQ)	Orchard Fan	7,995.00	80% or more	Issue
Georgia-Pacific Corp. Eugene	T-878 (AQ)	Replacement cyclones and duct work in veneer dryer control system	19,745.00	20% or less	Issue
Georgia-Pacific Corp., Eugene	T-879 (SW)	Wood waste storage, preparation and firing system	345,658.51	80% or more	Issue
Reynolds Metals Co., Troutdale	T-883 (AQ)	2 Mikropul wet electrostatic precipitators, 2 conditioning towers, 3 Mikropul fans & associated ductwork	2,717,379.15	80% or more	Issue
Oregon Water Corp., Oakland	T-885 (WQ)	Backwash settling ponds; water treatment plant	11,804.00	80% or more	Issue
Oregon Water Corp., Winchester	T-886 (WQ)	Backwash settling ponds; water treatment plant	50,082.00	80% or more	Issue
K. F. Jacobsen & Co., Inc., Portland	T-887 (AQ)	Stationary baghouse	113,228.00	80% or more	Issue
Oregon Bulb Farms, Sandy	T-888 (WQ)	Bulb wash waste water settling lagoon and irrigation	27,753.65	80% or more	Issue
Lage Orchards, Inc., Hood River	T-892 (AQ)	Orchard Fan	31,841.50	80% or more	Issue

TAX CREDIT SUMMARY

Proposed May 1977 Totals:

Air Quality	$2,940,814.65
Water Quality	89,639.65
Solid Waste	345,658.51
	$3,376,112.81

Calendar Year Totals to Date:
(Excluding May 1977 totals)

Air Quality	$ 660,910.01
Water Quality	853,659.13
Solid Waste	-0-
	$1,514,569.14

Total Certificates Awarded (Monetary Values)
Since Beginning of Program (excluding May 1977 totals):

Air Quality	$95,725,500.13
Water Quality	70,644,379.60
Solid Waste	12,471,967.79
	&178,842,847.52

Appl T-857

Date 4/25/77

State of Oregon
Department of Environmental Quality

Tax Relief Application Review Report

1. Applicant

Thomsen Orchard
Route 6, Box 125
Hood River, Oregon 97031

The applicant owns and operates a pear and apple orchard near Hood River, Oregon.

2. Description of Facility

The facility claimed in this application consists of an orchard fan system. The cost of the system is:

Tropic Breeze Wind Machine
Model GP 391, Serial Number 37419 $10,547.00

The specifications for the orchard fan are on file in file T-857. The orchard fan is located on the Miller Place property, 3-1/2 miles South of Hood River on East Side Grade Road in the Pine Grove area.

Construction of the claimed facility was started on December 1, 1976 and was completed on December 17, 1976. The facility was placed in operation on December 21, 1976. A "Notice of Intent to Construct and Request for Preliminary Certification for Tax Credit" was filed by the applicant and it was approved by the Department on October 27, 1976, thus meeting the pre-notice requirement.

Certification is claimed under current statutes and the percentage claimed for pollution control is 100%.

Facility cost: $10,547.00 (Accountant's certification was provided).

3. Evaluation of Application

There is no law limiting the use of fuel oil fired heaters to control frost damage to fruit trees even though the heaters can cause a significant smoke and soot air pollution problem in the City of Hood River. The orchard farmers desire a secure, long range solution to frost control that includes the reduction or elimination of the smoke and soot nuisance caused by the use of heaters. An orchard fan, which serves 10 acres, reduces the number of heaters required for frost protection from 340 heaters to 100 perimeter heaters, a 70% reduction. The significant function of the fan is to provide a reduction in the use of heaters, which reduces emissions to the atmosphere.

An orchard fan blows warmer air from above an inversion level down into the trees. They have proven effective for frost control in the Pine Grove area of Hood River where frost control is needed on an average of 30 hours per year.

The operating cost of the claimed facility is slightly greater than the savings in the cost of fuel oil. It is concluded that more than 80% of the cost of this facility is allocable to air pollution control.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate bearing the cost of $10,574.00 with 80% or more allocated to pollution control be issued for the facility claimed in Tax Application No. T-857.

RP:ds
4/25/77

Appl T-858

Date 4/28/77

State of Oregon
Department of Environmental Quality

Tax Relief Application Review Report

1. Applicant

W. C. Laraway
Route 6, Box 165
Hood River, Oregon 97031

The applicant owns and operates a fruit orchard near Hood River, Oregon.

2. Description of Facility

The facility claimed in this application consists of an orchard fan system. The cost of the system is:

Tropic Breeze Wind Machine Model GP 300, Serial Number 37354	$7,945.00

The specifications for the orchard fan are on file in file T-858. The orchard fan is located 3 miles south of Hood River, on East Side Road, 200 yards south of the Whiskey Creek Road junction.

Construction of the claimed facility was started on December 1, 1976 and was completed on December 20, 1976. The facility was placed in operation on January 5, 1977. A "Notice of Intent to Construct and Request for Preliminary Certification for Tax Credit" was filed by the applicant and it was approved by the Department on November 9, 1976, thus meeting the pre-notice requirement.

Certification is claimed under current statutes and the percentage claimed for pollution control is 100%.

Facility cost: $7,945.00 (Accountant's certification was provided).

3. Evaluation of Application

There is no law limiting the use of fuel oil fired heaters to control frost damage to fruit trees even though the heaters can cause a significant smoke and soot air pollution problem in the City of Hood River. The orchard farmers desire a secure, long range solution to frost control that includes the reduction or elimination of the smoke and soot nuisance caused by the use of heaters. An orchard fan, which serves 10 acres, reduces the number of heaters required for frost protection from 340 heaters to 100 perimeter heater, a 70% reduction. The significant function of the fan is to provide a reduction in the use of heaters, which reduces emissions to the atmosphere.

An orchard fan blows warmer air from above an inversion level down into the trees. They have proven effective for frost control in the Pine Grove area of Hood River where frost control is needed on an average of 30 hours per year.

The operating cost of the claimed facility is slightly greater than the savings in the cost of fuel oil. It is concluded that more than 80% of the cost of this facility is allocable to air pollution control.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate bearing the cost of $7,945.00 with 80% or more allocated to pollution control be issued for the facility claimed in Tax Application No. T-858.

RP:ds
4/28/77

Appl T-859

Date 4/28/77

State of Oregon
Department of Environmental Quality

Tax Relief Application Review Report

1. Applicant

Frank Lariza
Route 6, Box 93
Hood River, Oregon 97031

The applicant owns and operates a fruit orchard near Hood River, Oregon.

2. Description of Facility

The facility claimed in this application consists of an orchard fan system. The cost of the system is:

Tropic Breeze Wind Machine
Model GP 391, Serial Number 37390 $11,369.00

The specifications for the orchard fan are on file in file T-859. The orchard fan is located 4 miles SE of Hood River, on Eastside Grade Road, 1/4 mile north of Whiskey Creek Road.

Construction of the claimed facility was started on December 1, 1976 and was completed on December 19, 1976. The facility was placed in operation on December 19, 1976. A "Notice of Intent to Construct and Request for Preliminary Certification for Tax Credit" was filed by the applicant and it was approved by the Department on December 29, 1976, thus meeting the pre-notice requirement.

Certification is claimed under current statutes and the percentage claimed for pollution control is 100%.

Facility cost: $11,369.00 (Accountant's certification was provided).

3. Evaluation of Application

There is no law limiting the use of fuel oil fired heaters to control frost damage to fruit trees even though the heaters can cause a significant smoke and soot air pollution problem in the City of Hood River. The orchard farmers desire a secure, long range solution to frost control that includes the reduction or elimination of the smoke and soot nuisance caused by the use of heaters. An orchard fan, which serves 10 acres, reduces the number of heaters required for frost protection from 340 heaters to 100 perimeter heaters, a 70% reduction. The significant function of the fan is to provide a reduction in the use of heaters, which reduces emissions to the atmosphere.

An orchard fan blows warmer air from above an inversion level down into the trees. They have proven effective for frost control in the Pine Grove area of Hood River where frost control is needed on an average of 30 hours per year.

The operating cost of the claimed facility is slightly greater than the savings in the cost of fuel oil. It is concluded that more than 80% of the cost of this facility is allocable to air pollution control.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate bearing the cost of $11,369.00 with 80% or more allocated to pollution control be issued for the facility claimed in Tax Application No. T-859.

RP:ds
4/28/77

Appl T-868

Date 4/28/77

State of Oregon
Department of Environmental Quality

Tax Relief Application Review Report

1. Applicant

Bickford Orchards, Inc.
Route 1, Box 277
Hood River, Oregon 97031

The applicant owns and operates a fruit orchard near Hood River, Oregon.

2. Description of Facility

The facility claimed in this application consists of an orchard fan system. The cost of the system is:

Tropic Breeze Wind Machine
Model GP 391, Serial Number 67227 $10,369.00

The specifications for the orchard fan are on file in file T-868. The orchard fan is located 3-1/2 miles south of Hood River on the Old East Side Road.

Construction of the claimed facility was started on December 13, 1976 and was completed on December 20, 1976. The facility was placed in operation on December 20, 1976. A "Notice of Intent to Construct and Request for Preliminary Certification for Tax Credit" was filed by the applicant and it was approved by the Department on December 8, 1976, thus meeting the pre-notice requirement.

Certification is claimed under current statutes and the percentage claimed for pollution control is 100%.

Facility cost: $10,369.00 (Accountant's certification was provided).

3. Evaluation of Application

There is no law limiting the use of fuel oil fired heaters to control frost damage to fruit trees even though the heaters can cause a significant smoke and soot air pollution problem in the City of Hood River. The orchard farmers desire a secure, long range solution to frost control that includes the reduction or elimination of the smoke and soot nuisance caused by the use of heaters. An orchard fan, which serves 10 acres, reduces the number of heaters required for frost protection from 340 heaters to 100 perimeter heaters, a 70% reduction. The significant function of the fan is to provide a reduction in the use of heaters, which reduces emissions to the atmosphere.

An orchard fan blows warmer air from above an inversion level down into the trees. They have proven effective for frost control in the Pine Grove area of Hood River where frost control is needed on an average of 30 hours per year.

The operating cost of the claimed facility is slightly greater than the savings in the cost of fuel oil. It is concluded that more than 80% of the cost of this facility is allocable to air pollution control.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate bearing the cost of $10,369.00 with 80% or more allocated to pollution control be issued for the facility claimed in Tax Application No. T-868.

RP:ds
4/28/77

Appl T-869

State of Oregon
Department of Environmental Quality

Date 4/28/77

Tax Relief Application Review Report

1. Applicant

Bickford Orchards, Inc.
Route 1, Box 277
Hood River, Oregon 97031

The applicant owns and operates a fruit orchard near Hood River, Oregon.

2. Description of Facility

The facility claimed in this application consists of an orchard fan system. The cost of the system is:

Tropic Breeze Wind Machine Model GP 391, Serial Number 67234	$10,369.00

The specifications for the orchard fan are on file in file T-869. The orchard fan is located 4 miles south of Hood River on Highway 35.

Construction of the claimed facility was started on December 13, 1976 and was completed on December 20, 1976. The facility was placed in operation on December 20, 1976. A "Notice of Intent to Construct and Request for Preliminary Certification for Tax Credit" was filed by the applicant and it was approved by the Department on December 3, 1976, thus meeting the pre-notice requirement.

Certification is claimed under current statutes and the percentage claimed for pollution control is 100%.

Facility cost: $10,369.00 (Accountant's certification was provided).

3. Evaluation of Application

There is no law limiting the use of fuel oil fired heaters to control frost damage to fruit trees even though the heaters can cause a significant smoke and soot air pollution problem in the City of Hood River. The orchard farmers desire a secure, long range solution to frost control that includes the reduction or elimination of the smoke and soot nuisance caused by the use of heaters. An orchard fan, which serves 10 acres, reduces the number of heaters required for frost protection from 340 heaters to 100 perimeter heater, a 70% reduction. The significant function of the fan is to provide a reduction in the use of heaters, which reduces emissions to the atmosphere.

An orchard fan blows warmer air from above an inversion level down into the trees. They have proven effective for frost control in the Pine Grove area of Hood River where frost control is needed on an average of 30 hours per year.

The operating cost of the claimed facility is slightly greater than the savings in the cost of fuel oil. It is concluded that more than 80% of the cost of this facility is allocable to air pollution control.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate bearing the cost of $10,369.00 with 80% or more allocated to pollution control be issued for the facility claimed in Tax Application No. T-869.

RP:ds
4/28/77

Appl T-870

Date 4/28/77

State of Oregon
Department of Environmental Quality

Tax Relief Application Review Report

1. Applicant

Bob G. Willis
Route 1, Box 525
Hood River, Oregon 97031

The applicant owns and operates a fruit orchard near Hood River, Oregon.

2. Description of Facility

The facility claimed in this application consists of an orchard fan system. The cost of the system is:

Tropic Breeze Wind Machine Model GP 300, Serial Number 67250	$7,995.00

The specifications for the orchard fan are on file in file T-870. The orchard fan is located 4 miles south of Hood River, 1/2 mile east of Highway 35 at the Pine Grove Texaco Station.

Construction of the claimed facility was started on January 24, 1977 and was completed on January 24, 1977. The facility was placed in operation on January 24, 1977. A "Notice of Intent to Construct and Request for Preliminary Certification for Tax Credit" was filed by the applicant and it was approved by the Department on December 22, 1976, thus meeting the pre notice requirement.

Certification is claimed under current statutes and the percentage claimed for pollution control is 100%.

Facility cost: $7,995.00 (Accountant's certification was provided).

3. Evaluation of Application

There is no law limiting the use of fuel oil fired heaters to control frost damage to fruit trees even though the heaters can cause a significant smoke and soot air pollution problem in the City of Hood River. The orchard farmers desire a secure, long range solution to frost control that includes the reduction or elimination of the smoke and soot nuisance caused by the use of heaters. An orchard fan, which serves 10 acres, reduces the number of heaters required for frost protection from 340 heaters to 100 perimeter heaters, a 70% reduction. The significant function of the fan is to provide a reduction in the use of heaters, which reduces emissions to the atmosphere.

An orchard fan blows warmer air from above an inversion level down into the trees. They have proven effective for frost control in the Pine Grove area of Hood River where frost control is needed on an average of 30 hours per year.

The operating cost of the claimed facility is slightly greater than the savings in the cost of fuel oil. It is concluded that more than 80% of the cost of this facility is allocable to air pollution control.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate bearing the cost of $7,995.00 with 80% or more allocated to pollution control be issued for the facility claimed in Tax Application No. T-870.

RP:ds
4/28/77

Appl T-878

Date 4/21/77

State of Oregon
Department of Environmental Quality

Tax Relief Application Review Report

Applicant

Georgia Pacific Corp.
P. O. Box 1618
Eugene, Oregon 97401

The applicant operates a plywood manufacturing facility located in Eugene, Oregon.

Description of Facility

The items claimed in this facility are replacement parts for a previously certified facility (T-780). The facility costs consist of:

Replacement of existing cyclones and associated ductwork - - - $19,745.

Construction of the claimed items was started on October 21, 1976 and completed and placed in operation on November 5, 1976. An application for preliminary certification for tax credit was filed with the Department on September 16, 1976.

Certification is claimed under current statutes and the percentage claimed for pollution control is 100%.

Facility cost is $19,745.

Evaluation of Application

When the original veneer dryer control system was built, the cyclones and ductwork were made of mild steel. These were eroded by the acidic recirculation water causing a decrease in the efficiency of the control device.

The claimed cyclones and ductwork are replacements for the eroded items; however, they are constructed of stainless steel. The stainless steel will resist erosion and maintain the collection efficiency of the entire unit.

Replacement parts for the previously certified facility are considered maintenance items and are not eligible for tax certification. However, because the cyclones and ductwork have been manufactured of more expensive stainless steel instead of the previously used mild steel to preserve the collection efficiency of the unit, the increase in cost of the new stainless steel items should be certified for tax credit.

The company submitted the cost of the original cyclones and ductwork as being $17,101.27 for the cyclones and less than $500 for the ductwork or approximately $17,350 total.

While it is concluded that 100% of the claimed facility is for air pollution control, $17,350 of the total was previously certified (T-780) leaving $2,395 as the increased cost of the modified items to be certified in the application.

The company has been informed by letter of the reduction in their request of the percentage allocable for pollution control.

Director's Recommendation

It is recommended that a Pollution Control Facility Certificate bearing the cost of $19,745 with less than 20% allocated for pollution control be issued for the facility claimed in Tax Credit Application #T-878.

Appl. T-879

Date 5/2/77

State of Oregon

DEPARTMENT OF ENVIRONMENTAL QUALITY

TAX RELIEF APPLICATION REVIEW REPORT

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1. Applicant

Georgia-Pacific Corporation
900 S. W. Fifth Avenue
Portland, Oregon 97204

The applicant owns and operates a pre-finished hardwood plywood plant in Eugene, Lane County.

2. Description of Facility

The facility claimed in this application consists of a wood waste handling and processing system and a burner to produce hot gases which are injected into dryers. It includes the installed cost of the following:

a.	Wasteco Burner System and Engineering	$51,780.13
b.	Duct system and insulation	65,427.78
c.	Fuel handling system	68,554.03
d.	Fuel bin (20 unit)	36,091.83
e.	Pipe, cyclone and fan system	67,183.46
f.	Hammer mill	40,944.24
g.	Electrical and miscellaneous installations	15,677.04
	Total Project Cost	$345,658.51

The claimed facility was started in March 1976 and was completed in October 1976.

Certification is claimed under the 1973 Act as amended in 1975 with 100% of the cost allocated to pollution control for utilization of solid waste.

Facility costs: $345,658.51 (accountant's certification was attached to application).

3. Evaluation of Application

Georgia-Pacific Corporation submitted a Notice of Construction and request for Preliminary Certification to the Department which was approved March 3, 1976.

The claimed facility is a complete wood waste storage, preparation and firing system with incineration of the dryer exhaust gases. Sander dust and ply-trim are collected from the manufacturing plant and stored in bins. Wood waste residues are pulverized and metered to the burner on demand. The heated gases, after leaving the furnace, are fed into the dryer then part is returned to the burner and the rest is exhausted to the atmosphere thru the scrubber.

The plywood plant is generating approximately 100 tons of sander dust and 200 tons of ply-trim per month. The claimed facility is utilizing all generated sander dust and small amounts of ply-trim. Most of the ply-trim is given away or sold at cost to a fuel dealer for processing. Prior to construction of the claimed facility, most of the sander dust was given to farmers or burned in an old burner. Savings in terms of natural gas could amount to $250,000 annually. Total annual operating expenses as stated in the application are $114,358.63. Therefore, return on investment is approximately 40%.

The Department concludes that the claimed facility meets the requirements of ORS 468.165(1)(b) and is therefore eligible for certification.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate be issued pursuant to ORS 468.165(1)(b) for the claimed facility in application T-879, such certificate to bear the actual cost of $345,658.51.

MS:mm

Appl T-883

State of Oregon
Department of Environmental Quality

Date 5/4/77

Tax Relief Application Review Report

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1. Applicant

Reynolds Metals Company
Troutdale Division
N.E. Sundial Road
Troutdale, Oregon 97060

The applicant owns and operates an aluminum reduction plant off N.E. Sundial Road in Troutdale, Oregon.

2. Description of Facility

The facility claimed in this application consists of two Mikropul wet electrostatic precipitators (Serial No. 74-T 1255 and 74-T 1256), two conditioning towers, three Mikropul fans and associated ductwork for removing and cleaning exhaust gases from the carbon anode plant. The facility costs consist of:

a)	Cost to purchase and install electrical system	$ 385,112.89
b)	Cost to purchase and install buildings	14,333.83
c)	Cost to purchase and install foundations	125,019.77
d)	Cost to purchase and install piping	119,148.03
e)	Cost to purchase and install waste gas duct	736,004.06
f)	Cost to purchase and install pumps	45,966.04
g)	Cost to purchase and install fans	99,291.09
h)	Cost to purchase and install electrostatic precipitator	852,680.56
i)	Cost to purchase and install conditioning towers	162,417.94
j)	Cost to purchase and install tanks	177,404.94
	Total	$2,717,379.15

Plans and specifications for items a) through j) are in Tax Credit File No. T-883.

Construction of the claimed facility was started on August 9, 1974. The facility was placed in operation on December 23, 1975. Notice of Construction No. 524 covering the claimed facility was filed with the Department and was approved by the Department on July 29, 1974, Department File AQ 26-1841. The facility meets prior certification requirements.

Certification is claimed under current statutes and the percentage claimed for pollution control is 100%.

Facility cost: $2,717,379.15 (Accountant's certification was provided)

T-885

Date 4/22/77

State of Oregon

DEPARTMENT OF ENVIRONMENTAL QUALITY

TAX RELIEF APPLICATION REVIEW REPORT

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1. Applicant

Oregon Water Corporation
P. O. Box 1305
Roseburg, OR 97470

The applicant owns and operates a water treatment plant at Oakland, Oregon, processing Calapoola Creek water for consumption by the residents of the City.

2. Description of the Claimed Facility

The claimed facility consists of two settling ponds. The main pond has a capacity of 16,000 gallons. Settled solids may be removed mechanically for disposal. An adjustable floating overflow discharges to a second pond (3,000 gallons), which is used as a holding pond. This pond has an outlet to the creek but is checked for permit limit compliance before releasing clarified water.

The claimed facility was completed and placed in operation October 1, 1976. Certification is claimed with 100% of the cost allocated to pollution control.

Facility Cost: $11,804.00 (Certified Public Accountant's statement was attached to the application.

3. Evaluation of the Application

The facility design was based on an engineering report done by a consultant for Oregon Water Corporation to meet permit limits for settleable solids. The facility has reduced the settleable solids in the effluent from 16 ml/l to less than 1 ml/l.

Plans were approved and preliminary Tax Credit Certification was given by DEQ letter of 3/24/76.

There is no income to be derived from the claimed facility so that the only benefits are in pollution control.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate be issued for the facilities claimed in Application T-885, such certificate to bear the actual cost of $11,804.00 with 80% or more allocable to pollution control.

WDL:em
April 22, 1977

3. Evaluation of Application

Prior to installation of the claimed facility, the carbon anode plant was inadequately controlled so as to meet the Department's twenty percent opacity regulation for aluminum plant exhausts. The claimed facility was installed as part of a DEQ approved plant wide control strategy.

The claimed facility is operating satisfactorily as demonstrated by source test results and opacity observations. The test results are as follows:

	Emissions without Claimed Facility	Emission with Claimed Facility(Source tested 4/15/77
Particulate	364 #/day	13.2 #/day
Tars	1054	250
SO_2	1946	5.32
HF	809	2.46

The claimed facility has an annual operating cost of $145,229 and has an estimated useful life of 16 years.

No materials are recovered and no income is derived from the claimed facility. It is concluded that 100% of the cost of this facility is allocable to air pollution control.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate bearing the cost of $2,717,379.15 with 80% or more allocated to pollution control be issued for the facility claimed in Tax Credit Application No. T-883.

JAB:lb

Appl. T-886

Date 4/22/77

State of Oregon

DEPARTMENT OF ENVIRONMENTAL QUALITY

TAX RELIEF APPLICATION REVIEW REPORT

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1. Applicant

Oregon Water Corporation
P. O. Box 1305
Roseburg, OR 97470

The applicant owns and operates a water treatment plant at the Community of Winchester, Oregon, processing water from the North Umpqua River for consumption by the residents of the City of Roseburg and other surrounding communities.

2. Description of the Claimed Facility

The claimed facility consists of two settling ponds. The main pond has a capacity of 425,000 gallons. Settled solids may be removed mechanically for disposal. An adjustable floating overflow discharges to a second pond (15,000 gallons), which is used as a holding pond. This pond has an outlet to the North Umpqua River but is checked for permit limit compliance before releasing.

The claimed facility was completed and placed in operation September 9, 1976. Certification is claimed with 100% of the cost allocated to pollution control.

Facility Cost: $50,082.00 (Certified Public Accountant's statement was attached to the application).

3. Evaluation of Application

The facility design was based on an engineering report done by a consultant for Oregon Water Corporation to meet permit limits for settleable solids. The facility has reduced the settleable solids in the effluent from 16 ml/l to less than 1 ml/l.

Plans were approved and preliminary tax certification was given by DEQ letter of 3/24/76.

There is no income to be derived from the claimed facility so that the only benefits are in pollution control.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate be issued for the facilities claimed in Application T-886, such certificate to bear the actual cost of $50,082.00, with 80% or more allocable to pollution control.

WDL:em
April 22, 1977

Appl T-887

Date 4/28/77

State of Oregon
Department of Environmental Quality

Tax Relief Application Review Report

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1. Applicant

K. F. Jacobsen and Company, Inc.
2611 S. E. 4th Avenue
Portland, Oregon 97202

The applicant owns and operates an asphaltic concrete paving plant at 1208 North River Street in Portland, Oregon.

2. Description of Facility

The facility claimed in this application consists of a Wag Inc. Model 1951064 stationary baghouse. The facility cost consists of:

a.	Baghouse equipment, engineering and design	$ 55,634.00
b.	Structural housing and accessory equipment	30,886.00
c.	Installation	26,708.00
	TOTAL	$113,228.00

Plans and specifications are on file in AQ File No. 26-1764.

Construction of the claimed facility was started on January 15, 1973. The facility was placed in operation on February 15, 1976. The facility is not required to meet prior certification requirements since construction was started before October 5, 1973.

Certification is claimed under current statutes and the percentage claimed for pollution control is 100%.

Facility Cost: $113,228.00 (Accountant's certification was provided).

3. Evaluation of Application

Prior to installing the claimed facility the asphaltic concrete paving plant was equipped with a high efficiency venturi scrubber with the waste water being discharged into the Willamette River in violation of Department standards. The installation of the claimed facility eliminated the waste water discharge.

The baghouse has 1,064-14 oz. nomex bags providing 10,682 sq. ft. of cloth, and has a Pulse-Jet cleaning system with screw conveyor to reclaim dust. The system is designed to filter dryer air at an efficienty level of 99.9%+. Inspections of the plant by Department personnel have found the plant exhaust controlled by the claimed facility to be in compliance with Department Air Quality emission standards. The Department worked closely with K. F. Jacobsen and Company to bring the plant into compliance.

Because of the lack of available land area, discharge of the venturi scrubber water into the Willamette River could not be circumvented by constructing settling ponds and re-cycling the scrubber water. To solve a water pollution problem, the applicant switched his method of air pollution control from a venturi scrubber to a baghouse.

Dust captured by the claimed facility is returned to the asphaltic concrete hot-mix but has insignificant value. It is concluded that 100% of the cost of this facility is allocable to water pollution control.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate bearing the cost of $113,228.00 with 80% or more allocated to pollution control be issued for the facility claimed in Tax Credit Application No. T-887.

JAB:ds
4/28/77

Appl. T-888

Date 5/5/77

State of Oregon

DEPARTMENT OF ENVIRONMENTAL QUALITY

TAX RELIEF APPLICATION REVIEW REPORT

1. Applicant

Oregon Bulb Farms
Division of Melridge, Inc.
P. O. Box 529
Gresham, OR 97030

The applicant owns and operates a farm and processing plant for growing, harvesting, grading, packing, storing and shipping Hybrid Lily Bulbs, near Sandy, Oregon.

2. Description

The claimed facility for the treatment of bulb washing wastes consists of:

a. Collection Sump
b. Automatic Pump Station
c. 4-inch PVC Buried Pipe Line to Lagoon
d. Settling Lagoon (166 feet long by 56 feet wide)
e. Irrigation Pump and Piping with Non-Clog Sprinklers

The claimed facility was completed and placed in operation August 1976. Certification is claimed with 100% allocated to pollution control.

Facility Cost: $27,753.65 (Certified Public Accountant's statement was attached to the application).

3. Evaluation of Application

Bulb washing water was formerly discharged over a side hill and entered the Sandy River. With the installation, no water is discharged from the farm.

Plans were approved and preliminary tax certification was given by DEQ letter of June 7, 1976.

Staff has inspected the claimed facility and found it to be operating as required. There is no income derived from the claimed facility so the only benefits derived are in pollution control.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate be issued for the facility claimed in Application T-888, such certificate to bear the actual cost of $27,753.65 with 80% or more allocable to pollution control.

WDL:em
May 5, 1977

Appl T-892

Date 5/12/77

State of Oregon
Department of Environmental Quality

Tax Relief Application Review Report

1. Applicant

Lage Orchards, Inc.
2280 Eastside Road
Hood River, Oregon 97031

The applicant owns and operates a fruit orchard near Hood River, Oregon.

2. Description of Facility

The facility claimed in this application consists of an orchard fan system. The cost of the system is:

Tropic Breeze Wind Machines	
Model GP 391, Serial Numbers 67206, 67157, 67161	$31,667.00
Site Preparation	$ 174.50

The specifications for the orchard fan are on file in file T-892. The orchard fans are located 5 miles south of Hood River and one mile east of Highway 35.

Construction of the claimed facility was started on February 23, 1977 and was completed on April 9, 1977. The facility was placed in operation on April 9, 1977. A "Notice of Intent to Construct and Request for Preliminary Certification for Tax Credit" was filed by the applicant and it was approved by the Department on April 27, 1977, thus meeting the pre-notice requirement.

Certification is claimed under current statutes and the percentage claimed for pollution control is 100%.

Facility cost: $31,841.50 (Accountant's certification was provided).

3. Evaluation of Application

There is no law limiting the use of fuel oil fired heaters to control frost damage to fruit trees even though the heaters can cause a significant smoke and soot air pollution problem in the City of Hood River. The orchard farmers desire a secure, long range solution to frost control that includes the reduction or elimination of the smoke and soot nuisance caused by the use of heaters. An orchard fan, which serves 10 acres, reduces the number of heaters required for frost protection from 340 heaters to 100 perimeter heaters, a 70% reduction. The significant function of the fan is to provide a reduction in the use of heaters, which reduces emissions to the atmosphere.

An orchard fan blows warmer air from above an inversion level down into the trees. They have proven effective for frost control in the Pine Grove area of Hood River where frost control is needed on an average of 30 hours per year.

The operating cost of the claimed facility is slightly greater than the savings in the cost of fuel oil. It is concluded that more than 80% of the cost of this facility is allocable to air pollution control.

4. Director's Recommendation

It is recommended that a Pollution Control Facility Certificate bearing the cost of $31,841.50 with 80% or more allocated to pollution control be issued for the facility claimed in Tax Application No. T-892.

RP:ds
5/12/77

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

MEMORANDUM

TO: Environmental Quality Commission

FROM: Director

SUBJECT: Agenda Item D, May 27, 1977 EQC Meeting.

Variance Extension Request: Oregon Portland Cement Company, Huntington, Kiln No. 1 (File No. 01-0010) (OAR 340-21-015, 21-030 and 21-040).

Introduction

The Environmental Quality Commission at its May 23, 1975 meeting granted Oregon Portland Cement Company (OPC) a variance from Oregon Administrative Rules, Chapter 340, Sections 21-015 (opacity limitation), 21-030 (grain loading limitation), and 21-040 (process emission standard) until December 1, 1977 for Kiln No. 1 and for Kiln No. 2 until June 1, 1977 at their Huntington cement plant, staff report attached. OPC has now requested an extension in time to the above mentioned variance for Kiln No. 1 until December 1, 1980 or until their proposed new cement plant at Durkee begins production, whichever occurs first.

Background

OPC owns and operates a wet process cement manufacturing plant located along Interstate Highway 80-N about five miles north of Huntington, Oregon. The plant produces about 550 tons of cement per day and employs 110 people at full production.

The plant has two cement kilns, both of which are currently operating under a variance from the Department's opacity and particulate emission rules. The variance for Kiln No. 1 expires on December 1, 1977 and is the subject of this request for an extension. The variance had a provision that the expiration date be extended until September 1, 1978 if a decision to build a new plant was reached on or before September 1, 1975. Financial considerations precluded making that decision by September 1, 1975. The variance for Kiln No. 2, which has twice the production rate of Kiln No. 1, is to expire on June 1, 1977. OPC is just completing installation of a $725,000 electrostatic precipitator for Kiln No. 2 which is expected to bring it into compliance prior to its variance expiration date.

Because of efficiency and production limitations at the Huntington facility, and an improved financial situation, OPC has opted to build a new cement manufacturing plant at Durkee. They have applied to both EPA and DEQ for the necessary approvals and permits. The Huntington facility will be permanently closed down upon completion of the proposed new plant. The Company expects the new plant to be on line prior to December 1, 1980.

With the decision to build the new plant at a new site, some five miles south of Durkee, and the inability to recover their investment on control equipment and for other reasons, the Company has requested an extension of the variance for Kiln No. 1.

Discussion

With completion of the electrostatic precipitator for Kiln No. 2, the entire Huntington facility with the exception of Kiln No. 1 will be in compliance with the Department's air quality rules and the overall stack particulate emissions from kilns No. 1 and No. 2 will be reduced by more than 50% from the present level.

Departmental inspections of the OPC Huntington facility during the period of the current variance revealed both Kiln No. 1 and Kiln No. 2 to be in operation at normal rates with no violations of ambient air standards observed beyond the plant site. Continued operation of Kiln No. 1 beyond the original variance expiration date of December 1, 1977 until December 1, 1980 is not expected to cause violations of ambient air standards beyond the plant site.

The Company has stated in its application for a variance extension that continued operation of Kiln No. 1 is important to the construction industry in Eastern Oregon, Eastern Washington and Idaho as the cement supply in these areas has been short of demand since 1976 and is expected to remain so until the new Durkee plant goes into production. If OPC were not allowed to operate Kiln No. 1, the Company has said they could be faced with a loss of market that may be difficult to replace, and they could be forced into a layoff of some of the plant's labor force. The Company has also stated that the financial arrangements made for construction of the Durkee cement plant contemplated that Kiln No. 1 will continue to produce at a rate of 70-75,000 tons/year until the new plant comes on stream and loss of this much production would necessitate loan re-negotiation from a position of lessened economic strength on their part.

The cost of controlling Kiln No. 1 is estimated by the Company to be $775,000. This estimate is based on known cost of $725,000 for Kiln No. 2 control for similar air volume and construction conditions and with an inflation factor. Design, fabrication and installation of controls for Kiln No. 1 could take up to eighteen months.

The new ESP on Kiln No. 2 will be in service until the new plant goes into operation; therefore, it could not be used in construction of the new plant. Further, the design characteristics of this ESP is not the preferred type for the kiln at the proposed Durkee facility.

The Company estimates the salvage value of the existing Kiln No. 2 ESP to be not more than $50,000. If an ESP for Kiln No. 1 was installed, it would also have an estimated salvaged value of not more than $50,000.

The Company states, to require controls would result in closing down Kiln No. 1 on December 1, 1977.

If the proposed variance extension is granted, OPC's Air Contaminant Discharge Permit will be modified to reflect the conditions of the variance.

Conclusion

The granting of a variance extension for emissions from OPC's Kiln No. 1 at Huntington could be allowed in accordance with ORS 468.345 which states "The Environmental Quality Commission may grant specific variances which may be limited in time from the particular requirements of any rule, regulation or order...if it finds that...special circumstances render strict compliance unreasonable, burdensome or impractical due to special physical conditions or cause; or strict compliance would result in substantial curtailment or closing down of a business, plant or operation".

The extension is not expected to cause any violations of ambient air standards beyond the plant site.

Director's Recommendations

The Director recommends that the Environmental Quality Commission enter a finding that strict compliance is inappropriate because the cost of controlling emissions from Kiln No. 1 for the period from December 1, 1977 through December 1, 1980 would be unreasonable, burdensome or impractical, and to require such control would result in the closing down of the kiln, loss of markets, and re-negotiation of the financial arrangements made for construction of the proposed Durkee cement plant.

The Director further recommends that the Commission grant Oregon Portland Cement Company an extension to the variance granted at the Commission's May 23, 1975 meeting, to operate without further controls on Kiln No. 1 and out of compliance with Oregon Administrative Rules, Chapter 340, Sections 21-015, 21-030 and 21-040 until December 1, 1980 or until their new cement plant at Durkee begins production, whichever occurs first.

Bill

JAB:eve
Attachments (2)

WILLIAM H. YOUNG

OREGON PORTLAND CEMENT COMPANY
INCORPORATED 1915

111 S.E. MADISON STREET
PORTLAND, OR 97214
~~(503) 233-5353~~
(503) 232-3116

April 8, 1977

Department of Environmental Quality
1234 S. W. Morrison Street
Portland, OR 97205

Attention: Director, Air Quality Programs

RE: FILE 01-0010, KILN #1 VARIANCE REQUEST

Gentlemen:

Reference is made to our letter of March 3, 1977 in which we requested a variance from Condition #2 of subject ACDP. In response to a telephone request by your department additional information is supplied as follows:

1. If we were to proceed with control of Kiln #1 as rapidly as possible, we would expect the cost of the control to be $775,000.00. This estimate is based on known cost of $725,000.00 for Kiln #2 control for very similar air volume and construction conditions and with an inflation factor applied.

2. The new ESP on Kiln #2 at the Huntington Plant will be in service until the new plant is started in late 1979, at the earliest, or more realistically in 1980. Therefore, it could not be used in construction of the new plant. Further, the single chamber design is not the preferred unit for the proposed new kiln. The Kiln #2 ESP will have some salvage value providing the company can find a suitable application for it, or a sale for it, after 1980. That value is much less than the depreciated new cost due to the expenses and damages to be incurred in disassembling such a piece of equipment. We feel that the 1980 salvage value will be not more than $50,000.00 "where-is" and "as-is".

   If we were to construct an ESP for Kiln No. 1, the salvage value, assuming a need for it existed, would also be not more than $50,000.00.

3. We believe the variance is justified under ORS 468.345(b) and (c). The short usable life of a control facility for Kiln #1 does not justify the expenditure necessary to implement such a control. Without a variance Kiln #1 will be retired on December 1, 1977 and the plant labor force appropriately reduced.

Department of Environmental Quality April 8, 1977

4. As briefly mentioned in our March 3, 1977 letter, the financial arrangements made for construction of the Durkee cement plant contemplate that Kiln No. 1 will continue to produce at the rate of 70-75,000 tons/year until the new plant comes on stream. Loss of this much production would necessitate loan re-negotiation from a position of less strength on our part.

   Also, as previously mentioned, the loss of an additional 70,000 tons/year in 1978 and 1979 would adversely affect construction and employment in an area already short of cement.

If we can be of any further information in regard to the variance request, or if the above response requires elaboration, we would welcome the opportunity to meet with Department staff and provide such information.

Very truly yours,

OREGON PORTLAND CEMENT COMPANY

Edmond L. Miller

Edmond L. Miller
Assistant Vice President - Production

ELM/pk
cc: Frank Nash
Dick Cooke

File

OREGON PORTLAND CEMENT COMPANY

INCORPORATED 1915

March 3, 1977

Department of Environmental Quality
1234 S. W. Morrison Street
Portland, OR 97205

Attention: Director, Air Quality Programs

RE: FILE 01-0010, KILN #1 VARIANCE REQUEST

Gentlemen:

Under separate cover this date we are sending to your Department an application for an Air Contaminant Discharge Permit to allow us to construct a new cement plant on our Durkee, Oregon property.

You may recall that we held a series of discussions with the DEQ in early 1975 in which the construction of a new plant at Durkee and the closing down of our existing non-complying plant at Huntington was the focal point. As it turned out, we were unable to finance the new plant at that time and an Air Contaminant Discharge Permit for the Huntington plant was issued which required control for Kiln #2 by June 1, 1977 and control for Kiln #1 by December 1, 1977.

We are pleased that the economic situation has changed favorably since those 1975 discussions and we now have been assured of adequate financing and the new plant construction has been approved by our Board of Directors. It will be critical to us, however, to be able to continue to produce clinker in Kiln #1 at the Huntington plant until the new plant goes on stream in late 1980. It will also be very important to the construction industry in the market area we serve in Eastern Oregon, Eastern Washington and Idaho as cement supply was short of demand in that area in 1976 and is projected to become shorter each year until the Durkee cement plant goes into production.

For the reasons above given, we hereby request a variance from Condition No. 2 of ACDP #01-0010 to allow us to operate Kiln #1 with the existing level of control until December 1, 1980, or until the new Durkee cement plant is on stream, whichever is earlier.

We expect to meet the requirement for control of Kiln #2 somewhat ahead of schedule and overall stack emissions at the Huntington plant will be reduced by more than 50% when that control is implemented.

111 S.E. MADISON • PORTLAND, OREGON 97214 • (503) 233-5353

Department of Environmental Quality March 3, 1977

Early consideration by your Department of this request and for our new plant ACDP will be most appreciated. Please contact the writer for any further information that may be desired.

Very truly yours,

OREGON PORTLAND CEMENT COMPANY

Edmond L. Miller
Assistant Vice President - Production

ELM/pk

cc: Huntington Plant

ENVIRONMENTAL QUALITY COMMISSION

1234 S.W. MORRISON STREET • PORTLAND, ORE. 97205 • Telephone (503) 229-5696

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item H.2 for EQC Meeting of May 23, 1975

Oregon Portland Cement Co., Lime, Oregon
Variance Request - Extension of Compliance Schedule

BACKGROUND

Oregon Portland Cement Company owns and operates a wet process cement manufacturing plant located along U. S. Highway 80-N about 5 miles north of Huntington, Oregon. The plant produces about 550 tons of cement per day and employs 110 people at full production. Plant production generally parallels the construction activity in the Eastern Oregon and Boise, Idaho areas.

DISCUSSION

The cement plant includes a raw grind section, slurry tanks, two natural gas or coal-fired rotary kilns, a finish grind section, bins, silos, bagging and truck and rail loading facilities. A pozzolan cinder drier also operates infrequently at the site.

The exhausts from the two kilns, which are combined and discharged to the atmosphere via a 150 foot tall stack, are not in compliance with Department regulations and are not on an approved compliance schedule. The remainder of this facility is considered to be in compliance or an an approved compliance schedule. Therefore, only the kilns are being considered at this time.

Oregon Portland Cement Company and the Department began discussing the reduction of kiln emissions about a year ago during the process of developing an Air Contaminant Discharge Permit for the cement plant (see attached May 10, 1974 letter from OPC). At that time the Company indicated consideration had been given to controlling the kilns with either a precipitator or a baghouse, but decisions were not being made since long range plans were in the state of flux. During this period it was understood that the Company would be evaluating its long range plans and would submit a control program for the kilns as soon as practical.

A Notice of Construction for an electrostatic precipitator to control emissions from kiln No. 2 was submitted by the Company on December 26, 1974. The Company, on January 15, 1975, submitted additional information and requested a variance to operate kiln No. 2 at the existing level during the construction period. The Department approved the precipitator proposal by letter dated February 10, 1975 and began processing the variance request. Some five bids, subsequently obtained by the Company, indicated that the total installed cost of the precipitator would approximate $800,000 (letters attached).

In the January 15, 1975 correspondence, the Company also requested a variance to operate kiln No. 1 at the current emission level until its production would be supplemented by increased productivity at their Incom, Idaho plant. It was projected that kiln No. 1 would operate intermittently in response to market demand until permanent retirement in 1978 or 1979.

In early March the Company informed the Department that it wished to reassess its previous commitments due to the results of a recently completed long range planning study and the cost of the precipitator installation. Essentially, this study indicated that the existing cement plant should be replaced with a new modern facility. In a letter dated March 28, 1975, the Company indicated that it would make a decision regarding a new plant on or before September 1, 1975. Proposed schedules, one based on a decision to build and one based on a decision not to build, were also submitted.

The Company revised and expanded these schedules by copying the Department on a letter dated April 4, 1975 and addressed to the EPA. (Since the Huntington plant will not be in final compliance by July, 1975, and is not on a DEQ approved compliance schedule, the EPA has also been involved in this source.)

The proposed schedules and requested variances under consideration at this time are summarized below:

Case I - Based on a decision to build a new plant

A. Proposed Schedule

1. On or before September 1, 1975, decide to construct new plant.

2. By March 10, 1975, begin preliminary engineering (accomplished).

3. By September 1, 1975, begin design engineering.

4. By October 1, 1975, submit Notice of Construction and Application for Approval for air contaminant sources contemplated in new plant.

5. By February 1, 1976, issue purchase orders for major equipment.

6. By June 1, 1976, award construction contract, or contracts.

7. By August 1, 1976, begin construction.

8. By June 1, 1978, complete construction.

9. By September 1, 1978, demonstrate compliance with applicable air discharge standards.

B. Requested Variances

1. Kiln No. 1 - Until December 1, 1977.

2. Kiln No. 2 - Until September 1, 1978.

Case II - Based on a decision to defer building a new plant

A. Proposed Schedule

1. On or before September 1, 1975, decide to defer building a new plant.

2. By July, 1974, begin preliminary engineering for an electrostatic precipitator (ESP) for Kiln No. 2 (accomplished).

3. By December 26, 1974, submit Notice of Construction and Application for Approval for ESP (accomplished).

4. By September 1, 1975, begin design engineering for ESP.

5. By September 15, 1975, issue purchase order for ESP.

6. By January 1, 1977, award construction contract.

7. By January 15, 1977, begin construction.

8. By May 1, 1977, complete construction.

9. By June 1, 1977, demonstrate compliance with applicable air discharge standards.

10. By December 1, 1977, cease operating Kiln No. 1 without controls adequate to achieve compliance.

B. Requested Variances

1. Kiln No. 1 - Until December 1, 1977.

2. Kiln No. 2 - Until June 1, 1977.

ANALYSES

Oregon Administrative Rules, Chapter 340, Sections 21-015, 21-030 and 21-040 limits the amounts of particulates emitted from industrial processes. Cement Kiln No.'s 1 and 2 at the Oregon Portland Cement Company plant along U. S. Highway I-80N north of Huntington, Oregon are not capable of complying with these limits as currently equipped. Therefore, the Company has proposed compliance schedules to correct this matter and requested appropriate variances to allow legal operation in the interim.

The Department has reviewed the proposed schedules for both Case I and Case II, including the decision on constructing a new plant and designing, procurring and installing equipment, and did not see any obvious way whereby they might be shortened. A new modern plant (Case I) is considered by the Department to be the preferred long term solution. Should this be deferred (Case II), the precipitator would provide adequate control for kiln No. 2.

The economic importance of the plant includes being the major employer in the Huntington area, plus the major supplier of cement for the construction activity in the eastern Oregon - Boise, Idaho area.

Particulate emissions from the plant are not known to cause any adverse effects except for aesthetics in the area near the plant. The current emissions are not suspected of causing any violations of ambient air quality standards beyond the site area.

Forasmuch as Oregon Revised Statutes (ORS) Chapter 468.345, 1974 Replacement Part, "Variances From Air Contaminant Rules and Regulations", paragraph (1) states:

> "The Environmental Quality Commission may grant specific variances which may be limited in time from the particular requirements of any rule, regulation or order...if it finds that special circumstances render strict compliance unreasonable, burdensome or impractical due to special conditions or cause; or strict compliance would result in substantial curtailment or closing down of the business, plant or operation.",

Oregon Portland Cement Company has petitioned the Environmental Quality Commission for variances from Oregon Administrative Rules, Chapter 340, Sections 21-015, 21-030 and 21-040 to operate kilns 1 and 2 at its cement plant near Huntington, Oregon.

SUMMARY AND CONCLUSIONS

1. Oregon Portland Cement Company operates a two kiln wet process, cement manufacturing plant near Huntington, Oregon. This facility has a significant impact on local economics.

2. The company is considering the construction of a new dry process plant. A decision on whether or not to start construction will be made on, or before, September 1, 1975.

3. If the new plant is to be constructed, kilns 1 and 2 would be permanently phased out by December 1, 1977 and September 1, 1978, respectively.

4. If the new plant is not to be constructed, kiln No. 1 would be permanently phased out or not operated in non-compliance by December 1, 1977 and kiln No. 2 would be controlled by June 1, 1977.

5. The company has requested variances for kilns No. 1 and No. 2 with the appropriate time limits as necessitated by the dates in 3. and 4. above.

6. The granting of this variance by the Environmental Quality Commission would be allowable in accordance with ORS 468.345.

7. The requested variances are not expected to cause any violations of ambient air standards beyond the plant site area.

8. The results of the Commission action regarding the proposed schedules and requested variances will be incorporated in the Air Contaminant Discharge Permit upon its issuance for this facility.

DIRECTOR'S RECOMMENDATION

It is the Director's recommendation that the proposed schedules be accepted and variances from Oregon Administration Rules, Chapter 340, Sections 21-015, 21-030 and 21-040 be granted to the Oregon Portland Cement Company plant near Huntington for kiln No. 1 until December 1, 1977 and for kiln No. 2 until June 1, 1977 with the provision that the latter date be extended to September 1, 1978 if a decision to build a new plant is reached on or before September 1, 1975.

KESSLER R. CANNON
Director

Attachments - Oregon Portland Cement Company-DEQ correspondence in reverse chronological order

FAS:h

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

MEMORANDUM

TO: Environmental Quality Commission

FROM: Director

SUBJECT: Agenda Item No. E, May 27, 1977 Meeting - City of Happy Valley, Staff Report on Sewage Disposal Program

In March 1973, staff members of the DEQ conducted a sanitary sewage survey of the City of Happy Valley and its environs. This survey documented a sewage disposal problem. For several reasons the City has not proceeded with a Facilities Plan to study the alternatives to alleviate this situation.

Background

The Department's significant activities with Happy Valley may be summarized as follows:

Date	Action
1963-1967	Hearings on formation of Clackamas County Service District No. 1; originally the boundaries of the District were to coincide with the natural drainage basin of Mt. Scott and Kellogg Creek, including the City of Happy Valley, and to provide sewerage service for the City of Milwaukie.
March 24, 1967	Voters of the District voted to form Clackamas County Service District No. 1.
October 17, 1972	Due to a failure in proper election notification, the City of Happy Valley was not included. As a result, an election was held in Happy Valley on October 17, 1972 on the issue of whether to annex to the Service District. Voters by a wide margin (328-50) turned down this annexation proposal.

December 17, 1972

The Department felt that due to the soil and topographic conditions, high groundwater table and other factors, deficiencies may exist in the proper operation of the subsurface sewage disposal systems. Accordingly, the Department conducted a sampling survey of the drainage ditches and creeks in and adjacent to the city limits of Happy Valley. This survey revealed significant amounts of coliform, fecal coliform and fecal strep bacteria which indicates that contamination exists.

March 5-9, 1973

In order to substantiate the nature and extent of a sewage disposal problem, the Department with the assistance of Clackamas County sanitarians and soil scientists conducted a detailed survey of individual subsurface sewage disposal systems. This survey revealed:

No. Units Surveyed	227	
No. Units Satisfactory	97	42.7%
No. Units Unsatisfactory	93	41.0%
No. Units Questionable	37	16.3%

May 11, 1973

Report of above survey (Attachment 1) entitled, "Sanitary Survey - Happy Valley and Its Environs" sent to Mayor and City Council.

July 23, 1973

Meeting with Mayor and City Council of Happy Valley. Happy Valley indicated that the City would develop an answer to the report.

March 13, 1974

City of Happy Valley submitted report entitled, "Environmental Preservation and Improvement Plan - Happy Valley, Oregon". Upon receipt of this plan it was indicated to Happy Valley that because the use of individual package treatment plants were proposed and because it was the Department's intent to prepare and adopt regulations relative to alternate sewage treatment systems, it would be best to wait until these regulations were finalized before responding and completing our review of this plan.

May 1, 1975	The Department received Brown & Caldwell, Consulting Engineers, report entitled, "An Evaluation of Alternatives for On-Site Sewage Treatment & Disposal".
June 24, 1975	The Department reviewed and commented on the plan as submitted by the City of Happy Valley. It should be noted that the City of Happy Valley did not have the information as presented in the Brown & Caldwell report. Briefly, the Department requested the City of Happy Valley to review and revise its plan.
September 1, 1975	Alternate Sewage Treatment Systems regulations became effective.
September 15, 1975	Meeting with City of Happy Valley residents. (Approximately 500-600 citizens were present.) Mayor and City Council agreed to proceed with Facilities Plan.
March 29, 1976	DEQ certified grant application to EPA.
May 11, 1976	EPA awarded grant for Step I Facilities Plan. Projected time schedule for completion was approximately 6 months.
May 21, 1976	Department submitted report (Attachment 2) entitled, "Soils and Geological Study, Happy Valley, Clackamas County, March 1976" to Happy Valley. Information contained in that report would be used as basic data in Happy Valley's Facilities Plan.

Since May 1976, Happy Valley's consultant, Michael E. Bye, P.E., Engineered Concepts, Inc., has gathered basic data but essentially has awaited resolution of land-use designation before proceeding. The Columbia Region Association of Governments (CRAG) is expected to resolve the land-use designation for Happy Valley at the CRAG Board of Directors meeting scheduled for May 26, 1977.

Evaluation

1. There is a serious, widespread sewage disposal problem in the City of Happy Valley and the surrounding area.

2. Cascade and Powell silt loam soils are not suitable for installation of standard subsurface sewage systems because of excessive slope and a firm fragipan with slow permeability that perches water in the soil profile from December to April. These soil classifications exist in approximately 90% of the land area.

3. Saum silt loam is generally permeable enough and deep enough to be suitable for installation of standard subsurface sewage disposal systems. This soil exists in approximately 10% of the land area.

4. No substantial progress has been made toward completion of a Facilities Plan to study the alternatives to alleviate the sewage disposal problem.

5. The land-use planning process has also been undergoing evaluation since 1975. CRAG adopted their "Land-Use Framework Element" on December 22, 1976. On that date CRAG also entered into a contract with a consultant, Wilsey & Ham, to provide the CRAG Board with information to assist in resolving the issue of what land-use designation should be made in the Happy Valley/Rock Creek Study Area on the Regional Land-Use Framework. A final decision on land designation is expected to be made at the CRAG's Board meeting on May 26, 1977.

Conclusion

1. The City has not proceeded with preparing the facility plan. Of paramount concern to the local citizens is that the land designation issue should not be resolved "fait accompli" by the installation of a conventional gravity sewer system but through the land-use process.

2. Since CRAG is expected to complete land designation by May 26, 1977, the opportunity now exists to resolve both issues in a coordinated approach.

3. To assure timely resolution and to assure that grant monies, if available, would allow rapid design and construction of the needed facilities, a definite time schedule should be established to alleviate the sewage disposal problem.

Director's Recommendation

The EQC should instruct the staff of the Department in cooperation with the City of Happy Valley to develop an agreement in the form of a consent order requiring the City to alleviate their sewage disposal problem as soon as practicable but by no later than the following time schedule:

1. Submit final Facilities Plan and a completed Step II Grant Application by no later than six (6) months after CRAG land-use designation decision.

2. Submit final Engineering Plans and Specifications and a completed Step III Grant Application six (6) months after award of Step II Grant.

3. Complete construction of sewerage facilities twelve (12) months after award of Step III Grant.

If the City and the Department cannot work out a voluntary agreement then this matter should be scheduled before the Commission at their next meeting so that an order may be entered to alleviate the sewage disposal problem.

WILLIAM H. YOUNG
Director

REG:eve
5/10/77

Attachments (2)

1) "Sanitary Survey - Happy Valley and Its Environs"
2) "Soils and Geological Study, Happy Valley, Clackamas County, March 1976"

SANITARY SURVEY
HAPPY VALLEY AND ITS ENVIRONS

BACKGROUND

During 1963 in response to concerns of possible contamination of Kellogg Creek, the Clackamas County Health Department conducted water quality surveys of the drainage basin. These surveys, an example of which is shown in Table I, and investigation of individual subsurface sewage disposal system based on complaints revealed that problems with the proper functioning of the septic tank and drainfield systems existed.

Subsequently, several public meetings were held throughout the drainage basin involving the Oregon State Sanitary Authority (now the Department of Environmental Quality), Clackamas County Board of County Commissioners, and Clackamas County's Health, Public Works, and Planning Departments. The first of these public meetings was conducted on April 2, 1964. As a result of this and many other meetings, the voters of the district voted on March 24, 1967 to form Clackamas County Service District No. 1.

Originally the boundaries of the service district were to include all the area within the Mt. Scott-Kellogg Creek Drainage Basin as well as to provide service for the City of Milwaukie.

However, due to a technicality involving improper election notification procedures, the incorporated community of Happy Valley was not included. On October 17, 1972 an election was held in Happy Valley on the issue of whether or not to annex to the Service District. Voters by a wide margin (328-50) turned down the annexation proposal.

In the interim period, Clackamas County Service District No. 1 employed CH_2M/Hill, consulting engineers, to design the interceptors and sewage treatment facilities. In order to be responsive to the area's regional sewage disposal problems, the facilities were designed and are presently being constructed so that they can ultimately serve the City of Happy Valley.

Because of its knowledge of polluted conditions in Mt. Scott and Kellogg Creeks and of the soil conditions, high ground water table, and other factors which combine to cause deficiencies in the proper operation of the subsurface sewage disposal systems the Department conducted a sampling survey of the drainage ditches and creeks in and adjacent to the city limits of Happy Valley. This survey was conducted on December 17, 1972; the results (Table II) verified that a serious, widespread sewage disposal problem exists.

In order to further substantiate the nature and extent of the problem the staff of the DEQ with the assistance of Clackamas County sanitarians and soil scientists conducted a detailed survey of area sewage disposal systems during the period of March 5 through 9, 1973.

SURVEY AREA

The area survey included the entire City of Happy Valley and some fringe areas in Clackamas County.

Mt. Scott Creek flows through the center of Happy Valley and approximately three (3) miles southwest of the city enters Kellogg Creek which empties into the Willamette River.

BRIEF DESCRIPTION - SEPTIC TANK AND DRAINFIELD SYSTEM

In Oregon and in particular, Happy Valley, the predominate method of subsurface sewage disposal incorporates the septic tank and drainfield system. "A septic tank system is simple enough in theory. Wastes from the bathroom, kitchen and laundry flow into an underground tank where bacteria, by a natural process of digestion, convert part of the bulk to gas. The gas is vented to the air, the heavier solids settle to the bottom of the tank as sludge and the lighter ones float to the top to become scum.

When leftover liquid, called effluent, reaches a certain level, it flows from the tank into a system of open-jointed or perforated pipes beneath the ground. The buried pipes distribute the liquid through the drainfield (absorption field) so that it can be soaked up by the surrounding earth."

It should be clearly understood that a septic tank does not make sewage fit to drink. In fact, it is the crudest type of treatment device. Septic tank effluent contains sewage particles (fine settable and suspended solids) and may also

contain harmful (pathogenic) bacteria which cause typhoid fever, dysentery, and other gastrointestinal diseases. A septic tank functions by conditioning sewage so that it will percolate into the ground without clogging the pores of the soil. During the effluent absorption process, the organic substances including bacteria in the effluent are acted upon by soil organisms. Oxidation of the organic materials in the zone of aeration of porous soils results in chemical products that dissolve and are absorbed into the soil. Absorption of the effluent into the soil is an essential part of a successfully operating septic tank and drainfield system.

AREA GEOLOGY AND SOILS RELATIVE TO SUBSURFACE SEWAGE DISPOSAL SYSTEMS

Soil maps and soil evaluation data prepared by the United States Department of Agriculture Soil Conservation Service show that the entire Happy Valley area surveyed is rated as having severe limitations for use of septic tank and drainfield systems.

The reasons given for rating the area as severely limited for subsurface sewage disposal are: excessive slope, restrictive layer (fragipan) at 20 to 30 inches, high fluctuating water table during winter and early spring, and slow to very slow permeability.

Experience has shown that for a single family residence a flow of 400 gallons per day can be expected. This volume of

liquid waste waters and with precipitation of approximately 40 inches per year coupled with the topographic and soil conditions listed above results in the overloading of the soils' capacity for absorption.

Specifically in Happy Valley during the seasons with high precipitation a perched water table is typically formed on top of the restrictive layer. These rising water tables perched on the restrictive layers will impair the effluent storage voids in the drain rock and by reducing the opportunity for air to reach the effluent in order to oxidize the organic material. This leads to rapid clogging of the soil and either surfacing of sewage effluent and/or rapid seepage of inadequately filtered sewage into road cuts or drainage ditches.

In addition, terracing and landscaping in some areas of Happy Valley where the drainfield (absorption fields) are located results in allowing sewage effluent to surface. If the soil where the drainfield is located is scalped (truncated) the surfacing free water from the perched water tables contains inadequately filtered sewage. If the soil where the drainfield is located is filled when the fill becomes saturated, surfacing water occurring at the toe of the fill contains inadequately filtered sewage.

METHOD OF EVALUATION

Five (5) survey teams consisting of personnel from the DEQ and Clackamas County covered designated areas of Happy Valley and its environs. Prior to the actual field investigations, it was decided that each team should attempt to physically inspect approximately 50 percent of the dwelling units within its assigned area. These survey teams and the area each team covered by tax lot maps are found in Table III.

The survey consisted of attempting to contact the occupants of each dwelling or occupied structure which would be a source of domestic waste. A standard data sheet was used to obtain information about the sewage disposal systems from the occupants. Where it was not possible to contact the occupant, the lot was inspected to find out as much as possible about the sewage disposal system's operation and performance based strictly on direct observation. Return visits were not made in case of no response.

From the individual lot and premises inspection, each disposal system was rated satisfactory, questionable, or unsatisfactory. A "satisfactory" rating resulted under the following conditions:

1. No visible discharge of sewage onto the ground or into a ditch or drainageway.

2. No detectable sewage odor around the drainfield area.

Conversely, an "unsatisfactory" rating resulted under the following conditions:

1. A visible discharge of sewage onto the ground surface or into a ditch or drainageway.
2. A detectable sewage odor around the drainfield area.

Disposal systems were rated "questionable" in cases of observed conditions of adverse soil, high ground water occurrence, excessive slope, close proximity to steep ravines, limited area for drainfield system, and/or other hazardous conditions.

In addition, where the occupant refused admittance the disposal system was rated questionable unless observations of the drainage system or roadway cuts revealed direct discharges, where then the systems was rated unsatisfactory. Only 12 occupants denied access to their property, all of these within the city limits of Happy Valley. This represents 5.3 percent of the units surveyed.

Where discharges were suspect and access was available, the failure of the subsurface sewage disposal was verified by flushing a bright colored (fluorescein) dye into a bathroom toilet or sink. The dye mixed with the waste water and then the surfacing sewage effluent could then be detected and traced by the appearance of the dye in the discharge or seepage. Where discharges were obvious as to its origin and nature, the dye was not utilized.

Either pictures were taken of the direct discharges or seepages and/or bacteriological samples were collected where seepages or outfalls were suspected of containing sewage, where dye confirmed sewage malfunctions, and within ditches and drainageways. The primary purpose of collecting these samples was to supplement the survey findings by laboratory determination of the presence of sewage.

Tests run on the samples include: total coliform, "fecal" coliform, and fecal streptococci. All tests were run in the Public Health Laboratory, Oregon State Board of Health. The test results were expressed in terms of "most probable number" of organisms (MPN) per 100 ml. of the sample. The bacteriological results are indicated in Table IV.

RESULTS

The results of the detailed community sewage disposal survey for Happy Valley and its environs are indicated below:

Number of units surveyed	227
Number of units satisfactory	97 (42.7%)
Number of units unsatisfactory	93 (41.0%)
Number of units unsatisfactory where occupant refused admittance	5
Number of units questionable	37 (16.3%)
Number of units questionable where occupant refused admittance	7

In summary, 93 units or 41.0 percent of the units surveyed were verified as being unsatisfactory. One hundred and thirty (130) units (93 + 37) representing 57.3 percent of the total numbers of units surveyed were found failing or were classified as questionable. A further breakdown of the survey according to areas can be found in Table V.

For the incorporated community of Happy Valley the results for the detailed community sewage disposal survey are indicated below:

Number of units surveyed	182
Number of units satisfactory	76 (41.8%)
Number of units unsatisfactory	70 (38.4%)
Number of units unsatisfactory where occupant refused admittance	5
Number of units questionable	36 (19.8%)
Number of units questionable where occupant refused admittance	7

In summary, 70 units or 41.8 percent of the units surveyed were verified as being unsatisfactory. One hundred and six (106) units (70 + 36) representing 58.2 percent of the total number of units surveyed were found failing or were classified as questionable. A further breakdown in the survey according to areas can be found in Table VI.

It should be noted that this survey was conducted during March 1973 and that this was one of the lowest precipitation

seasons in quite some time. It would be expected that under normal rainfall conditions the soil would be saturated to a greater extent then that observed during the period of this particular survey.

A display showing the areas each survey team covered has been prepared. A brief description of each area is given below:

AREA A

Area A of the survey tract was that portion south of Clatsop to Lucille Street from 132nd to 145th. The majority of the lot sizes were 20,000 square feet and the houses were in general built over five years ago.

The individual subsurface sewage disposal system failures indicated for Area A in Table V and VI are dispersed throughout the area and are not confined to any one section, although the greatest percentage (7 out of 12) of failures occurring within the city limits are located on Lucille (3), Portland View Place (2), and 139th (2).

AREA B

Area B of the survey tract can best be divided up into two separate portions. Tract 1 was that portion south of Kanne Road to Ridgecrest and Callahan Road from 132nd to 145th. Tract 2 was that portion south of Clatsop to Lucille on 132nd and that

portion south of the city limits to Ridgecrest from 121st and 127th including Ridgecrest Court.

The lot sizes in the Kanne Road and Valemont Lane area varied from 10,000 to 20,000 square feet, with the majority of the homes being built between 10 to 15 years ago. The lot sizes in the rest of Area B were predominately in the 30,000 to 40,000 square foot range with the homes in general being built over five years ago.

The individual subsurface sewage disposal system failures indicated for Area B in Table V and Table VI are dispersed throughout the area and are not confined to any one section, although the greatest percentage (7 out of 9) of failures occurring within the city limits are located on Kanne (4), Ridgecrest and Ridgecrest Court (3).

AREA C

Area C of the survey tract can best be divided up into two separate portions. Tract 1 was that portion south of Callahan Road to Ridgecrest from 127th to 132nd. Tract 2 was that portion south of Ridgecrest and Callahan from Mt. Scott Boulevard to 145th.

The lot sizes varied from 15,000 square feet to over 5 acres; however, the majority are in the 25,000 to 40,000 square foot range. Most of the homes were built 10 to 20 years ago,

although 10 homes were built less than three years ago. The majority of these newer houses are located outside of the city limits on Callahan.

The individual subsurface sewage disposal system failures indicated for Area C in Table V and Table VI are dispersed throughout the area and are not confined to any one section, although the greatest percentage (12 out of 16) of failures occurring within the city limits are located on Mt. Scott Boulevard (4), 132nd (4), and Ridgecrest (4). Of particular note, the relative new area outside the city limits in the Callahan section revealed the following results: total number of units inspected - 8; total number of units satisfactory - 5; total number of units unsatisfactory - 2; total number of units questionable - 1.

AREA D

Area D of the survey tract essentially was that portion south of the city limits of Happy Valley to Idleman from 102nd to Mt. Scott Boulevard. The majority of the lot sizes were in the 20,000 to 40,000 square foot range with the houses in general being built over five years ago.

The individual subsurface sewage disposal system failures indicated for Area D in Table V and Table VI are dispersed throughout the area and are not confined to any one section,

although the greatest percentage (13 out of 15) of failures occurring within the city limits are located on Idleman (5), Walnut Drive (4), and Cresthill (4).

AREA E

Area E of the survey tract was that portion south of Idleman and King Road to the city limits of Happy Valley from 107th to 134th. Area covered outside the city limits included that portion north of Sunnyside Road from Valley View Terrace to 122nd and King Road from 134th to 145th.

The lot sizes varied from 10,000 square feet to over 5 acres; however, the majority are in the 30,000 to 40,000 square foot range. Most of the homes were built over five years ago, although newer homes predominate in the Valley View Terrace, Lavona Court, Lenora Section.

The individual subsurface sewage disposal system failures indicated for Area E in Table V and Table VI are dispersed throughout the area and are not confined to any one section, although the greatest percentage (10 out of 18) of failures occurring within the city limits are located on 129th (6) and 122nd (4). Of particular note, the relative new area within the city in the Valley View Terrace Section revealed the following results: total number of units inspected - 10; total number of units satisfactory - 4; total number of units unsatisfactory - 4; total number of units questionable - 2.

CONCLUSIONS

1. Soil and topographic conditions that exist in the Happy Valley area are adverse to the proper functioning of individual subsurface sewage disposal systems.
2. Fourty-one percent (93 units) of the subsurface sewage disposal systems surveyed in the Happy Valley area were not functioning properly and were in fact discharging sewage onto the surface of the ground or into a ditch or drainageway.
3. The discharge of sewage including septic tank and disposal field effluent onto the ground surface is in violation of Oregon Revised Statutes (ORS) Sections 449.105 and 449.150 and Oregon Administrative Rules (OAR) Section 41-015 and such discharges constitute a definite public health hazard.
4. The discharge of sewage including septic tank effluent onto the ground surface such that the waste waters are likely to escape or be carried into the waters of the State or the discharge of sewage into a ditch or drainageway is in violation of ORS Section 449.079 and 449.150 and OAR Chapter 340 Section 41-025 and such discharges constitute pollution of public waters, in particular, Mt. Scott Creek and its tributaries and Johnson Creek and its tributaries.

5. Sewage wastes for Happy Valley and its environs should be collected, treated, and disposed of in accordance with an area-wide plan. The wastes should be treated in a large, properly located, and highly efficient sewage treatment plant and discharged to an adequate receiving stream. Since Clackamas County Service District No. 1 has been formed, interceptors and sewage treatment facilities have been designed to ultimately serve Happy Valley and since these facilities are presently under construction this regional sewerage system is the logical and only acceptable alternative for proper sewage disposal.
6. Continued attempts to "get by" on septic tank and drainfield systems would result in continued area and water pollution with attendant sanitation and health hazards, severely restricted and inequitable use of lands, repeated failures of subsurface sewage disposal systems and overall higher sewerage costs.

RECOMMENDATIONS

It is the recommendation of the DEQ that the City of Happy Valley take immediate steps to either:

1. Annex to Clackamas County Service District No. 1 and/or

2. Contract with Clackamas County Service District No. 1 for sewerage service, and
3. The City of Happy Valley and/or Clackamas County should explore the possibility and if feasible enter into an agreement with the City of Portland for sewerage service in that area where the natural drainage is toward Johnson Creek. If not feasible the use of pump stations and force mains to the gravity sewer lines flowing toward Mt. Scott Creek should be implemented as an interim measure until gravity sewer lines become available in the Johnson Creek drainage system.

DEQ
5/10/73

Table I

Kellogg Creek Water Quality Survey
October 9, 1963

Sampling Location on Kellogg Creek	Total Coliform MPN/100 ml.
Head of Kellogg Lake	>7,000
Clackamas Road Extension	230
Thiessen Road	7,000
Rusk Road	620
S. E. Aldercrest	>7,000
Keuhn Road	>7,000

Table II

Happy Valley Drainage Survey
December 17, 1972

Sample Location	MPN/11 ml. Total Coliform	Fecal Colifrom	Fecal Streptococci
Mt. Scott Cr. @ Sunnyside Rd.	13,000	2,300	7,000
12200 S. E. 122	1,300	230	7,000
Mt. Scott Cr. @ S. E. 122nd Ave.	24,000	620	2,400
Mt. Scott Cr. (trib.) @ intersection of S. E. 122nd & King (12908 S. E. King)	24,000	620	130
Greiner Ln. (trib. Mt. Scott Cr.)	2,300	620	2,400
Catch basins runoff @ Idleman Rd. and Walnut Rd.	620	1,300	7,000
11660 Idleman Cr. at Culvert N.W.	2,300	2,300	7,000
Ditch @ 11660 Idleman	60	<45	7,000
Ditch @ crossing of Idleman and Tyler @ (11780)	230	<45	7,400
Cr. N. of Clover Ln.	2,300	2,300	2,400
Cr. @ Green House of private property @ Clover Ln.	<45	<45	230
Seepage west of Green House @ private property of Clover Ln.	60	<45	60
Clover Ln. ditch @ crossing of Clover Ln. Idleman	230	230	2,400
Ditch @ Mt. Scott Blvd. Cemetery	7,000	6,200	>7,000
Ditch at crossing of Ridgecrest Ct. and Ridgecrest Rd.	500	500	620

Table II (Cont.)

Sample Location	MPN/11 ml. Total Coliform	Fecal Coliform	Fecal Streptococci
Ditch at crossing of S. E. 132 and Ridgecrest Rd. (from Ridgecrest)	6,200	230	1,300
Ditch at crossing of S. E. 132 and Ridgecrest Rd. (from S. E. 132)	24,000	620	2,400
Ditch at crossing of S. E. 132 and S. E. Lucille St.	24,000	620	7,000
Dead End of Margie Way	2,300	230	620
Portland View Pl. at S. E. 139	6,200	6,200	620
Ditch of crossing of S. E. 138 and S. E. Kanne	24,000	500	2,400
Drain basin at 13645 S. E. Kanne	70,000	620	7,000
Dead End of Callahan Rd.	6,200	1,300	>7,000
Ridgecrest Rd. at 13901 Post	>70,000	230	>7,000
Ditch at 9750 S. E. 145th (Start Mt. Scott Cr.)	1,300	230	7,000
Ditch at S. E. King nr. the school at 13865	>70,000	6,200	7,000
Mt. Scott Cr. @ S. E. King	24,000	620	2,400
Ditch @ crossing S. E. 132 and S. E. King	6,200	230	210

Table III

Happy Valley Sanitary Survey
SURVEY TEAMS

Team	Personnel	Representing	Tax Lot Maps*
A	R. H. Whitmore	Sanitarian, Clack. Co.	25B-26AB
	J. A. Marshall	Soil Scientist, Clack. Co.	
B	W. H. Doak	Soil Scientist, Clack. Co.	26AC-26BC
	P. S. Wong	Engineer, DEQ	
C	R. E. Gilbert	Engineer, DEQ	26BD-26DD
	C. H. Glaisyer	Sanitarian, Clack. Co.	
D	D. W. O'Guinn	Sanitarian, DEQ	27
	P. L. Hanrahan	Sanitarian, Clack. Co.	
E	B. R. Vaughan	Sanitarian, Clack. Co.	34-35
	L. D. Patterson	Engineer, DEQ	

* Tax Lot Maps cover T1S, R2E with the Section as designated in the Table.

Table IV

HAPPY VALLEY SANITARY SURVEY
BACTERIOLOGICAL RESULTS

Survey Team	Location	Date Collected	Total Coliform	Fecal Coliform	Fecal Streptococci
A	8915 S. E. 145th	3/5/73	600	<450	450
A	13920 Portland View Terrace	3/5/73	>70,000	>70,000	2,300
A	8788 S. E. 137th	3/6/73	>70,000	24,000	6,200
A	8844 Margie Way	3/6/73	>70,000	600	<450
A	13320 Lucille Street	3/6/73	<450	<450	460
B	13623 Kanne	3/5/73	24,000	<450	2,300
B	9085 137th	3/5/73	70,000	600	2,300
B	13328 S. Kanne Road	3/5/73	>70,000	70,000	6,200
B	9462 Ridgecrest	3/6/73	>70,000	>70,000	>23,000
B	13310 Callahan	3/6/73	70,000	6,200	<450
B	13215 Valemont	3/6/73	>70,000	>70,000	>70,000
C	9311 S. E. 132	3/5/73	>70,000	>70,000	2,300
C	9242 S. E. 129th	3/5/73	2,300	600	<450
C	12801 S. W. Callahan	3/5/73	>70,000	>70,000	5,000
C	9415 S. E. 132	3/5/73	>70,000	>70,000	6,200
C	12668 Ridgecrest Road	3/5/73	70,000	24,000	<450
C	12868 Ridgecrest Road	3/5/73	>70,000	>70,000	2,300
C	12976 Ridgecrest Road	3/5/73	24,000	6,200	600
C	13048 Ridgecrest Road	3/5/73	70,000	2,300	940
C	12440 S. E. Ridgecrest	3/6/73	>70,000	>70,000	<450
C	12320 S. E. Mt. Scott	3/6/73	>70,000	70,000	460
C	12340 S. E. Mt. Scott	3/6/73	>70,000	>70,000	600
C	12345 Greiner Lane	3/6/73	>70,000	24,000	13,000
C	12600 S. E. Mt. Scott	3/6/73	21,000	21,000	2,800
C	10125 S. E. 132nd	3/6/73	70,000	6,200	6,200
C	9595 S. E. 132nd	3/6/73	>70,000	>70,000	70,000

Table IV (Cont.)

Survey Team	Location	Date Collected	Total Coliform	Fecal Coliform	Fecal Streptococci
C	10222 S. E. 132nd	3/7/73	>70,000	24,000	450
C	9940 S. E. 132nd	3/7/73	>70,000	>70,000	>70,000
C	13729 S. E. King Road	3/7/73	>70,000	>70,000	<450
C	13675 S. E. King	3/7/73	>70,000	2,300	<450
C	9710 S. E. 132nd	3/7/73	>70,000	>70,000	24,000
C	13910 S. E. Callahan	3/7/73	>70,000	24,000	7,000
D	11890 Idleman Road	3/5/73	600	<450	<450
D	12003 Idleman Road	3/5/73	>70,000	24,000	<450
D	11780 S. E. Idleman	3/5/73	>70,000	24,000	5,000
D	10160 Cresthill	3/5/73	>70,000	>70,000	>70,000
D	11470 S. E. Clover Lane	3/6/73	70,000	1,300	2,300
D	10505 S. E. Walnut Drive	3/6/73	>70,000	24,000	24,000
D	10193 Walnut Drive	3/6/73	>70,000	>70,000	70,000
D	10234 Walnut Drive	3/6/73	>70,000	>70,000	2,300
D	10260 Idleman	3/6/73	>70,000	>70,000	70,000
D	11920 Mt. Scott Blvd.	3/7/73	>70,000	>70,000	>70,000
E	12110 S. E. Valley View	3/5/73	70,000	24,000	<450
E	12560 S. E. 122nd	3/5/73	>70,000	>70,000	6,200
E	12377 S. E. 122nd	3/5/73	>70,000	>70,000	>70,000
E	12200 S. E. 122nd	3/5/73	>70,000	>70,000	24,000
E	11540 S. E. 129th	3/5/73	>70,000	>70,000	70,000
E	13102 S. E. King Road	3/6/73	24,000	24,000	5,000
E	11556 Hilltop Court	3/6/73	>70,000	>70,000	>70,000
E	11660 S. E. Idleman	3/7/73	>70,000	70,000	<450
E	13520 S. E. King Road	3/7/73	>70,000	70,000	2,300
E	13760 S. E. King Road	3/7/73	>70,000	>70,000	2,300
E	11460 S. E. Valley View Terrace	3/7/73	>70,000	>70,000	600
E	11390 S. E. Peggy Way	3/7/73	2,300	<450	<450
E	10958 S. e. Valley View Terrace	3/7/73	>70,000	600	<450
E	14300 S. E. King Road	3/7/73	>70,000	24,000	600

Table V

HAPPY VALLEY SANITARY SURVEY
RESULTS PER SURVEY TEAM

Happy Valley & Its Environs

Survey Team	No. Surveyed	Satisfactory	Unsatisfactory	Questionable
A	30	11 (36.7%)	15 (50.0%)	4 (13.3%)
B	28	12 (42.9%)	15 (53.5%)	1 (3.6%)
C	56	23 (41.1%)	22 (39.3%)	11 (19.6%)
D	48	21 (43.8%)	16 (33.3%)	11 (22.9%)
E	65	30 (46.1%)	25 (38.5%)	10 (15.4%)
TOTAL	227	97 (42.7%)	93 (41.0%)	37 (16.3%)

Table VI

HAPPY VALLEY SANITARY SURVEY
RESULTS PER SURVEY TEAM

City Limits
Happy Valley

Survey Team	No. Surveyed	Satisfactory	Unsatisfactory	Questionable
A	25	9 (36.0%)	12 (48.0%)	4 (16.0%)
B	21	11 (52.4%)	9 (42.8%)	1 (4.8%)
C	42	16 (38.1%)	16 (38.1%)	10 (23.8%)
D	46	20 (43.5%)	15 (32.6%)	11 (23.9%)
E	48	20 (41.7%)	18 (37.5%)	10 (20.8%)
TOTAL	182	76 (41.8%)	70 (38.4%)	36 (19.8%)

DEPARTMENT OF ENVIRONMENTAL QUALITY

SOILS AND GEOLOGICAL STUDY
HAPPY VALLEY
CLACKAMAS COUNTY

MARCH 1976

REGIONAL OPERATIONS
INVESTIGATION & COMPLIANCE SECTION
PORTLAND REGION

Introduction

This report will review and consolidate previous studies by the Clackamas County Health Department, Clackamas County Public Works Department, Clackamas County Planning Department, the City of Happy Valley, the Soil Conservation Service, and the Department of Environmental Quality and will add information about Geology, Surface Water Hydrology, and Soil Interpretations prepared by the Oregon Water Resource Department and the Department of Environmental Quality.

Purpose

The purpose of this report is to provide the following:

1. To consolidate and update all past soils and surface water pollution studies in the incorporated community of Happy Valley.
2. To correlate previously documented septic tank drainfield failures to specific soils.
3. To coorelate use of subsurface sewage disposal systems to potential contamination of surface water.
4. To evaluate use of alternate sewage disposal systems and experimental systems on lots not suitable for installation of standard subsurface sewage disposal systems.
5. To determine feasibility of repairing failing septic tank and drainfield systems.

Study Area

The City of Happy Valley is located in the Northwestern part of Clackamas County just South of the Multnomah County line (Map 1, Appendix A).

History and Documented Problems

During 1963, in response to concerns of possible contamination of Kellogg Creek, the Clackamas County Health Department conducted water quality surveys of the drainage basin. Results of these surveys and subsequent investigation of individual subsurface sewage disposal systems indicated that malfunctioning septic tank and drainfield systems were the source of surface water pollution.

Subsequently, a series of public meetings was held throughout the drainage basin involving the Oregon State Sanitary Authority (now the Department of Environmental Quality), Clackamas County Board of Commissioners, Clackamas County Health Department, Clackamas County Public Works Department, and Clackamas County Planning Department which resulted in formation of the Clackamas County Service District No. 1 on March 24, 1967. Originally, the boundary of the service district was to include all of the area within the Mt. Scott-Kellogg Creek Drainage Basin as well as to provide service to the City of Milwaukie, but because of an election technicality, the incorporated community of Happy Valley was not included. On October 17, 1972, residents of Happy Valley turned down a proposal to annex to the Service District by a margin of 328 to 50.

The Department of Environmental Quality conducted a sampling survey of the drainage ditches and creeks in and adjacent to the City of Happy Valley on December 17, 1972 that showed a serious widespread sewage disposal problem existed (Table I). In order to further substantiate the nature and extent of this problem, the Department of Environmental Quality with the assistance of Clackamas County sanitarians and soil scientists conducted a detailed survey of subsurface sewage disposal systems during the period of March 5 - 9, 1973.

Table I

Happy Valley Drainage Survey

December 17, 1972

Sample Location	Total Coliform (MPN/100ml.)	Fecal Coliform (MPN/100ml.)	Fecal Streptococci (MPN/100ml.)
Mt. Scott Cr. @ Sunnyside Rd.	13,000	2,300	7,000
12200 S.E. 122nd	1,300	230	7,000
Mt. Scott Cr. @ S.E. 122nd Ave.	24,000	620	2,400
Mt. Scott Cr. (trib.) @ intersection of S.E. 122nd & King (12908 S.E. King)	24,000	620	130
Greiner Ln. (trib. Mt. Scott Cr.)	2,300	620	2,400
Catch basins runoff @ Idleman Rd. & Walnut Rd.	620	1,300	7,000
11660 Idleman Cr. at Culvert N.W.	2,300	2,300	7,000
Ditch @ 11660 Idleman	60	<45	7,000
Ditch @ crossing of Idleman & Tyler @ (11780)	230	<45	7,400
Cr. N. of Clover Ln.	2,300	2,300	2,400
Cr. @ Green House of private property @ Clover Ln.	<45	<45	230
Seepage west of Green House @ private property of Clover Ln.	60	<45	60
Clover Ln. ditch @ crossing of Clover Ln. Idleman	230	230	2,400
Ditch @ Mt. Scott Blvd. Cemetery	7,000	6,200	>7,000
Ditch at crossing of Ridgecrest Ct. & Ridgecrest Rd.	500	500	620

Table 1 (Continued)

Sample Location	MPN/100 ml. Total Coliform	Fecal Coliform	Fecal Streptococci
Ditch at crossing of S.E. 132nd & Ridgecrest Rd. (from Ridgecrest)	6,200	230	1,300
Ditch at crossing of S.E. 132nd & Ridgecrest Rd. (from S.E. 132nd)	24,000	620	2,400
Ditch at crossing of S.E. 132nd & S.E. Lucille St.	24,000	620	7,000
Dead End of Margie Way	2,300	230	620
Portland View Pl. at S.E. 139th	6,200	6,200	620
Ditch of crossing of S.E. 138th & S.E. Kanne	24,000	500	2,400
Drain basin at 13645 S.E. Kanne	70,000	620	7,000
Dead End of Callahan Rd.	6,200	1,300	>7,000
Ridgecrest Rd. at 13901 Post	>70,000	230	>7,000
Ditch at 9750 S.E. 145th (Start Mt. Scott Cr.)	1,300	230	7,000
Ditch at S.E. King near school at 13865	>70,000	6,200	7,000
Mt. Scott Cr. @ S.E. King	24,000	620	2,400
Ditch at crossing S.E. 132nd & S.E. King	6,200	230	210

Results of the survey showed that of 182 units inspected within the incorporated community of Happy Valley, 76 units (41.8 percent) had systems that were operating properly, 70 units (38.4 percent) had failing subsurface sewage disposal systems, and 36 units (19.8 percent) had systems whose operation was considered questionable (Table II).

Table II

Happy Valley Sanitary Survey

Results Per Survey Team

City Limits

Happy Valley

Survey Team	No Surveyed	Satisfactory	Unsatisfactory	Questionable
A	25	9 (36.0%)	12 (48.0%)	4 (16.0%)
B	21	11 (52.4%)	9 (42.8%)	1 (4.8%)
C	42	16 (38.1%)	16 (38.1%)	10 (23.8%)
D	46	20 (43.5%)	15 (32.6%)	11 (23.9%)
E	48	20 (41.7%)	18 (37.5%)	10 (20.8%)
TOTAL	182	76 (41.8%)	70 (38.4%)	36 (19.8%)

General Nature of the Area

The City of Happy Valley is located on the slopes of Mt. Scott, one of a series of volcanic vents that make up the hills Southeast of Portland. Mt. Scott rises about 900 feet above the adjacent valleys. It has a well-established drainage system that indirectly flows into the Willamette River through Johnson Creek on the North and Mt. Scott and Kellogg Creeks on the South.

This region has a climate characterized by mild rainy winters and warm, relatively dry summers. More than 200 days each year are free of frost. The average annual precipitation is about 42 inches, most of which occurs as rain which falls mainly within the six month period from October to March.

General Geology

Most of the City of Happy Valley is underlain by Boring Lava that was erupted on an irregular erosional surface of the Troutdale Formation (Trimble, 1963). The Boring Lavas consist mainly of light gray to nearly black olivine basalt flows and pyroclastic rocks characterized by columnar jointing and flow structure that results in some platiness. The surface has been weathered in some places to a depth of 25 feet. The upper 5 to 15 feet is commonly a red clay that retains no rock structure. A mantle of yellowish-brown silt overlines the Boring Lava from an elevation of about 250 feet up to the summit of Mt. Scott. It generally conforms to the surface of the underlying bedrock but tends to be thicker on North slopes. A particle-size analysis (Trimble, 1963) indicated that the silt deposit was 19 percent sand, 64 percent silt, and 17 percent clay. The sand and silt are mainly quartz, feldspar, and muscovite and the clay fraction is kaolinite, hydrous mica (illite), and an undetermined clay mineral, possibly montmorillonite or chlorite.

General Hydrology

Surface earth materials in the Happy Valley area consist of soils underlain by a thick clay sequence. The clays commonly contain cobbles and boulders of basalt from which the clays are derived by weathering.

Beneath the clay is a total of several hundred feet of basalt consisting of many flows and associated interflow zones. The flows themselves may be fractured and/or jointed though jointing is not as well developed as it is in the older Columbia River Basalts. Interflow zones either contain remnants of older soils or are highly fractured due to the rapid temperature changes encountered during eruptive cycles.

The fractures, joints, and interflow zones impart porosity and permeability to the basalt which enables it to store and transmit water. The basalt serves as an aquifer supplying several wells in the area.

Because of the topography in the Happy Valley area, the basalts are recharged on the highland areas such as Mt. Scott and discharge occurs in the adjacent valley floors. Such local flow systems are responsible for the flow in Mt. Scott Creek throughout the dry summer months.

However, because of the thick overlying clay sequence recharge of the basalt is very inefficient. Most of the water available for recharge falls on the area as precipitation. But, because sewage disposal in the area is via subsurface methods, septic tank effluent also recharges any porous and permeable zones. Because the thick sequence of clays and the fragipan developed within some of the overlying soils are very slowly permeable, little of the water available for recharge each year percolates down to the water table in the basalt to recharge the ground water body. Most of the potential recharge either runs off directly in roadside ditches and intermittent streams or percolates downward to accumulate above the very slowly permeable fragipan or clay sequence. Such a perched ground water body percolates laterally through the upper, more permeable soil layers to discharge as springs or seeps at and near breaks in slope, in stream banks and beds, in road cuts, and in roadside ditches.

The perched ground water thus becomes surface water. If part of the recharge happened to be septic tank effluent and if the distance from drainfield to discharge point is not great enough, these surface water bodies will contain a quantity of sewage. The presence of fecal coliform and fecal streptococci in surface water bodies in the Happy Valley area (Table I) suggest that in fact sewage is recharging perched ground water bodies and discharging into surface water bodies down gradient.

General Soils Information

The General Soil Map with Soil Interpretations for Land Use Planning prepared by the Soil Conservation Service (USDA-SCS, 1970) shows that the entire City of Happy Valley occurs within the Cascade Soil Association. This association consists of somewhat poorly drained Cascade and Powell silt loams formed in silty loess over residuum from basalt and well-drained Saum silt loam formed in mixed loess and residuum from basalt on hilly uplands. Slopes are mainly between 3 and 20 percent but range up to as much as 60 percent.

Brief Description - Septic Tank and Drainfield System

In Oregon and in particular, Happy Valley, the predominate method of subsurface sewage disposal incorporates the septic tank and drainfield system. A septic tank system is simple enough in theory. Wastes from the bathroom, kitchen and laundry flow into an underground tank where bacteria, by a natural process of digestion, convert part of the bulk to gas. The gas is vented to the air, the heavier solids settle to the bottom of the tank as sludge and the lighter ones float to the top to become scum.

When leftover liquid, called effluent, reaches a certain level, it flows from the tank into a system of open-jointed or perforated pipes beneath the ground. The buried pipes distribute the liquid through the drainfield (absorption field) so that it can be soaked up by the surrounding earth.

It should be clearly understood that a septic tank does not make sewage fit to drink. In fact, it is the crudest type of treatment device. Septic tank effluent contains sewage particles (fine settleable and suspended solids) and may also contain harmful (pathogenic) bacteria which cause typhoid fever, dysentery, and other gastrointestinal diseases. A septic tank functions by conditioning sewage so that it will percolate into the ground without clogging the pores of the soil. During the effluent absorption process, the organic substances including bacteria in the effluent are acted upon by soil organisms. Oxidation of the organic materials in the zone of aeration of porous soils results in chemical products that dissolve and are absorbed into the soil. Absorption of the effluent into the soil is an essential part of a successfully operating septic tank and drainfield system.

Summary of Suitability of Soils for Septic Tank Drainfields

Cascade and Powell soils are not suitable for installation of standard subsurface sewage disposal systems because of excessive slopes and a firm fragipan with slow permeability that perches water in the soil profile from December to April. Field surveys by the Clackamas County Health Department, Clackamas County Department of Public Works, and the Department of Environmental Quality showed that 38.4 percent of the homes examined had failing septic tank drainfields. All of these failing systems were installed in

Cascade and Powell soils. In addition to these, 19.8 percent of the homes had subsurface sewage disposal systems whose operation was considered questionable. These also were installed in Cascade and Powell soils.

Saum soils are generally permeable enough and deep enough to be acceptable for use as septic tank drainfields. No failing systems were observed on Saum soils during the field survey.

For a detailed description of the suitability of Cascade, Powell, and Saum soils for subsurface sewage disposal, see Appendix C.

Alternate Sewage Disposal Systems

Oregon Administrative Rules, Chapter 340, Division 7, Subsurface and Alternate Sewage Disposal, Subdivision 1, Section 71-037, Alternate Sewage Disposal Systems makes provision for installation of sewage stabilization ponds, land disposal of sewage by irrigation, and use of holding tanks.

A sewage stabilization pond may be installed where the mean annual evaporation potential is sufficiently in excess of the mean annual rainfall so that the pond can be designed to operate continuously without overflow at all times of the year. Sufficient land area must be available so that no existing or possible future residence will be located within three hundred (300) feet of the sewage stabilization pond. In addition, no seepage from the pond may occur that would pollute ground waters which are or may likely be used for domestic purposes.

A vast majority of the lots in Happy Valley do not contain sufficient land area to accommodate construction of a sewage lagoon and meet the required setback of 300 feet from existing or possible future residences.

Furthermore, rainfall and potential evapotranspiration data (Johnsgard, 1963) show that the average annual rainfall exceeds average annual evapotranspiration by 31.4 inches at Estacada, 23.9 inches at Stafford Station, and 15.2 inches at Portland. These data indicate that sewage stabilization ponds would overflow during the rainy season in Happy Valley even if they were constructed on suitable sites.

Land disposal of sewage by irrigation is allowed on land that is not accessible to the public and where sewage applied will be completely confined to the boundaries of the land disposal site so that pollution of surface and ground waters of the State or airborne contamination will not occur outside the site. Sewage must receive prior treatment that will consistently produce an effluent having a 5-day BOD of not more than 20 mg/liter, a suspended solids content of not more than 20 mg/liter , and a chlorine residual of at least 2.0 mg/liter after 60 minutes contact time. Treated sewage effluent may then be used for either surface or spray irrigation of forest land, fodder crops used for hay, and grass seed production, but can not be used on crops intended for human consumption or on pasture land used for dairy cattle.

Holding tanks may be used to serve small industrial or commercial buildings or occasional use facilities such as county fairs or rodeos with daily sewage flows of 200 gallons or less where soils are not suitable for installation of subsurface sewage disposal systems and no community or area-wide sewerage systems are available or are expected to be available within 5 years.

Variances

A variance from particular requirements of the rules or standards pertaining to subsurface sewage disposal systems may be granted if the

variance officer finds that the subsurface sewage disposal system will function in a satisfactory manner so as not to create a public health hazard, or cause pollution of the waters of the State of Oregon.

Experimental Systems

Slowly permeable soils with seasonally perched water tables constitute a major portion of the soils in the City of Happy Valley. These soils have a seasonal water table in the winter and spring within 2 feet of the soil surface. Perching of rain water on top of the slowly permeable fragipan makes these soils unsuitable for on-site disposal of sewage effluent.

The experimental on-site sewage treatment and disposal systems program is intended to provide for valid, controlled experimentation that will produce information upon which to base future rules for subsurface sewage disposal. Any proposal for experimentation must be a valid project that will provide information that makes it possible to convert some of these experimental systems to alternate subsurface sewage disposal systems. Monitoring will, therefore, be an integral part of any experimental system that is approved for installation. Applicants should bear in mind, however, that the experimental program is not nor was it intended to be a vehicle to obtain a permit for an on-site subsurface sewage disposal system when all other possibilities of obtaining a permit have been exhausted.

Experimental systems suggested for Oregon under this program are mounded disposal systems, evapotranspiration systems, evapotranspiration-adsorption systems, composting toilets with gray water disposal systems, sand filters with effluent disposal systems, and other experimental systems proposed by a property owner that can be expected to function properly and provide information to satisfy the intent of the experimental program.

Evapotranspiration and evapotranspiration-adsorption systems are not applicable in the City of Happy Valley because rainfall far exceeds potential evapotranspiration.

Permits for mounded systems can be considered in the City of Happy Valley on parcels of land where the temporarily perched water table is at least 12 inches below the natural ground surface, where a restrictive or impervious layer is at least 12 inches below the natural ground surface, where the permanent water table is at least 3 feet below the natural ground surface, and where slope of the natural ground surface does not exceed 12 percent.

Composting toilets can be considered where soils are suitable for installation of a full-sized septic tank and a drainfield reduced in size by 1/3 for disposal of gray water or where the applicant has proposed an experimental gray water disposal system that can be expected to function properly without creating a public health hazard or causing pollution of the waters of the State of Oregon.

Experimental sand filters with oversized drainfields can be considered for installation in soils not suitable for standard subsurface sewage disposal systems.

All these experimental systems have the common disadvantage of being very expensive. Estimated costs range from $1,600.00 for a composting toilet with a gray water disposal system to $5,000.00 for a sand filter and drainfield to $6,000.00 for a mounded disposal system. In addition, we expect a number of experimental systems to fail because lack of monitoring data and basic design criteria make it difficult to develop suitable alternatives to the conventional subsurface sewage disposal system.

Repair of Failing Subsurface Sewage Disposal Systems

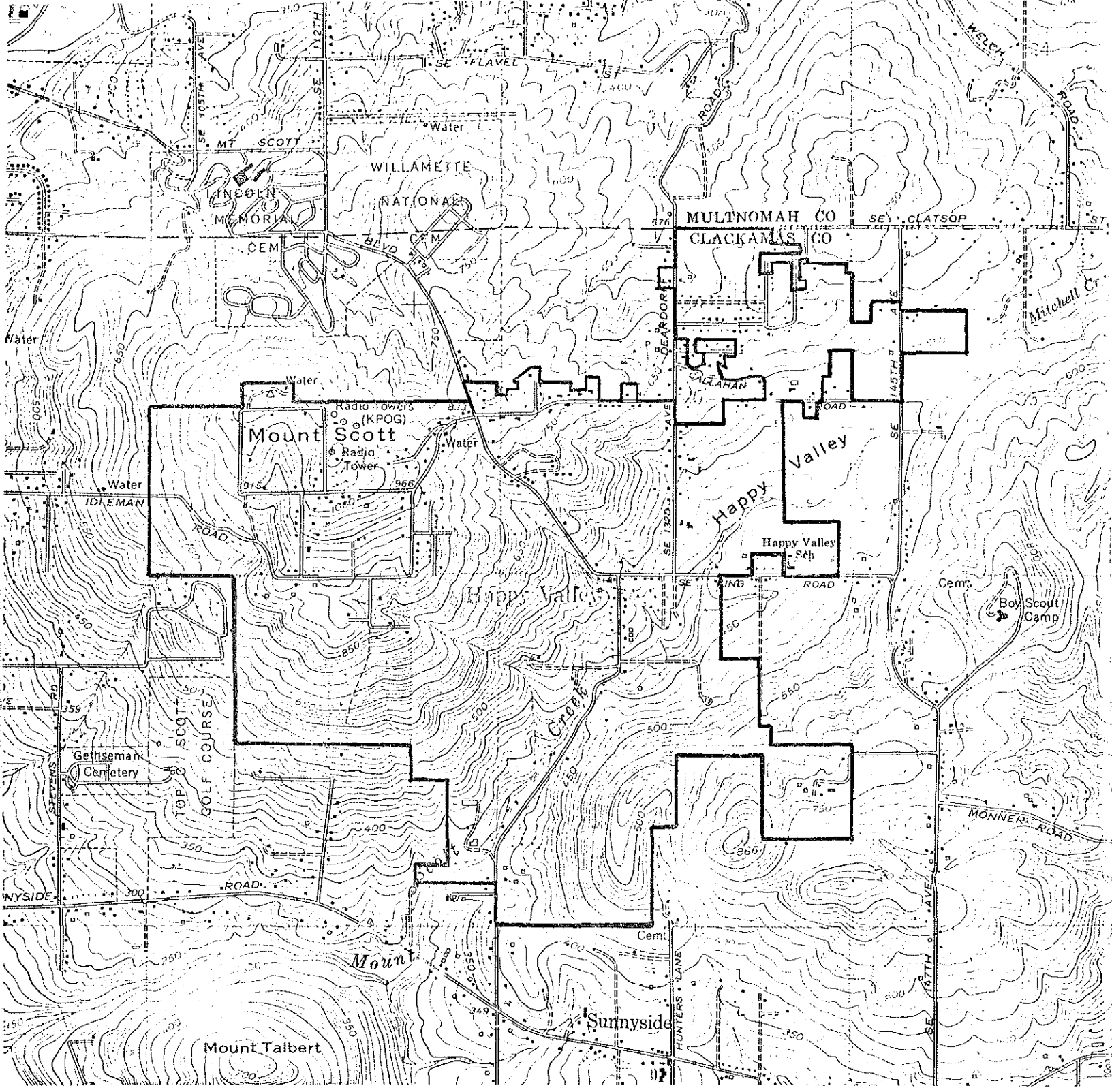
Many of the homes in Happy Valley are on rather large lots and one would expect that there would be sufficient available area for repair of the drainfields. This, however, is not true, since many of these large lots have steep slopes, large concrete patios, swimming pools, terracing, landscaping, and the like. These topographical and man-made structures, coupled with the adverse soil conditions, reveal that most of the malfunctioning subsurface sewage disposal systems are not susceptible to repair. Continued attempts to repair systems would result in repeated failures and health hazards until finally no land areas would be available for replacement of the drainfield systems.

Conclusions

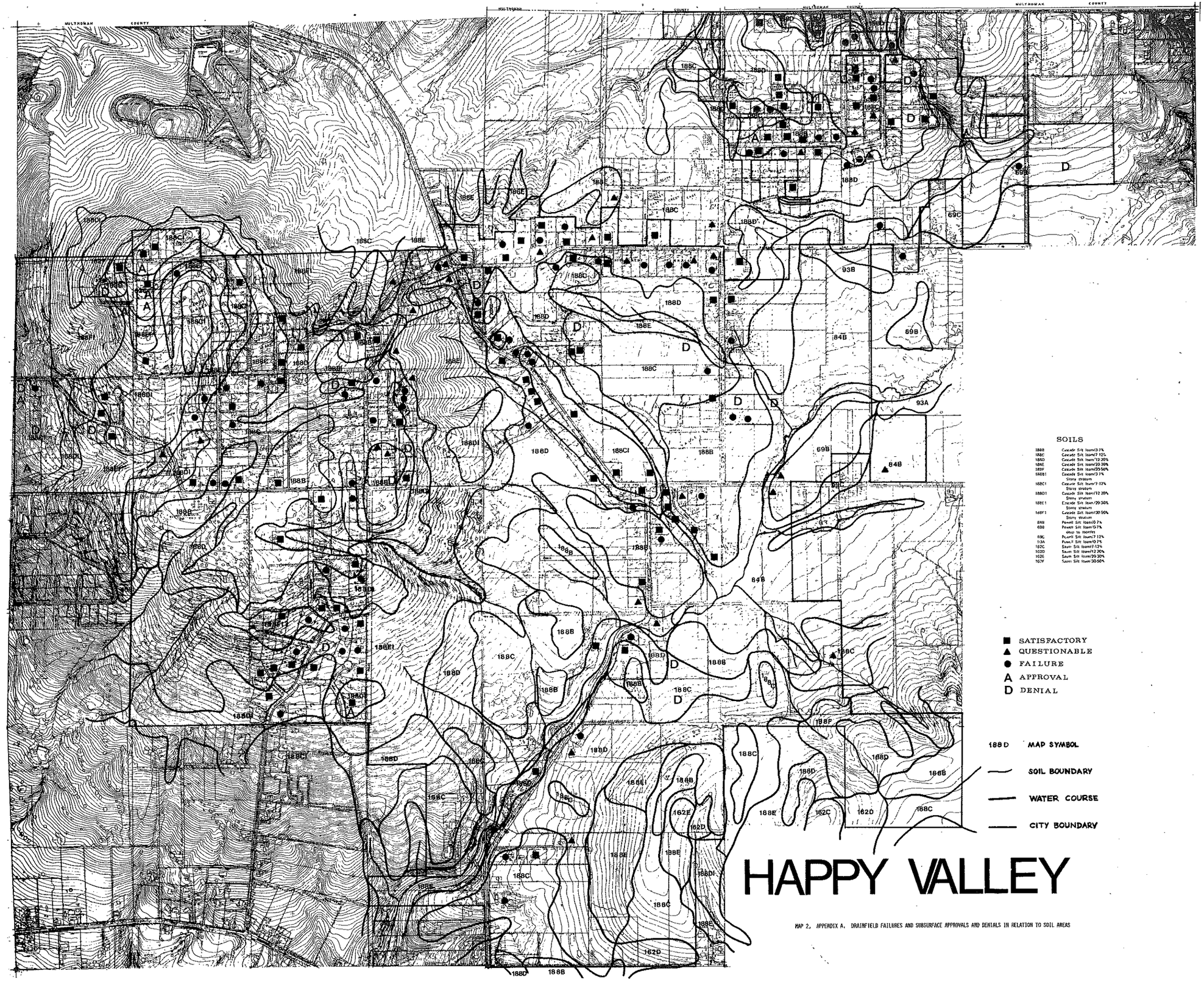
1. Cascade and Powell silt loams are not suitable for installation of standard subsurface sewage disposal systems because of excessive slope and a firm fragipan with slow permeability that perches water in the soil profile from December to April.
2. Saum silt loam is generally permeable enough and deep enough to be suitable for installation of standard subsurface sewage disposal systems.
3. There is a serious widespread sewage disposal problem in the City of Happy Valley. Contamination of surface waters is due to failing subsurface sewage disposal systems, primarily in Cascade and Powell soils.

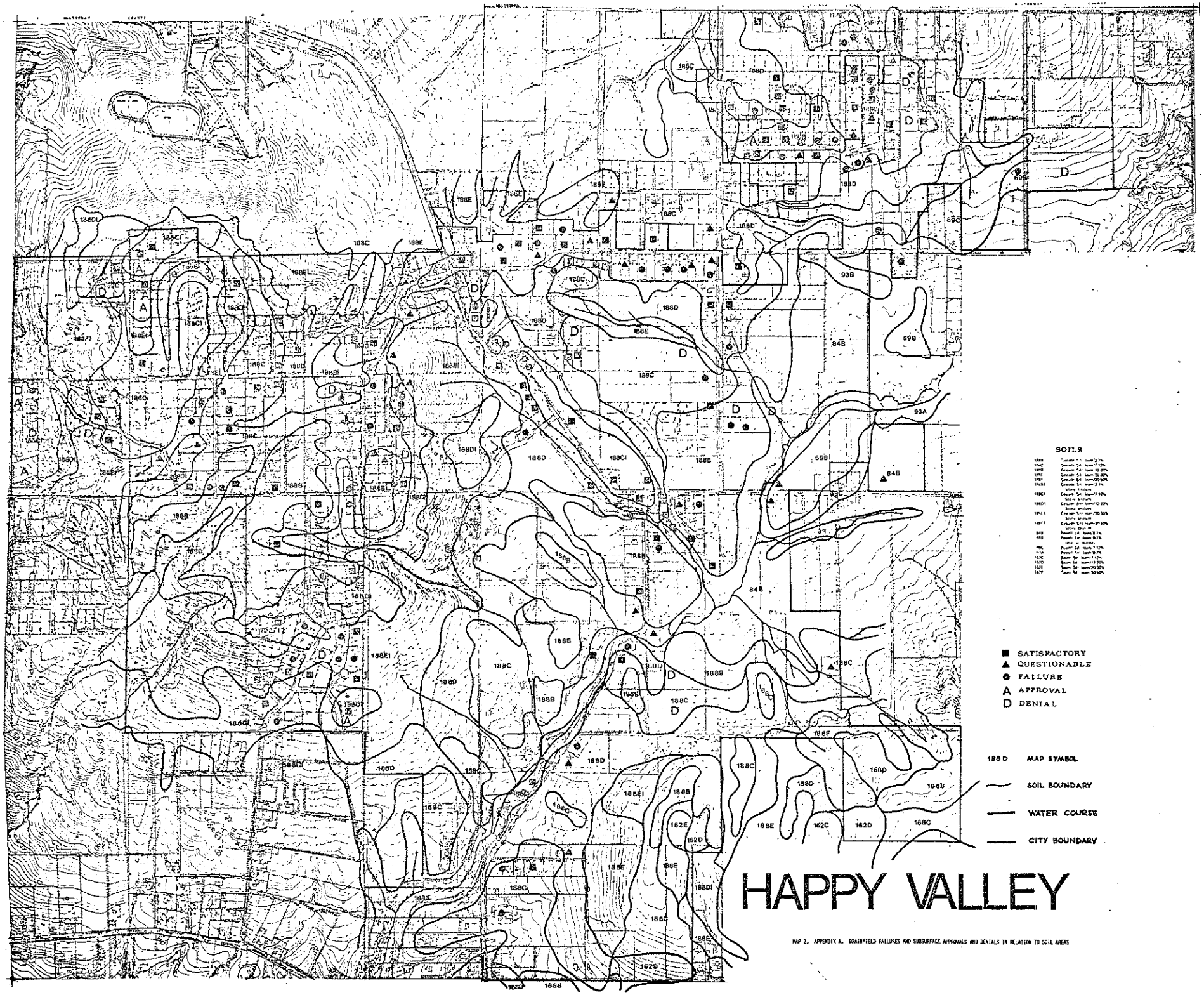
4. Continued attempts to repair existing septic tank and drainfield systems in Cascade and Powell soils would result in risk of repeated failures, disruption of landscaping, lack of available repair areas, and continued water pollution with attendant sanitation and health hazards.
5. Alternate sewage disposal systems are not suitable because mean annual rainfall exceeds mean annual potential evapotranspiration and lot sizes are generally too small.
6. Variance applications would usually not be approved on Cascade and Powell soils because of a combination of excessive slopes, small lot sizes, and shallow depths to a firm, slowly permeable fragipan and temporarily perched water.
7. Use of experimental systems is not a satisfactory solution to an areawide sewage disposal problem because annual precipitation exceeds annual potential evapotranspiration, lot sizes are generally too small, and slopes on many lots are excessive. In addition, experimental systems have the common disadvantage of being very expensive.

APPENDIX A



MAP 1 APPENDIX A. HAPPY VALLEY STUDY AREA


MULTNOMAH COUNTY
SOILS
188B Cascade Silt loam 0-3%
188C Cascade Silt loam 7-12%
188D Cascade Silt loam 12-20%
188E Cascade Silt loam 20-30%
188F Cascade Silt loam 20-50%
188B1 Cascade Silt loam 0-3% Stony stratum
188C1 Cascade Silt loam 7-12% Stony stratum
188D1 Cascade Silt loam 12-20% Stony stratum
188E1 Cascade Silt loam 20-30% Stony stratum
188F1 Cascade Silt loam 30-50% Stony stratum
84B Powell Silt loam 0-7%
69B Powell Silt loam 0-7% Wash in terrace
69C Powell Silt loam 7-12%
93A Salem Silt loam 0-7%
162C Salem Silt loam 7-12%
162D Salem Silt loam 12-20%
162E Salem Silt loam 20-30%
162F Salem Silt loam 30-50%
SATISFACTORY
QUESTIONABLE
FAILURE
A APPROVAL
D DENIAL
188D MAP SYMBOL
SOIL BOUNDARY
WATER COURSE
CITY BOUNDARY
HAPPY VALLEY
MAP 2, APPENDIX A. DRAINFIELD FAILURES AND SUBSURFACE APPROVALS AND DENIALS IN RELATION TO SOIL AREAS



MAP 2. APPENDIX A. DRAINFIELD FAILURES AND SUBSURFACE APPROVALS AND DENIALS IN RELATION TO SOIL AREAS

APPENDIX B

Geomorphology and Soils

The hills Southeast of Portland are remnants of eruptive vents of the Boring Lava that rise to an elevation of about 1,100 feet with a maximum relief of 900 feet. Erosion has formed a well-organized drainage system. Slope gradients range up to 60 percent. Cascade, Powell, and Saum soils occur within the city limits of Happy Valley on the slopes of Mt. Scott.

Cascade soils consist of somewhat poorly drained, medium-textured soils formed in loess on moderately steep to steep uplands. The surface layer is dark brown, friable silt loam about 8 inches thick. The upper subsoil is dark brown friable silt loam about 16 inches thick. The lower subsoil is a very firm, very hard, brittle, mottled fragipan 3 or more feet thick. In areas where the loess mantle is thinner, Cascade soils have a stony substratum derived from the underlying basalt. Permeability of the fragipan is slow and a perched water table may occur at a depth of 1.5 to 2.5 feet from December to March.

Powell soils consist of somewhat poorly drained, medium textured soils formed in loess on gently sloping to sloping terraces. The surface layer is dark brown friable silt loam about 8 inches thick. The upper subsoil is dark brown friable silt loam about 8 inches thick. The lower subsoil is a very firm, very hard, brittle, mottled fragipan about 53 inches thick. Permeability of the fragipan is moderately slow to slow and a perched water table may occur at a depth of 1.5 to 2.0 feet from December to April.

Saum soils consist of well-drained, moderately fine textured soils formed in mixed silty loess and alluvium, slope wash and residuum weathered from basalt on sloping to moderately steep uplands. The surface

layer is dark reddish brown silt loam about 11 inches thick. The upper subsoil is firm silty clay loam about 12 inches thick. The lower subsoil is firm silty clay about 2 feet thick. The substratum is basalt. Permeability of the subsoil is moderately slow.

APPENDIX C

Suitability of Soils for Subsurface Sewage Disposal

Soils that have slight limitations for use as septic tank drainfields are well drained, are not subject to flooding, do not have a permanent water table within six feet of the natural ground surface, are more than 36 inches deep to an impervious layer, are more than 30 inches deep to a restrictive layer, are on the upper end of moderate permeability, and have slopes less than 12 percent. Soils that have moderate limitations for use as septic tank drainfields are moderately well to somewhat poorly drained, subject to a temporarily perched water table, are on the lower end of moderate permeability, are more than 36 inches deep to an impervious layer, are more than 30 inches deep to a restrictive layer, and have slopes of 12 to 25 percent. Soils that have severe limitations for this same use are somewhat poorly to very poorly drained, have a high water table, are subject to flooding, are less than 36 inches deep to an impervious layer, are less than 30 inches deep to a restrictive layer, have moderately slow to very slow permeability, and have slopes in excess of 25 percent.

The General Soil Map with Soil Interpretations for Land Use Planning (USDA-SCS, 1970) indicates that soils in the Cascade association have a severe limitation for use as septic tank filter fields because of a combination of a firm fragipan at a depth of 20 to 30 inches, high fluctuating water table during the winter and early spring, slow or very slow permeability, and excessive slope. The OR-SOILS-1 (attached) indicate more

specifically that Cascade and Powell silt loams have a severe limitation because of a firm fragipan, slow permeability, a perched water table at 1.5 to 2.5 feet from December to April, and excessive slope. Saum silt loam has a severe limitation because of depth to bedrock and excessive slope.

Cascade and Powell silt loams have formed on the upland silt that blankets the slopes of Mt. Scott. Schlicker (1967) describes the distinctive characteristics of this material when used as support for structures and as media for disposal of sanitary wastes. He states that the upland silt is a homogeneous and structureless material of low plasticity. At low moisture content it is stable, but it is unstable and spongy at moisture contents much above the plastic limit. It has low permeability, is subject to high capillary rise, and therefore is frost susceptible. In many locations, the ground water is able to rise to the surface of the upland silt, thereby seriously weakening heavily stressed foundations and earth slopes. Mud flows and slumps have been observed in many areas where the slope of the ground surface is in the order of 15 to 20 percent. Although it is occasionally possible to construct a septic tank drainfield on upland silt, this formation should be considered as marginal at best for this purpose. Attempts to construct septic tank drainfields for large installations such as schools or shopping centers would, in all probability, meet with serious difficulty.

These evaluations and the present evaluation by the DEQ indicate that Cascade and Powell soils are not suitable for installation of standard subsurface sewage disposal systems because of a fragipan with slow permeability that perches water in the soil profile from December to March. Depth to the fragipan ranges from 15 to 24 inches in Powell soils and from 20 to 30

inches in Cascade soils. In addition, some areas of these soils have slopes in excess of 25 percent.

A fragipan is a loamy textured subsurface horizon roughly parallel to the soil surface. It is very low in organic matter, has a bulk density usually in excess of 1.6 grams/cc, and a correspondinly low porosity. A fragipan is seemingly cemented when dry with hard or very hard consistence. When moist, it has the property of brittleness (brittleness is the tendency for a ped or clod to sustain increasing pressure without detectable deformation until a critical pressure is reached. At this point, the material suddenly ruptures). It is distinctly mottled, is slowly permeable to water, and contains a network of bleached vertical fracture planes that forms coarse polygonal prisms. A fragipan is virtually free from roots, except for those that occur along the bleached prism faces.

The significance of a fragipan to subsurface sewage disposal lies in the fact a fragipan is a continuous soil horizon that impedes water movement and root growth. Water stands above the fragipan in areas of nearly level Cascade and Powell soils. Where these soils are sloping, water moves laterally along the top of the fragipan and either erupts on the surface of the ground or seeps out of cut banks and road ditches. Effluent would behave in the same manner.

During the period of March 5 to 9, 1973, the Department of Environmental Quality, with the assistance of Clackamas County sanitarians and soil scientists, conducted a detailed survey of 182 subsurface sewage disposal systems in the City of Happy Valley. Results of this survey showed that 70 units (38.4 percent) had failing subsurface sewage disposal systems. Ten of these systems were installed in Cascade silt loam, 3 to 8

percent slopes (Map 2, Appendix A), 28 were installed in Cascade silt loam, 8 to 15 percent slopes, 11 were installed in Cascade silt loam 15 to 30 percent slopes, 3 were installed in Cascade silt loam, stony substratum, 8 to 15 percent slopes, 15 were installed in Cascade silt loam, stony substratum, 15 to 30 percent slopes, 1 was installed in Cascade silt loam, stony substratum, 30 to 60 percent slopes, and 2 were installed in Powell silt loam, 0 to 8 percent slopes. In addition to these, 36 units (19.8 percent) had subsurface sewage disposal systems whose operation was considered questionable. Six of these systems were installed in Cascade silt loam, 3 to 8 percent slopes, 16 were installed in Cascade silt loam, 8 to 15 percent slopes, 7 were installed in Cascade silt loam, 15 to 30 percent slopes, 4 were installed in Cascade silt loam, stony substratum, 15 to 30 percent slopes, and 3 were installed in Powell silt loam, 0 to 8 percent slopes. Seventy six of the units (41.8 percent) inspected had systems that were operating properly. Sixty of these units were installed in Cascade silt loam with slopes less than 15 percent and 2 were installed in Saum silt loam 7 to 12 percent slopes. The remainder of the properly operating systems (14) were installed in Cascade silt loam with slopes in excess of 15 percent.

In areas where sanitary sewers are not available, the State Department of Environmental Quality requires a field inspection of the soil to determine if a lot or parcel of land is suitable for construction of a standard subsurface sewage disposal system. Clackamas County Department of Public Works has kept a record of these studies since early 1973. The overall percentage of approvals in Clackamas County has been about 70 percent from early 1973 to February 1976. During this same period of time, 26 applications for subsurface sewage disposal permits were received from

within the city limits of Happy Valley. Thirty and eight tenths percent (8/26) of these applications were approved and 69.2 percent (18/26) were denied. One of the approvals was on Cascade silt loam, 3 to 8 percent slopes, 3 were on Cascade silt loam, stony substratum, 8 to 15 percent slopes, 2 were on Cascade silt loam, stony substratum, 15 to 30 percent slopes, and 2 were on Saum silt loam, 7 to 12 percent slopes (Map 2, Appendix A). Two of the denials were on Cascade silt, 3 to 8 percent slopes, 8 were on Cascade silt loam, 8 to 15 percent slopes, 2 were on Cascade silt loam, stony substratum, 8 to 15 percent slopes, 3 were on Cascade silt loam, stony substratum, 15 to 13 percent slopes, 2 were on Powell silt loam, 0 to 8 percent slopes, and one was on Saum silt loam, 12 to 20 percent slopes.

Saum silt loam is generally permeable enough and deep enough to be suitable for installation of standard subsurface sewage disposal systems. Some areas are not suitable because of excessive slope.

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Trimble, D.E. 1963. Geology of Portland, Oregon and Adjacent Areas. United States Department of the Interior, Geological Survey Bulletin 1119, 118p

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ENVIRONMENTAL QUALITY COMMISSION

1234 S.W. MORRISON STREET • PORTLAND, ORE. 97205 • Telephone (503) 229-5696

ROBERT W. STRAUB
GOVERNOR

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. F May 27, 1977 EQC Meeting

Variance Request:

Valley Landfills, Inc., Corvallis (Roche Road Landfill)

Background:

Valley Landfills, Inc. operates a solid waste disposal site known as the Roche Road Landfill, which is located approximately one-half mile east of Corvallis in Linn County. The site is an old gravel pit approximately 10 acres in size. It receives primarily land clearing debris, building demolition and selected industrial wastes.

The site was established in 1969, before the Department adopted solid waste regulations, and wastes are deposited directly into ponded water (shallow groundwater). In 1973 the facility was put under regular permit and groundwater monitoring wells were constructed to evaluate the impact of the facility. Results indicated that the effects on downgradient water quality were minimal and the company was permitted to continue the fill. Water quality monitoring has continued on a routine basis and shows very little change.

The Roche Road site has generally been well operated but there were some odor problems early in its history. The company was cooperative and took corrective actions to deal with the problem. It was eventually corrected by the installation of an aerator.

The site presently serves as the regional demolition waste landfill for Linn and Benton Counties, in accordance with the Chemeketa Region Solid Waste Management Plan. It is anticipated the site will be full in approximately one and one-half years. The company has now applied for a permit to expand the landfill by approximately 5 acres, coincident with the removal of gravel for construction, and requests a variance from Oregon Administrative Rule 340-61-040(3)(c) which prohibits depositing decomposable materials directly into the groundwater table.

DISCUSSION:

The existing fill operation has had minimal effects on water quality and has not impaired beneficial uses of the local groundwater or of the Willamette River. The expansion proposal includes provisions for improved landfill design and operation. There are three domestic wells located downgradient from the current fill and tests indicate that none of these has been adversely affected. This is a groundwater discharge area and the flow appears to swing away from these residences. The expansion would be upgradient from the current fill and is not expected to significantly increase the threat to these wells. The area is zoned agricultural and no new residential development is anticipated. Valley Landfills proposes to install 4 additional monitoring wells and there is a contingency plan for collecting and treating contaminated groundwater if necessary. The site is located within the floodplain of the Willamette River, but a dike protects the site from 100 year frequency floodwaters. The variance request is supported by the Department's Water Quality Division and the Department of Water Resources.

The regional solid waste management plan did not address the possible expansion of Roche Road site, since the proposal was only recently conceived. The plan suggests another very large gravel pit in the Corvallis area as a possible alternative. That site, however, is currently restricted to the owner's use only and there are significant questions concerning water quality which have not yet been answered. The only site currently available is not recommended for demolition waste in the regional plan and would involve a substantial hauling distance and costs. It is believed that the expansion of the Valley Landfills, Inc. site would be compatible with the regional plan, but the Department would require that the company obtain the formal approval of the Regional Solid Waste Committee before issuing a permit. The Company has already obtained the approval of the Linn County Board of Commissioners and Planning Commission after a public hearing.

It is predicted that a resource recovery facility will be available in the Corvallis area within 8 years when the proposed 5-acre expansion is to be completed. The proposed expansion is small enough so that its approval should not delay any such move to resource recovery.

A final consideration is that high grade gravel exists at the proposed site and it can be mined only if the land is properly restored. Filling with solid wastes is the most economical alternative and overburden from the gravel excavation would provide needed final cover material for the company's existing landfill.

Granting of a variance by the Environmental Quality Commission is authorized by ORS 459.225, if the Commission finds that:

(a) Conditions exist that are beyond the control of the applicant.

(b) Special conditions exist that render strict compliance unreasonable, burdensome or impracticable.

(c) Strict compliance would result in substantial curtailment or closing of the disposal site and no alternative method of solid waste management is available.

CONCLUSIONS:

1. The existing site is nearly full and an alternative landfill of moderate size is needed at least until a resource recovery facility is available.

2. There are no nearby alternative sites currently available. A possible alternative suggested in the regional solid waste management plan is a very large private site where the effects on water quality are not known.

3. It would seem unreasonable to prohibit the expansion on the basis of water quality when there is a substantial amount of test data to indicate that the effects of the current operation have been well within acceptable limits.

4. Strict compliance with the regulations would cause the landfill to close and would prevent the mining of needed sand and gravel at the site.

5. The Commission may grant a variance to the regulations.

DIRECTOR'S RECOMMENDATION:

It is recommended that a Variance from OAR Chapter 340, Section 61-040(3)(c) be granted to Valley Landfills, Inc. for the proposed 5-acre expansion of the Roche Road Landfill under the following conditions:

1. Wastes deposited shall be restricted to primarily land clearing debris, building demolition and construction wastes, and selected industrial wastes.

2. No food wastes, garbage, dead animals, sewage sludges, septic tank pumpings, hospital waste, chemicals, oils, liquids, explosives or other materials which may be hazardous or difficult to manage shall be deposited.

3. Landfill construction and operation shall be in accordance with plans approved in writing by the Department and in compliance with a Solid Waste Disposal Permit issued by the Department.

Bill

WILLIAM H. YOUNG
Director

5/9/77

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. G, May 27, 1977, EQC Meeting

Proposed Rule Revisions to Agricultural Burning Rules
OAR Chapter 340, Sections 26-005 through 26-030

Background

Pursuant to Oregon Revised Statute 468.460, the Commission must promulgate rules regarding the extent, type and amount of open field burning to be allowed during the 1977 season. Prior to the adoption of these rules, the Commission must consult with the Oregon Field Sanitation Committee (OFSC) and Oregon State University (OSU) and hold a public hearing to determine:

1. The status and availability of alternative methods of field sanitation and straw utilization and disposal,

2. The total acreage registered to be open burned during 1977, and

3. In the event of the registration of more than the maximum allowable acres for open burning, the method of allocation.

As specified in Oregon Law, in promulgating rules for open field burning it is the responsibility of the Commission to:

1. Hold public hearing to receive testimony on whether:

   a. There are insufficient numbers of workable machines that can reasonably be made available to sanitize the acreage if an acreage reduction is ordered;

   b. There are insufficient methods available for straw utilization and disposal, and

   c. Reasonable efforts have been made to develop alternative methods of field sanitation and straw utilization and disposal, and such methods have been utilized to the maximum reasonable extent.

The Commission shall authorize issuance of permits during 1977 up to the statutorily set maximum acreage of 95,000 acres only if the Commission finds a, b, and c above, after hearing.

2. In the event of registration of more than 95,000 acres to be open burned in 1977, the Commission, after consultation with the Oregon Field Sanitation Committee, may allocate permits for acreage based on particular local air quality conditions, soil characteristics, the type or amount of field burning, or crops, the availability of alternative methods of field sanitation, the date of registration, proportional share, or any reasonable classification. Priority shall be given to use of available alternatives to open field burning in Lane County and priority areas.

3. When alternatives are certified and based on testimony received from appropriate agencies, the Commission shall adopt field burning rules for Multnomah, Washington, Clackamas, Marion, Polk, Yamhill, Linn, Benton, and Lane Counties, which provide for a more rapid phased reduction by certain permit areas, depending on particular local air quality conditions and soil characteristics, the extent, type or amount of open field burning of perennial grass seed crops, annual grass seed crops, and grain crops and the availability of alternative methods of field sanitation and straw utilization and disposal.

At its April 30 and May 14, 1976 meeting, the Commission directed the Department to collect information so that allocation might be given to individuals who cooperated closely with OFSC and had acreages sanitized by the mobile field sanitizers.

Acreage Allocation

Registration

Registration of fields was completed in early April and results have been tabulated. A summary is shown below. More complete information is attached. (Attachment I)

AREA	ACRES REGISTERED			
	Perennial	Annual	Cereal	Total
North Valley	53,945	15,997	23,805	93,747
South Valley	70,398	116,287	28,778	215,463
All Valley	124,343	132,284	52,583	309,210

As may be seen, the registered acres exceed the 95,000 acre limitation for 1977. Acreage must be allocated per 2 above.

Agronomic Considerations

In an effort to obtain support information for allocation procedures, the Department's staff met with representatives of the following agencies on May 5, 1977 and discussed their respective roles regarding allocations of acreages as specified in ORS 468.460(3) and requested that they participate in the public hearing:

Oregon State University

Oregon Seed Council

Soil and Water Conservation Commission

Soil Conservation Service

Verbal comments made at that time may be summarized briefly as follows:

1. The OSU representative indicated that the status of alternatives for weed and pest control is similar to last year's situation.

   a. No chemical controls exist for disease control.

   b. Weed control is necessary. Chemical control is of limited use in annuals but not for perennial grasses.

   c. There is no difference in the necessity for burning annuals and perennials.

   d. There is no justification for reduction below the 95,000 acre limitation.

2. The Oregon Seed Council representative stated that:

   a. There is no equitable distribution possible when special considerations based on soil and slope problems, crop type, or grower acreage are given since the resulting special allocations would virtually use up the 95,000 acres available.

   b. No viable alternatives exist to open burning. Therefore, the Governor should receive hardship requests from seed growers and allow additional allocations for all burning requested.

   The Oregon Seed Council also made the following recommendations:

   a. Eliminate the "first" allocation of 100 acres since the allocation:

(1) Tends to support the small part-time farmer or a large farmer who is growing seed as a side-line product.

(2) Penalizes larger growers who are the backbone of seed business and whose seed crops support family rather than "hobby" farms.

b. Make a straight percentage acreage allocation based on acreage registered.

3. A point reiterated by most representatives was that since alternatives are not capable of sanitizing those fields eliminated from open burning, no further reductions below the 95,000 acres should be made for 1977.

4. Also, it was mentioned that special allocations would tend to use up major portions of the 95,000 acres available leaving very few acres for individuals with more conventional burning situations.

Written comments have been solicited from attendees but have not been received. This additional information is expected soon and will be forwarded to the Commission.

In addition to the above information, the Department has circulated soil and slope questionnaires among seed growers requesting information on soil, slope, and erosion problems of acreages in grass seed rotation. The staff has received about 100 responses so far. Forms are still being received so that no final statistics are available yet.

The staff concurs with the recommendations of the OSC to remove the "first" 100 acre allocation provision from the proposed rules. In addition to the reasons stated above, the staff has calculated that to comply with the "first" 100 acre provision would utilize an estimated 74,341 acres of the 95,000 acre maximum authorized for the 1977 burning season.

Repeal of the "first" 100 acre allocation provision [Section 26-013(5)(A)] has not been included as part of the Director's Recommendation but may be worthy of consideration by the Commission.

Available Alternatives

The Oregon Field Sanitation Committee will decide its recommendation to the Commission at its May 11, 1977 meeting. DEQ will also obtain from the Committee estimates of acreage to be treated by sanitizers during 1977 and information regarding farmers who assisted in sanitizer development during 1976.

Air Quality Considerations

Burning of southern Valley acreage under the general summertime north wind conditions tends to have more impact than does burning of more northerly acreages particularly those which are located near the Valley's perimeter. Many of the fields in Clackamas, Washington, Yamhill, and Marion Counties are so distributed that they may be burned with little or no identifiable smoke impact in the remainder of the Valley. Attachment II is a map illustrating areas staff believes, because of prevailing winds and field distribution, to be burnable with essentially no smoke impact under appropriate and specified meteorological conditions. The areas identified cover approximately 30,000 acres registered for burning.

Analysis

The proposed field burning rules (Attachment III) include the maximum statutory allowable acreages to be open burned. Prior to the adoption of these rules, those acreages must be amended if a lower limitation is established, to coincide with the findings of the Commission.

The attached proposed rules also retain the allocation procedures adopted by the Commission after hearing April 30, 1976. The procedures, Section 26-013(5):

1. Allow for issuance of open field burning permits for 10% more acreage than the statutory maximum of 95,000 acres, but provide that burning quotas shall cease to be issued when a total of 95,000 acres have been open burned.

2. Allocate to each grower based on all of his registered acres up to and including 100 acres.

3. Allow the Department to supervise "wide area burn" experiments utilizing up to 10,000 acres.

4. Allocate the remainder of the 104,500 acres on a proportional share basis.

Should the Commission allocate the maximum of 95,000 acres for open field burning, rule revisions reflecting this allocation would be as follows:

Revise 26-012(1) to read:

> On or before April 1 of each year,...

Revise 26-012(2) to read:

> Registration of acreage after April 1 of each year shall require:

Revise 26-013(1)(a) to read:

During 1977 not more than 95,000 acres...

Revise 26-013(2) to read:

Each year the Commission...

Revise 26-013(3) to read:

On or before June 1 of each year,...

Revise 26-013(5) as follows:

Change 195,000 to 95,000
Change 1976 to 1977
Change June 1, 1976 to June 1, 1977
Change April 1, 1976 to April 1, 1977
Change 214,500 to 104,500

Director's Recommendation

It is the Director's recommendation that the Commission, subject to any changes found appropriate in light of recommendations made to the Commission, or findings reached after this May 27, 1977 hearing, take the following action:

1. Acknowledge as of record the consultation with and recommendations as received, of the Oregon Field Sanitation Committee, Oregon State University and any other parties consulted pursuant to ORS 468.460(3).

2. Enter specific findings as to whether:

   a. There are insufficient numbers of workable machines that can reasonably be made available to sanitize the acreage if an acreage reduction is ordered,

   b. There are insufficient methods available for straw utilization and disposal, and

   c. Reasonable efforts have been made to develop alternative methods of field sanitation and straw utilization and disposal, and such methods have been utilized to the maximum reasonable extent.

3. If findings with regard to the above three issues are all positive, allocate the statutory limit of 95,000 acres to be burned during 1977 or such other allocation as is deemed appropriate.

4. If any of the above-mentioned findings are negative, allocate such reduced acreage to be burned in 1977 as is found appropriate.

5. Confirm existing allocation procedures in the rules or make changes as appropriate as a result of testimony received.

6. Adopt revised rules as proposed (Attachment III) or as may be further amended.

William H. Young

WILLIAM H. YOUNG
Director

SF:sw
5-10-77

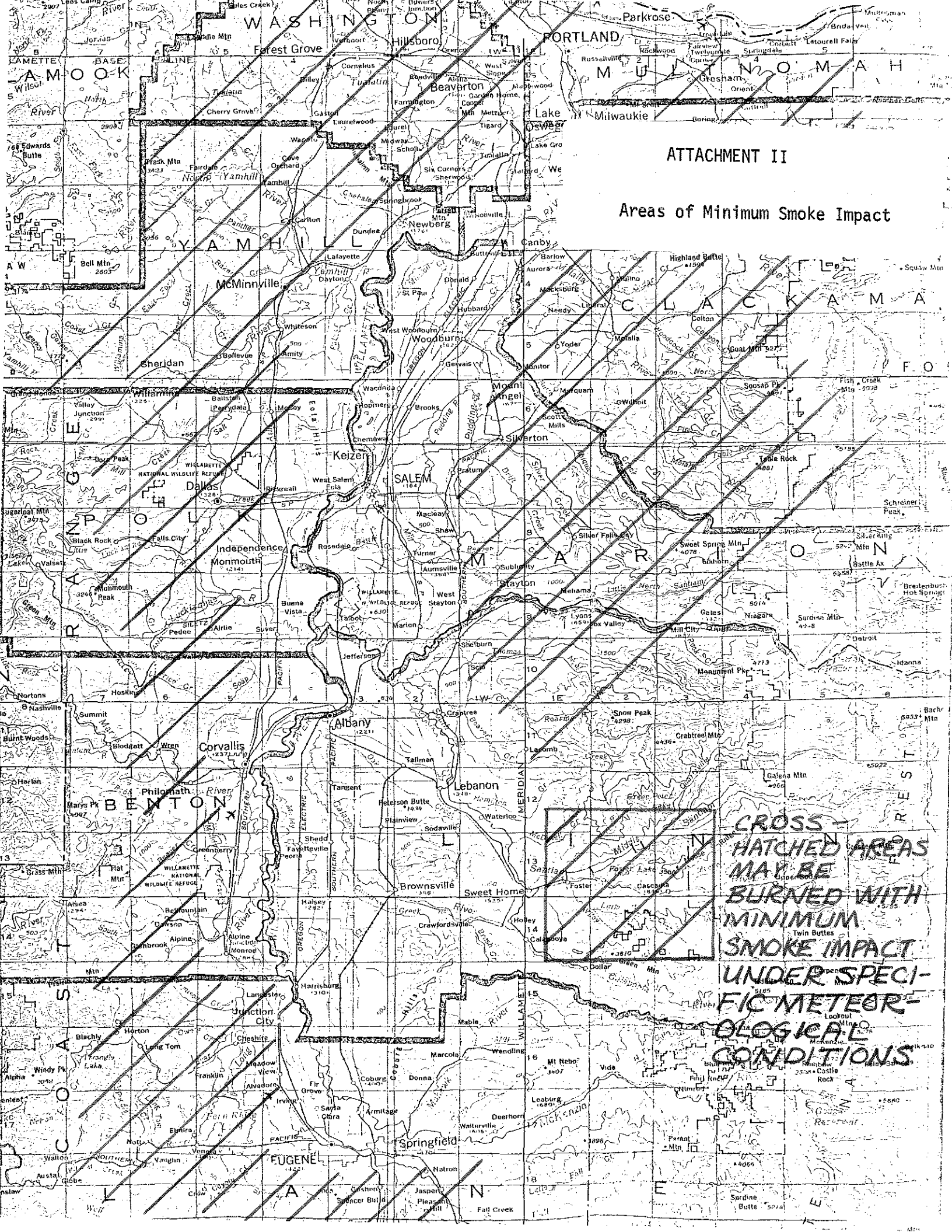
Attachments

ATTACHMENT I

1977 Field Burning Registration Summary

PRIOR ACRES	RGULR ACRES	REGIS ACRES	ALLOC ACRES	BRNED ACRES	PERN FLDS	PRNIAL ACRES	ANNL FLDS	ANNUAL ACRES	CERL FLDS	CEREAL ACRES	TOT FLDS	TOTL RGIS
SUMMARY FOR CLACKAMAS COUNTY												
366	5923	6289	00	00	155	5445	0	00	21	844	176	63
SUMMARY FOR MARION COUNTY												
4616	44592	49208	00	00	956	34922	86	5583	263	8703	1305	460
SUMMARY FOR POLK COUNTY												
3439	20142	23581	00	00	152	10641	179	8437	82	4503	413	96
SUMMARY FOR WASHINGTON COUNTY												
200	3101	3301	00	00	3	75	0	00	81	3226	84	38
SUMMARY FOR YAMHILL COUNTY												
3098	8270	11368	00	00	79	2862	48	1977	153	6529	280	131
SUMMARY FOR NORTH VALLEY												
11719	82028	93747	00	00	1345	53945	313	15997	600	23805	2258	788
SUMMARY FOR BENTON COUNTY												
10064	14601	24665	00	00	153	9039	150	14245	35	1381	338	107
SUMMARY FOR LANE COUNTY												
10116	21602	31718	00	00	195	13867	154	11112	122	6739	471	122
SUMMARY FOR LINN COUNTY												
31427	127653	159080	00	00	765	47492	1372	90930	505	20658	2642	711
SUMMARY FOR SOUTH VALLEY												
51607	163856	215463	00	00	1113	70398	1676	116287	662	28778	3451	940
SUMMARY FOR ENTIRE VALLEY												
63326	245884	309210	00	00	2458	124343	1989	132284	1262	52583	5709	1728

5-4-77 Preliminary - Subject to change on edit.


ATTACHMENT II
Areas of Minimum Smoke Impact
CROSS-HATCHED AREAS MAY BE BURNED WITH MINIMUM SMOKE IMPACT UNDER SPECIFIC METEOROLOGICAL CONDITIONS
WASHINGTON
CLACKAMAS
MARION
LINN
BENTON
LANE
YAMHILL
POLK
TILLAMOOK
MULTNOMAH
PORTLAND
Forest Grove
Hillsboro
Beaverton
Tigard
Lake Oswego
Milwaukie
Gresham
Parkrose
Newberg
McMinnville
Canby
Sheridan
Willamina
Woodburn
Mount Angel
Silverton
Keizer
SALEM
Dallas
Independence
Monmouth
Stayton
Albany
Corvallis
Lebanon
Brownsville
Sweet Home
Junction City
Harrisburg
Springfield
EUGENE
Cottage Grove
Oakridge
Detroit
Idanha
Mill City
Lyons
Scio
Jefferson
Shedd
Halsey
Crawfordsville
Foster
Cascadia
Santiam Pass
Mt Jefferson
Three Sisters
Mt Washington
Mt Nebo
Diamond Peak
Waldo Lake
Willamette National Forest
Willamette National Wildlife Refuge
Santiam River
North Santiam River
South Santiam River
Willamette River
Clackamas River
Molalla River
Pudding River
Yamhill River
Nestucca River
Siuslaw River
Coast Fork Willamette River
Middle Fork Willamette River
McKenzie River
Long Tom River
Calapooia River
Thomas Creek
Crabtree Creek
Roaring River
Green Peter Lake
Detroit Lake
Timothy Lake
Clear Lake
Horse Creek
Fish Creek
Battle Ax
Bachelor Mtn
Snow Peak
Crabtree Mtn
Galena Mtn
Twin Buttes
Sweet Spring Mtn
Schreiner Peak
Monument Pk
Sardine Mtn
Sardine Butte
Castle Rock
Lookout Mtn
Bell Mtn
Grass Mtn
Flat Mtn
Marys Pk
Peterson Butte
Green Mtn
Dollar Mtn
Windy Pk
Alpha
Mt Pisgah
Fern Ridge Reservoir
Cougar Reservoir
Foster Reservoir
Detroit Reservoir
Lookout Point Reservoir
Hills Creek Reservoir
Fall Creek Reservoir
Dexter Reservoir
Cottage Grove Reservoir
Siltcoos Lake
Tahkenitch Lake
Eel Lake
Clear Lake
Horse Creek
Fish Creek
Battle Ax
Bachelor Mtn
Snow Peak
Crabtree Mtn
Galena Mtn
Twin Buttes
Sweet Spring Mtn
Schreiner Peak
Monument Pk
Sardine Mtn
Sardine Butte
Castle Rock
Lookout Mtn
Bell Mtn
Grass Mtn
Flat Mtn
Marys Pk
Peterson Butte
Green Mtn
Dollar Mtn
Windy Pk
Alpha
Mt Pisgah
Fern Ridge Reservoir
Cougar Reservoir
Foster Reservoir
Detroit Reservoir
Lookout Point Reservoir
Hills Creek Reservoir
Fall Creek Reservoir
Dexter Reservoir
Cottage Grove Reservoir
Siltcoos Lake
Tahkenitch Lake
Eel Lake

DEPARTMENT OF ENVIRONMENTAL QUALITY
Chapter 340

Subdivision 6
Agricultural Operations
AGRICULTURAL BURNING

26-005 DEFINITIONS. As used in this general order, regulation and schedule, unless otherwise required by context:

(1) Burning seasons:

(a) "Summer Burning Season" means the four month period from July 1 through October 31.

(b) "Winter Burning Season" means the eight month period from November 1 through June 30.

(2) "Department" means the Department of Environmental Quality.

(3) "Marginal Conditions" means conditions defined in ORS 468.450(1) under which permits for agricultural open burning may be issued in accordance with this regulation and schedule.

(4) "Northerly Winds" means winds coming from directions in the north half of the compass, at the surface and aloft.

(5) "Priority Areas" means the following areas of the Willamette Valley:

(a) Areas in or within 3 miles of the city limits of incorporated cities having populations of 10,000 or greater.

(b) Areas within 1 mile of airports serving regularly scheduled airline flights.

(c) Areas in Lane County south of the line formed by U.S. Highway 126 and Oregon Highway 126.

(d) Areas in or within 3 miles of the city limits of the City of Lebanon.

(e) Areas on the west side of and within 1/4 mile of these highways; U.S. Interstate 5, 99, 99E and 99W. Areas on the south side of and within 1/4 mile of U.S. Highway 20 between Albany and Lebanon, Oregon Highway 34 between Lebanon and Corvallis, and Oregon Highway 228 from its junction south of Brownsville to its rail crossing at the community of Tulsa.

(6) "Prohibition Conditions" means atmospheric conditions under which all agricultural open burning is prohibited (except where an auxiliary fuel is used such that combustion is nearly complete, or an approved sanitizer is used).

(7) "Southerly Winds" means winds coming from directions in the south half of the compass, at the surface and aloft.

(8) "Willamette Valley" means the areas of Benton, Clackamas, Lane, Linn, Marion, Multnomah, Polk, Washington and Yamhill Counties lying between the crest of the Coast Range and the crest of the Cascade Mountains, and includes the following:

(a) "South Valley," the areas of jurisdiction of all fire permit issuing agents or agencies in the Willamette Valley portions of the Counties of Benton, Lane or Linn.

(b) "North Valley," the areas of jurisdiction of all other fire permit issuing agents or agencies in the Willamette Valley.

(9) "Commission" means the Environmental Quality Commission.

(10) "Local Fire Permit Issuing Agency" means the County Court or Board of County Commissioners or Fire Chief of a Rural Fire Protection District or other person authorized to issue fire permits pursuant to ORS 477.515, 477.530, 476.380 or 478.960.

(11) "Open Field Burning Permit" means a permit issued by the Department pursuant to Section 2 of SB 311.

(12) "Fire Permit" means a permit issued by a local fire permit issuing agency pursuant to ORS 477.515, 477.530, 476.380 or 478.960.

(13) "Validation Number" means a unique three-part number issued by a local fire permit issuing agency which validates a specific open field burning permit for a specific acreage on a specific day. The first part of the validation number shall indicate the number of the month and the day of issuance, the second part the hour of authorized burning based on a 24 hour clock and the third part shall indicate the size of acreage to be burned (e.g., a validation number issued August 26 at 2:30 p.m. for a 70 acre burn would be 0826-1430-070).

(14) "Open Field Burning" means burning of any perennial grass seed field, annual grass seed field or cereal grain field in such manner that combustion air and combustion products are not effectively controlled. Field burning utilizing a device other than an approved field sanitizer shall constitute open field burning.

(15) "Approved Field Sanitizer" means any field burning device that has been approved by the Field Sanitation Committee and the Department as a feasible alternative to open field burning.

(16) "Approved Experimental Field Sanitizer" means any field burning device that has been approved by the Field Sanitation Committee and the Department for trial as a potentially feasible alternative to open field burning or as a source of information useful to further development of field sanitizers.

(17) "After-Smoke" means persistent smoke resulting from the burning of a grass seed or cereal grain field with a field sanitizer, and emanating from the grass seed or cereal grain stubble or assumulated straw residue at a point ten (10) feet or more behind a field sanitizer.

(18) "leakage" means any smoke which is not vented through a stack and is not classified as after-smoke, and is produced as a result of using a field sanitizer.

(19) "Committee" means Oregon Field Sanitation Committee.

(20) "Approved Pilot Field Sanitizer" means any field burning device that has been observed and endorsed by the Committee and the Department as an acceptable but improvable alternative to open field burning, the operation of which is expected to contribute information useful to further development and improved performance of field sanitizers.

(21) "Approved Alternative Methods" means any method approved by the Committee and the Department to be a satisfactory alternative method to open field burning.

(22) "Approved Interim Alternative Method" means any interim method approved by the Committee and the Department as an effective method to reduce or otherwise minimize the impact of smoke from open field burning.

(23) "Approved Alternative Facilities" means any land, structure, building, installation, excavation, machinery, equipment or device approved by the Committee and the Department for use in conjunction with an Approved Alternative Method or an Approved Interim Alternative Method for field sanitation.

26-010 GENERAL PROVISIONS. The following provisions apply during both summer and winter burning seasons in the Willamette Valley unless otherwise specifically noted.

(1) Priority for Burning. On any marginal day, priorities for agricultural open burning shall follow those set forth in ORS 468.450 which give perennial grass seed field used for grass seed production first priority, annual grass seed fields used for grass seed production second priority, grain fields third priority and all other burning fourth priority.

(2) Permits required.

(a) No person shall conduct open field burning within the Willamette Valley without first obtaining a valid open field burning permit from the Department and a fire permit and validation number from the local fire permit issuing agency for any given field for the day that the field is to be burned.

(b) Applications for open field burning permits shall be filed on Registration/Application forms provided by the Department.

(c) Open field burning permits issued by the Department are not valid until acreage fees are paid pursuant to ORS 468.480(1)(b) and a validation number is obtained from the appropriate local fire permit issuing agency for each field on the day that the field is to be burned.

(d) As provided in ORS 468.465(1), permits for open field burning of cereal grain crops shall be issued only if the person seeking the permit submits to the issuing authority a signed statement under oath or affirmation that the acreage to be burned will be planted to seed crops (other than cereal grains, hairy vetch, or field pea crops) which require flame sanitation for proper cultivation.

(e) Any person granted an open field burning permit under these rules shall maintain a copy of said permit at the burn site at all times during the burning operation and said permit shall be made available for at least one year after issuance for inspection upon request by appropriate authorities.

(f) At all times proper and accurate records of permit transactions and copies of all permits shall be maintained by each agency or person involved in the issuance of permits, for inspection by the proper authority.

(g) Permit agencies or persons authorized to participate in the issuance of permits shall submit to the Department, on forms provided, weekly summaries of field burning permit data, during the period July 1 to October 15.

(h) All debris, cutting and prunings shall be dry, cleanly stacked and free of dirt and green material prior to being burned, to insure as nearly complete combustion as possible.

(i) No substance or material which normally emits dense smoke or obnoxious odors may be used for auxiliary fuel in the igniting of debris, cutting or prunings.

(j) Use of approved field sanitizers shall require a fire permit, and permit agencies or agents shall keep up-to-date records of all acreages burned by such sanitizers.

26-011 CERTIFIED ALTERNATIVE TO OPEN FIELD BURNING

(1) Approved pilot field sanitizers, approved experimental field sanitizers, or propane flamers may be used as alternatives to open field burning subject to the provisions of this section.

(2) Approved Pilot Field Sanitizers

(a) Procedures for submitting application for approval of pilot field sanitizers.

Applications shall be submitted in writing to the Department and shall include, but not be limited to, the following:

(i) Design plans and specifications;

(ii) Acreage and emission performance data and rated capacities;

(iii) Details regarding availability of repair service and replacement parts;

(iv) Operational instructions;

(v) Letter of approval from the Field Sanitation Committee.

(b) Emission Standards for Approved Pilot Field Sanitizers.

(A) Approved pilot field sanitizers shall be required to demonstrate the capability of sanitizing a representative and harvested grass field or cereal grain stubble with an accumulative straw and stubble fuel load of not less than 1.0 tons/acre, dry weight basis, and which has an average moisture content not less than 10%, at a rate of not less than 85% of rated maximum capacity for a period of 30 continuous minutes without exceeding emission standards as follows:

(i) 20% average opacity out of main stack;

(ii) Leakage not to exceed 20% of the total emissions;

(iii) No significant after-smoke originating more than 25 yards behind the operating machine.

(B) The Department shall certify in writing to the Field Sanitation Committee and the manufacturer, the approval of the pilot field sanitizer within thirty (30) days of the receipt of a complete application and successful compliance demonstration with the emission standards of 2(b)(A). Such approval shall apply to all machines built to the specifications of the Department certified field sanitation machine.

(C) In the event of the development of significantly superior field sanitizers, the Department may decertify approved pilot field sanitizers previously approved, except that any unit built prior to this decertification in accordance with specifications of previously approved pilot field sanitizers shall be allowed to operate for a period not to exceed seven years from the date of delivery provided that the unit is adequately maintained as per (2)(c)(A).

(c) Operation and/or modification of approved pilot field sanitizers.

(A) Operating approved pilot field sanitizers shall be maintained to design specifications (normal wear expected) i.e., skirts, shrouds, shields, air bars, ducts, fans, motors, etc., shall be in palce, intact and operational.

(B) Modifications to the structure or operating procedures which will knowingly increase emissions shall not be made.

(C) Any modifications to the structure or operating procedures which result in increased emissions shall be further modified or returned to manufacturer's specifications to reduce emissions to original levels or below as rapidly as practicable.

(D) Open fires away from the sanitizers shall be extinguished as rapidly as practicable.

(3) Experimental field sanitizers identified in writing as experimental units by the Committee and not meeting the emission criteria specified in 2(b)(A) above, may receive Department authorization for experimental use for not more than one season at a time, provided:

(a) The Committee shall report to the Department field burning manager the locations of operation of experimental field sanitizers.

(b) The Committee shall provide the Department an end-of-season report of experimental field sanitizer operations.

(c) Open fires away from the maxhines shall be extinguished as rapidly as practicable.

(4) Propane Flamers. Open propane flaming is an approved alternative to open field burning provided that all of the following conditions are met:

(a) Field sanitizers are not available or otherwise cannot accomplish the burning.

(b) The field stubble will not sustain an open fire.

(c) One of the following conditions exist:

(A) The field has been previously open burned and appropriate fees paid.

(B) The field has been flail-chopped, mowed, or otherwise cut close to the ground and loose straw has been removed to reduce the straw fuel load as much as practicable.

26-012 · REGISTRATION AND AUTHORIZATION OF ACREAGE TO BE OPEN BURNED.

(1) On [~~or before July 1, 1975 and on~~] or before April 1 of each [~~subsequent~~] year, all acreages to be open burned under this rule shall be registered with the local fire permit issuing agency or its authorized representative.

(2) Registration of acreage [~~after July 1, 1975 and~~] after April 1 of each [~~subsequent~~] year shall require:

(a) Approval of the Department.

(b) An additional late registration fee of $1 per acre if the late registration is determined by the Department to be the fault of the late registrant.

(3) Copies of all Registration/Application forms shall be forwarded to the Department promptly by the local fire permit issuing agency.

(4) The local fire permitting agency shall maintain a record of all registered acreage by assigned field number, location, type of crop, number of acres to be burned and status of fee payment for each field.

(5) Burn authorizations shall be issued by the local fire permit issuing agency up to daily quota limitations established by the Department and shall be based on registered fee-paid acres and shall be issued in accordance with the priorities established by sub-section 26-010(1) of these rules, except that fourth priority burning shall not be permitted from July 15 to September 15 of any year unless specifically authorized by the Department.

(6) No local fire permit issuing agency shall authorize open field burning of more acreage than may be sub-allocated annually to the District by the Department pursuant to Section 26-013(5) of these rules.

26-013 LIMITATION AND ALLOCATION OF ACREAGE TO BE OPEN BURNED.

(1) Maximum acreage to be open burned under these rules each year shall not exceed the following:

(a) During [~~1976~~] 1977, not more than [~~195,000~~] 95,000 acres.

(b) In 1978 and each year thereafter, the Commission, after taking into consideration the factors listed in sub-section (2) or ORS 468.460, may by order issue permits for the burning of not more than 50,000 acres.

(2) [On or before May 1 of any] Each year, the Commission shall seek certification from the Field Sanitation Committee of the numbers of acres that can be sanitized by feasible alternative methods and the Committee's recommendations as to the general location and types of fields to be sanitized utilizing feasible alternative methods.

(3) On or before [July 10, 1975 and] June 1 of each [subsequent] year, the Commission shall, after public hearing, establish an allocation of registered acres that can be open burned that year. In establishing said acreage allocation, the Commission shall consult with OSU and the Oregon Field Sanitation Commiteee and may consult with other interested agencies and shall, pursuant to ORS 468.460(2) and ORS 468.475(4) consider means of more rapid reduction of acres burned each year than provided by ORS 468.475(2).

(4) Acres burned on any day by approved field sanitizers shall not be applied to open field burning acreage allocations or quotas, and such sanitizers may be operated under either marginal or prohibition conditions.

(5) For the [1976] 1977 burning season, in the event that more than [195,000] 95,000 acres are registered to be burned, the Department may issue acreage allocations to growers totaling not more than [195,000] 95,000 acres plus ten (10) percent or [214,500] 104,500 acres. The Department shall monitor burning and shall cease to issue burning quotas when a total of [195,000] 95,000 acres have been reported burned.

(a) Allocations to growers will be made by applying a first and second allocation procedure:

(A) A first allocation will be made to each grower based on all of his registered acreage up to and including 100 acres.

(B) A second allocation will be made to each grower having more than 100 registered acres based on the grower's proportional share of the unallocated remainder of the total [~~214,500~~] 104,500 acre grower allocation.

(b) The fire district allocation shall be the sum of all first allocations applied to growers within the district plus the proportionate district share of the unallocated portion of the [~~195,000~~] 95,000 total burnable acres.

(c) In an effort to insure that permits are available in areas of greatest need, to coordinate completion of burning, and to achieve the greatest possible permit untilization, the Department may adjust, in cooperation with the fire districts, allocations of the [~~195,000~~] 95,000 burnable acres made to those fire districts.

(d) Transfer of allocations for farm management purposes may be made within and between fire districts on a one-in/one-out basis under the supervision of the Department. Transfer of allocations between growers are not permitted after [~~195,000~~] 95,000 acres have been burned within the Valley.

(e) Except for additional acreage allowed to be burned by the Governor pursuant to ORS 468.475(5), no fire district shall allow acreage to be burned in excess of their allocations assigned pursuant to (b), (c) and (d) above.

(f) In [~~1976~~] 1977 the Department may supervise "wide area energy concentrated convective ventilation experiments" to investigate the possible use of the techniques as an alternative to open burning. The total acreage involved with such experimentation shall not exceed that amount specifically authorized in writing by the Department and shall not exceed 10,000 acres.

(6) The Department may authorize burning on an experimental basis, and may also, on a fire district by fire district basis, issue limitations more restrictive than those contained in these regulations when in their judgement it is necessary to attain air quality.

26-015 WILLAMETTE VALLEY SUMMER BURNING SEASON REGULATIONS

(1) Classification of Atmospheric Conditions. All days will be classified as marginal or prohibition days under the following criteria:

(a) Marginal Class N conditions: Forecast northerly winds and maximum mixing depth greater than 3500 feet.

(b) Marginal Class S conditions: Forecast southerly winds.

(c) Prohibition conditions: Forecast northerly winds and maximum mixing depth 3500 feet or less.

(2) Quotas.

(a) Except as provided in this subsection, the total acreage of permits for open field burning shall not exceed the amount authorized by the Department for each marginal day. Daily authorizations of acreages shall be issued in terms of basic quotas or priority area quotas as listed in Table 1, attached as Exhibit A and incorporated by reference into this regulation and schedule, and defined as follows:

(A) The basic quota represents the number of acres to be allowed throughout a permit jurisdiction, including fields located in priority areas, on a marginal day on which general burning is allowed in that jurisdiction.

(B) The priority area quota represents the number of acres allowed within the priority areas of a permit jurisdiction on a marginal day when only priority area burning is allowed in that jurisdiction.

(b) Willamette Valley permit agencies or agents not specifically named in Table 1 shall have a basic quota and priority area quota of 50 acres only if they have registered acreage to be burned within their jurisdiction.

(c) In no instance shall the total acreage of permits issued by any permit issuing agency or agent exceed that allowed by the Department for the marginal day, except as provided for 50 acre quotas as follows: When the established daily acreage quota is 50 acres or less, a permit may be issued to include all the acreage in one field providing that field does not exceed 100 acres and provided further that no other permit is issued for that day. For those districts with a 50 acre quota, permits for more than 50 acres shall not be issued on two consecutive days.

(d) The Department may designate additional areas as Priority Areas, and may adjust the basic acreage quotas or priority area quotas of any permit jurisdiction, where conditions in their judgment warrant such action.

(3) Burning Hours may begin at 9:30 a.m. PDT, under marginal conditions but no open field burning may be started later than one-half hour before sunset nor be allowed to continue burning later than one and one-half hour after sunset. Burning hours may be reduced by the fire chief or his deputy when necessary to protect from danger by fire.

(4) Extent and Type of Burning.

(a) Prohibition. Under prohibition conditions, no fire permits or validation numbers for agricultural open burning shall be issued and no burning shall be conducted, except where an auxiliary liquid or gaseous fuel is used such that combustion is essentially complete, or an approved field sanitizer is used.

(b) Marginal Class N Conditions. Unless specifically authorized by the Department, on days classified as Marginal Class N burning may be limited to the following:

(A) North Valley: one basic quota may be issued in accordance with Table 1.

(B) South Valley: one priority area quota for priority area burning may be issued in accordance with Table 1.

(c) Marginal Class S Conditions. Unless specifically authorized by the Department on days classified as Marginal Class S conditons, burning shall be limited to the following:

(A) North Valley: One basic quota may be issued in accordance with Table 1 in the following permit jurisdictions: Aumsville, Drakes Crossing, Marion County District 1, Silverton, Stayton, Sublimity, and the Marion County portion of the Clackamas-Marion Forest Protection District. One priority area quota may be issued in accordance with Table 1 for priority area burning in all other North Valley jurisdictions.

(B) South Valley: One basic quota may be issued in accordance with Table 1.

(d) Special Restrictions on Priority Area Burning. No field may be burned on the upwind side of any city, airport, or highway within a priority area.

TABLE 1

FIELD BURNING ACREAGE QUOTAS

NORTH VALLEY AREAS

County/Fire District	Quota	
North Valley Counties	Basic	Priority
Clackamas County		
Canby RFPD	50	50
Clackamas County #54	50	0
Clackamas - Marion FPA	50	0
Estacada RFPD	75	0
Molalla RFPD	59	0
Monitor RFPD	50	0
Scotts Mills RFPD	50	0
Total	375	50
Marion County		
Aumsville RFPD	50	0
Aurora-Donald RFPD	50	50
Drakes Crossing RFPD	50	0
Hubbard RFPD	50	0
Jefferson RFPD	225	50
Marion County #1	100	50
Marion County Unprotected	50	50
Mt. Angel RFPD	50	0

TABLE 1
(continued)

County/Fire District	Quota	
North Valley Counties	Basic	Priority
Marion County (continued)		
St. Paul RFPD	125	0
Salem City	50	50
Silverton RFPD	300	0
Stayton RFPD	150	0
Sublimity RFPD	250	0
Turner RFPD	50	50
Woodburn RFPD	125	50
Total	1675	350
Polk County		
Polk County Non-District	50	0
Southeast Rural Polk	400	50
Southwest Rural Polk	125	50
Total	575	100
Washington County		
Cornelius RFPD	50	50
Forest Grove RFPD	50	0
Forest Grove, State Forestry	50	0
Hillsboro	50	50
Washington County FPD #1	50	50
Washington County FPD #1	50	50
Total	300	200

TABLE 1
(continued)

County/Fire District	Quota	
	Basic	Priority
North Valley Counties		
Yamhill County		
Amity RFPD	125	50
Carlton RFPD	50	50
Dayton RFPD	50	50
Dundee RFPD	50	0
McMinnville RFPD	150	75
Newberg RFPD	50	0
Sheridan RFPD	75	50
Yamhill RFPD	50	0
Total	600	275
North Valley Total	3575	975

Table 1
(continued)

SOUTH VALLEY AREAS

County/Fire District	Quota	
South Valley Counties	Basic	Priority
Benton County		
County Non-District & Adair	350	175
Corvallis RFPD	175	125
Monroe RFPD	325	50
Philomath RFPD	125	100
Western Oregon FPD	100	50
Total	1075	500
Lane County		
Coburg RFPD	175	50
Creswell RFPD	75	100
Eugene RFPD		
(Zumwalt RFPD)	50	50
Junction City RFPD	325	50
Lane County Non-District	100	50
Lane County RFPD #1	350	50
Santa Clara RFPD	50	50
Thurston-Walterville	50	50
West Lane FPD	50	0
Total	1225	450
Linn County		
Albany RFPD (inc. N. Albany, Palestine,		
Co. Unprotected Areas)	625	125
Brownsville RFPD	750	50

Table 1
(continued)

County/Fire District	Quota	
South Valley Counties	Basic	Priority
Linn County (continued)		
Halsey-Shedd RFPD	2050	200
Harrisburg RFPD	1350	50
Lebanon RFPD	325	325
Lyons RFPD	50	0
Scio RFPD	175	0
Tangent RFPD	925	325
Total	6250	1075
South Valley Total	8550	2025

26-020 WINTER BURNING SEASON REGULATIONS.

(1) Classification of atmospheric conditions:

(a) Atmospheric conditions resulting in computer air pollution index values in the high range, values of 90 or greater, shall constitute prohibition conditions.

(b) Atmospheric conditions resulting in computed air pollution index values in the low and moderate ranges, values less than 90, shall constitute marginal conditions.

(2) Extent and Type of Burning.

(a) Burning Hours. Burning hours for all types of burning shall be from 9:00 a.m. until 4:00 p.m., but may be reduced when deemed necessary by the fire chief or his deputy. Burning hours for stumps may be increased if found necessary to do so by the permit issuing agency. All materials for burning shall be prepared and the operation conducted, subject to local fire protection regulations, to insure that it will be completed during the allotted time.

(b) Certain Burning Allowed Under Prohibition Conditions. Under prohibition conditions no permits for agricultural open burning may be issued and no burning may be conducted, except where an auxiliary liquid or gaseous fuel is used such that combustion is essentially complete, or an approved field sanitizer is used.

(c) Priority for Burning on Marginal Days. Permits for agricultural open burning may be issued on each marginal day in each permit jurisdiction in the Willamette Valley, following the priorities set forth in ORS 468.450 which gives perennial grass seed fields used for grass seed production first priority, annual grass seed fields used for grass seed production second priority, grain fields third priority and all other burning fourth priority.

26-025 CIVIL PENALTIES. In addition to any other penalty provided by law:

(1) Any person who intentionally or negligently causes or permits open field burning contrary to the provisions of ORS 468.450, 468.455 to 468.485, 476.380 and 478.960 shall be assessed by the Department a civil penalty of at least $20, but not more than $40 for each acre so burned.

(2) Any person planting contrary to the restrictions of subsection (1) of ORS 468.465 shall be assessed by the Department a civil penalty of $25 for each acre planted contrary to the restrictions.

(3) Any person who violates any requirements of these rules shall be assessed a civil penalty pursuant to OAR Chapter 340, Division 1, Subdivision 2, CIVIL PENALTIES.

26-030 TAX CREDITS FOR APPROVED ALTERNATIVE METHODS, APPROVED INTERIM ALTERNATIVE METHODS OR APPROVED ALTERNATIVE FACILITIES.

(1) As provided in Oregon Laws 1975 Chapter 559 and ORS Chapter 468, approved alternative methods, approved interim alternative methods or approved alternative facilities are eligible for tax credit as pollution control facilities as described in ORS 468.155 through 468.190.

(2) Approved alternative facilities eligible for pollution control facility tax credit shall include:

(a) Mobile equipment including but not limited to:

(A) Straw gathering, densifying and handling equipment.

(B) Tractors and other sources of motive power.

(C) Trucks, trailers, and other transportation equipment.

(D) Mobile field sanitizers (approved models and approved pilot models) and associated fire control equipment.

(E) Equipment for handling all forms of processed straw.

(F) Special straw incorporation equipment.

(b) Stationary equipment and structures including but not limited to:

(A) Straw loading and unloading facilities.

(B) Straw storage structures.

(C) Straw processing and in plant transport equipment.

(D) Land associated with stationary straw processing facilities.

(E) Drainage tile installations which will result in a reduction of acreage burned.

(3) Equipment and facilities included in an application for certification for tax credit under this rule will be considered at their current depreciated value and in proportion to their actual use to reduce open field burning as compared to their total farm or other use.

(4) Procedures for application and certification of approved alternative facilities for pollution control facility tax credit.

(a) Preliminary certification for pollution control facility tax credit.

(A) A written application for preliminary certification shall be made to the Department prior to installation or use of approved alternative facilities in the first harvest season for which an application for tax credit certification is to be made. Such application shall be made on a form provided by the Department and shall include but not be limited to:

(i) Name, address and nature of business of the applicant.

(ii) Name of person authorized to receive Department requests for additional information.

(iii) Description of alternative method to be used.

(iv) A complete listing of mobile equipment and stationary facilities to be used in carrying out the alternative methods and for each item listed include:

(a) Date or estimated future date of purchase.

(b) Percentage of use allocated to approved alternative methods and approved interim alternative methods as compared to their total farm or other use.

(v) Such other information as the Department may require to determine compliance with state air, water, solid waste, and noise laws and regulations and to determine eligibility for tax credit.

(B) If, upon receipt of a properly completed application for preliminary certification for tax credit for approved alternative facilities the Department finds the proposed use of the approved alternative facilities are in accordance with the provisions of ORS 468.175, it shall, within 60 days, issue a preliminary certification of approval. If the proposed use of the approved alternative facilities are not in accordance with provisions of ORS 468.175, the Commission shall, within 60 days, issue an order denying certification.

(b) Certification for pollution control facility tax credit.

(A) A written application for certification shall be made to the Department on a form provided by the Department and shall include but not be limited to the following:

(i) Name, address and nature of business of the applicant.

(ii) Name of person authorized to receive Department requests for additional information.

(iii) Description of the alternative method to be used.

(iv) For each piece of mobile equipment and/or for each stationary facility, a complete description including the following information as applicable:

(a) Type and general description of each piece of mobile equipment.

(b) Complete description and copy of proposed plans or drawings of stationary facilities including buildings and contents used for straw storage, handling or processing of straw and straw products or used for storage of mobile field sanitizers and legal description of real property involved.

(c) Date of purchase or initial operation.

(d) Cost when purchased or constructed and current value.

(e) General use as applied to approved alternative methods and approved interim alternative methods.

(f) Percentage of use allocated to approved alternative methods and approved interim alternative methods as compared to their farm or other use.

(B) Upon receipt of a properly completed application for certification for tax credit for approved alternative facilities or any subsequently requested additions to the application, the Department shall return within 120 days the decision of the Commission and certification as necessary indicating the portion of the cost of each facility allocable to pollution control.

(5) Certification for tax credits of equipment or facilities not covered in OAR Chapter 340, Section 26-030(1) through 26-030(4) shall be processed pursuant to the provisions of ORS 468.165 through 468.185.

(6) Election of type of tax credit pursuant to ORS 468.170(5).

(a) As provided in ORS 468.170(5), a person receiving the certification provided for in OAR Chapter 340, Section 26-030(4)(b) shall make an irrevocable election to take the tax credit relief under ORS 316.097, 317.072, or the ad volorem tax relief under ORS 307.405 and shall inform the Department of his election within 60 days of receipt of certification documents on the form supplied by the Department with the certification documents.

(b) As provided in ORS 468.170(5) failure to notify the Department of the election of the type of tax credit relief within 60 days shall render the certification ineffective for any tax relief under ORS 307.405, 316.097 and 317.072.

ENVIRONMENTAL QUALITY COMMISSION

1234 S.W. MORRISON STREET • PORTLAND, ORE. 97205 • Telephone (503) 229-5696

ROBERT W. STRAUB
GOVERNOR

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. G, May 27, 1977, EQC Meeting

Proposed Rule Revisions to Agricultural Burning Rules
OAR Chapter 340, Sections 26-005 through 26-030

As noted in the previously mailed staff report, additional testimony has been received regarding acreage allocation procedures. Oregon State University has submitted a letter which discusses the agricultural aspects of alternative methods. A copy of the letter is attached.

On May 11, 1977, the Oregon Field Sanitation Committee met and discussed allocation procedures. Since most allocation procedures will use up most of the 95,000 acres being considered at this public hearing, the Committee opted for the percentage cut basis for allocation. Committee member Janet McLennan indicated that if allocations of larger acreages were to be considered in the future she would propose new methods. The Committee also indicated that Mobile Field Sanitizers were expected to treat approximately 1500 acres this year.

WILLIAM H. YOUNG
Director

Crop Science Dept.
EXTENSION SERVICE

Oregon State University

(503) 754-2771
Corvallis, Oregon 97331

May 17, 1977

Scott A. Freeburn, Manager
Field Burning Program
Department of Environmental Quality
16 Oakway Mall
Eugene, OR 97401

Doug Brannock
Department of Environmental Quality
1234 S. W. Morrison Street
Portland, OR 97205

Dear Mr. Freeburn and Mr. Brannock:

Subject: EQC Hearing to Allocate Open Field Burning Acreages

The following statement summarizes the opinion of Oregon State University staff members listed in regard to the question of availability of alternative methods of field sanitation in 1977.

PLANT DISEASE CONTROL

Dr. John Hardison has developed the background information substantiating the pressing need for disease control and the effectiveness of field burning for control of major grass diseases. It is our impression that the current Oregon law was passed with the expectation that two main alternatives to burning, namely mobile field sanitizers and chemicals, would soon be available for disease control. Neither alternative has progressed to the point of being available for the 1977 season. The 1975 and 1976 tests demonstrated that no mobile field sanitizer is yet operational or reliable. Even when a field sanitizer of some design does become operational, the question still remains as to whether the sanitizer is economically feasible. Sanitizers cannot be considered available to growers for 1977. Models that have been constructed can be used for demonstration and testing to develop an informational base for future use.

Major diseases, especially ergot and blind seed disease, are now controlled only by burning. The experimental chemical BAY MEB 6447 may help seed production by control of diseases such as rusts, powdery mildew, and many other leaf and stem diseases; but it is not expected to solve the ergot and blind seed disease problems. Neither the availability nor field effectiveness of the chemical can be assured at this time. In addition, we do not know the cost from which to determine economic feasibility. New chemicals are being screened to find a control of blind seed and ergot.

WEED CONTROL

Dr. Orvid Lee reports that field burning, initiated in grass seed fields in western Oregon to control plant diseases, also proved effective in controlling other plant pests. Burning is essential in providing satisfactory weed control in grass seed fields in western Oregon to meet current market quality standards.

Field burning is the principal means of controlling winter annual grass weeds in annual ryegrass seed fields. Burning destroys the weed seed source. Research has shown that burning destroys 95% or more of the weed seeds in a field. Without burning, all weed seeds on the field are returned to the soil and result in an explosive weed population.

Dr. Orvid Lee's research shows that NC-8438 (2-ethoxy-2,3-dihydro-3, 3-dimethyl-5-benzofuranyl methanesulphonate), marketed by the Fisons Corporation under the name "Nortron," has potential for selective control of winter annual grass weeds in annual ryegrass. When it is applied preemergence or early postemergence, annual ryegrass is not injured at rates that are very effective in controlling troublesome weeds, particularly rattail fescue (*Festuca myuros* L.), annual bluegrass (*Poa annua* L.), and wild oats (*Avena fatua* L.).

NC-8438 is not registered for general use at this time. A temporary permit was issued by EPA in the fall of 1975 to allow field scale testing. This temporary use permit may be extended into 1977, but we have no assurance that it will at this time. There is no indication when full registration can be obtained.

While NC-8438 looks promising for selective weed control in annual ryegrass, it will be expensive to use. Cost of applying the herbicide is estimated to be from $25.00 to $35.00 per acre, depending on the weed problem. In addition, the crop residue must be removed, the field plowed and worked before application. This will add an additional cost of $25.00 to $30.00 per acre. Thus, if NC-8438 were available, cost to the grower for weed control to replace open burning on annual ryegrass would be $40.00 to $60.00 per acre.

In perennial grass seed fields, open burning not only destroys most of the weed seeds on the field but also removes crop residues which interfere with the action of soil-applied herbicides that are used to selectively control winter annual grass weeds. All herbicides now registered for selective control of winter annual grass weeds in established perennial grass seed fields are adsorbed and inactivated by crop residues. Since 1965, a number of experiments comparing the effect of different methods of crop residue management on herbicidal activity have been conducted. Results show that without burning in some form, none of the herbicides gave satisfactory weed control. Weed control has been satisfactory where fields were burned with the mobile sanitizers being tested. There are no herbicides being evaluated with potential for selective grass weed control in perennial grass seed fields that are not adversely affected by crop residues.

INSECT CONTROL

Insects that use leaves, seed culms, and stems of grasses as overwintering sites are affected by field burning, while those pests that feed in the roots or crowns of grasses are not affected by burning. Seven species of plant bugs occur in grasses grown for seed in the Willamette Valley. These do, or potentially could, cause a condition in grasses called "silver top" in which part or all of the inflorescence prematurely turns white, resulting in sterile seed.

Insecticides that once effectively controlled plant bugs have been canceled by the EPA because of real or potential environmental concerns.

Research studies indicate that any reduction in field burning is likely to result in an increase in "silver top" and a subsequent need for insecticides to control plant bugs. These insecticides must be registered with tolerances permitted in grass and straw for forage and feed, if present practices are to continue.

FIELD SANITIZER DEVELOPMENT

Considering the performance of the various models of sanitizers placed in the field to date, it becomes clear that no particular design of machine has evolved past the experimental stage and become an operational commercial prototype. Several of the different models tested have displayed desirable features such as reduced initial cost, maneuverability, fire control, fuel economy, adequate field capacity under certain conditions, ability to handle an adequate spectrum of moisture conditions, etc., but these features have not been integrated into a single operational design. Until a machine can demonstrate its performance over the broad range of necessary operating conditions throughout the burning season, the sanitizer cannot be considered available to the seed growers.

SUMMARY

There is no feasible chemical or substitute thermal treatment available to control ergot, blind seed disease, or seed nematode other than open field burning during the 1977 season. Further, field burning is the only available technique for control of insects that cause "silver top." Without field burning for weed control in both annual and perennial grasses grown for seed, it will be difficult if not impossible to produce grass seeds that meet the high quality standards for purity demanded by the consumer. As a consequence, many farmers, especially those farming on land with poor drainage, excessive slope, or other physical limitations, will be forced out of seed production. They have few, if any, economically viable cropping alternatives.

The EQC should allow the maximum to be burned in 1977. Due to adverse weather conditions, a critical condition exists because of failure to burn fields in 1976. Support should be given to increased acreage above the 95,000-acre allowance in view of the limited acreage burned in 1976. The acreage reduction proposed is beyond the capacity of the seed industry to adjust because of the lack of alternatives.

Proposals to adjust allocation of reduced acreage according to soil limitations of slope or drainage present serious problems. The acreage with severe limitations far exceeds the 95,000 acres to be allocated.

I am attaching a statement which shows more than 250,000 acres of soils with severe drainage limitations in the three south valley counties. Hill land soils with severe erosion hazards exist in many counties. Discriminatory allocation of burning to these soils on the basis of their limitations would require months of staff time in identifying fields and making judgments on their application of the criteria. Any consideration of burning allocation on this basis should carefully consider the adequacy of the data base from which such judgments will be made and the staff time involved in allocation.

Field sanitation is essential to grass seed production of both annual and perennial crops, and the individual grower is best able to judge which fields he will allow to remain unsanitized. Thus, any reduction in acreage below registered acres should be allocated equally to all grass seed growers.

Sincerely,

Harold Youngberg
Extension Agronomist

HY/llv
cc: J. R. Hardison
D. Kirk
J. Capizzi
D. Chilcote
Dean Cooney
D. Moss
F. Hagelstein
O. Lee

Oregon State University

AGRONOMIC CROP SCIENCE REPORT

Research Extension

SOUTHERN WILLAMETTE VALLEY SOILS WITH SERIOUS RESTRICTIONS THAT LIMIT CROP ALTERNATIVES

Harold Youngberg, Extension Agronomist
Oregon State University

Grass seed production in the southern Willamette Valley is located on poorly drained soils that have severely limited cropping alternatives. Linn, Lane, and Benton Counties have 259,400 acres classified as poorly drained with slow or very slow permeability and excess surface water causing them to be difficult to subsurface drain (Table 1). The characteristics of these soils are described in Table 2. The Amity soil series is included in this group but is classified as somewhat poorly drained with a high water table during the winter and spring months. Crop production is strongly limited by wetness without artificial drainage. The excess water can be removed from these soils by an adequate drainage system only if outlets are available.

Grass seed crops can tolerate the winter flooding and saturated soils common in these areas. There are few other crops that are adapted to these soils. More than 170,000 acres of grass seed are grown in these counties, or approximately 65% of the area in these soil series is in grass seed production.

TABLE 1
ACREAGES OF CERTAIN SOIL SERIES BY COUNTIES 1/

Soil series	Benton	Linn	Lane	Total
Amity	12,500	51,700	--	64,200
Awbrey	2,200	4,500	14,000	20,700
Brenner	2,500	--	--	2,500
Concord	--	4,600	600	5,200
Conser	--	7,200	6,000	13,200
Courtney	--	8,800	6,500	15,300
Dayton	13,200	63,100	9,300	85,600
Waldo	2,600	3,700	11,600	17,900
Wapato	10,400	22,400	2,000	34,800
Total	*43,400*	*166,000*	*50,000*	*259,400*

1/ Oregon's Long-range Requirements for Water. Appendix I-2. State Water Resources Board. 1969. pp. 31-35.

TABLE 2

PROPERTIES, QUALITIES, AND DESCRIPTIONS OF POORLY DRAINED SOIL SERIES 2/

Soil series	% slope	Major land use	Drainage class & group	Permeability	Major soil limitation	Irrigation suitability
Amity	0-3	Cultivated	S.poor(2)	M.slow	Wetness	Excellent
Awbrey	0-3	Cultivated	Poor(5)	V.slow	Wetness & claypan	Fair
Brenner	0-3	Pasture	Poor(5)	Slow	Wetness	Fair
Concord	0-3	Cultivated	Poor(4)	M.slow	Wetness	Fair
Conser	0-3	Cultivated	Poor(5)	Slow	Wetness	Fair
Courtney	0-3	Cultivated	Poor(5)	Slow	Wetness	Poor
Dayton	0-3	Cultivated	Poor(5-6)	V.slow	Wetness	Poor-fair
Waldo	0-3	Cultivated	Poor(5)	M.slow	Wetness	Fair
Wapato	0-3	Cultivated	Poor(4)	M.slow-slow	Wetness	Good

2/ Oregon's Long-range Requirements for Water. Appendix I-2. State Water Resources Board. 1969. pp. 52-58.

COUN SUMMARIES
1977 OPEN FIELD BURNING REGISTRATIONS

PRIOR ACRES	RGULR ACRES	REGIS ACRES	ALLOC ACRES	BRNED ACRES	PERN FLDS	PRNIAL ACRES	ANNL FLDS	ANNUAL ACRES	CERL FLDS	CEREAL ACRES	TOT FLDS	TOTL RGIS
SUMMARY FOR CLACKAMAS COUNTY												
366	5829	6195	00	00	155	5445	0	00	16	750	171	62
SUMMARY FOR MARION COUNTY												
4434	45973	50407	00	00	974	35665	85	5798	274	8944	1333	468
SUMMARY FOR POLK COUNTY												
3682	20441	24123	00	00	155	10966	181	8561	84	4596	420	97
SUMMARY FOR WASHINGTON COUNTY												
200	3029	3229	00	00	3	75	0	00	82	3154	85	39
SUMMARY FOR YAMHILL COUNTY												
2804	8778	11582	00	00	79	2862	53	2185	156	6535	288	134
SUMMARY FOR NORTH VALLEY												
11486	84050	95536	00	00	1366	55013	319	16544	612	23979	2297	800
SUMMARY FOR BENTON COUNTY												
10084	14761	24845	00	00	153	9039	152	14425	35	1381	340	107
SUMMARY FOR LANE COUNTY												
10172	21976	32148	00	00	200	14049	159	11360	122	6739	481	123
SUMMARY FOR LINN COUNTY												
33314	133587	166901	00	00	815	50029	1435	95492	521	21380	2771	725
SUMMARY FOR SOUTH VALLEY												
53570	170324	223894	00	00	1168	73117	1746	121277	678	29500	3592	955
SUMMARY FOR ENTIRE VALLEY												
65056	254374	319430	00	00	2534	128130	2065	137821	1290	53479	5889	1755

Print date 5-25-77

REGISTERED ACREAGE AND SOIL-SLOPE RESULTS - MAY 26, 1977

	FIRE DISTRICT	TOTAL REGISTERED ACRES	GRASS ACRES	CEREAL ACRES	TOTAL ACRES REPORTED ON SOIL-SLOPE QUESTIONNAIRE	ACRES SOIL TYPE PROBLEMS	ACRES SLOPE 3%	ACRES SLOPE 12%	ACRES WITH NO SOIL-SLOPE PROBLEM INDICATED
	CLACKAMAS COUNTY								
(03)	Canby	378	250	128	73	25	48	40	
(04)	Clackamas #54	627	627	0	588				588
(05)	Clackamas-Marion	958	916	42	140		140		
(07)	Estacada	2082	2082	0					
(08)	Molalla	158	35	123	140	105			35
(09)	Monitor	1085	716	369					
(11)	Scotts Mills	907	819	88	63		63		
	MARION COUNTY								
(13)	Aumsville	1717	1457	260					
(14)	Aurora	1169	722	447	52		12	12	40
(15)	Drakes Crossing	876	782	94					
(16)	Hubbard	175	175	0					
(17)	Jefferson	6490	5984	506					
(18)	Marion #1	4630	3449	1181	63		63		
(19)	Mt. Angel	368	368	0					
(20)	St. Paul	5153	2900	2253					
(21)	Salem	1234	1194	40	426		426	210	
(22)	Silverton	8178	5862	2316	313	105	262	51	51
(23)	Stayton	4609	4171	438	167	120	78	30	
(24)	Sublimity	8604	7700	904	451	451	451	240	
(25)	Turner	2209	2119	90					
(26)	Woodburn	4995	4580	415					
	POLK COUNTY								
(28)	Polk County	533	533	0	633	493	140	130	
(29)	S. E. Polk	18616	15368	3248					
(30)	SW Polk	4974	3626	1348	3188	2148	1226	469	411
	WASHINGTON COUNTY								
(32)	Cornelius	77	0	77					
(33)	Forest Grove	543	0	543	98		30		68
(36)	Washington Co. #1	573	0	573	48		48		
(37)	Washington Co. #2	2036	75	1961					

REGISTERED ACREAGE AND SOIL-SLOPE RESULTS - May 26, 1977

	FIRE DISTRICT	TOTAL REGISTERED ACRES	GRASS ACRES	CEREAL ACRES	TOTAL ACRES REPORTED ON SOIL-SLOPE QUESTIONNAIRE	ACRES SOIL TYPE PROBLEMS	ACRES SLOPE 3%	ACRES SLOPE 12%	ACRES WITH NO SOIL-SLOPE PROBLEM INDICATED
	YAMHILL COUNTY								
(39)	Amity	3727	1710	2017	2526	1494	866	80	439
(40)	Carlton	1137	126	1011	80	17	80	80	
(41)	Dayton	1244	1094	150	1130		142	1130	
(44)	McMinnville	1324	1460	1964	191	146	8	8	37
(45)	Newberg	216	20	196	106		106		
(46)	Sheridan	1017	637	380	474	356	25		118
(47)	Yamhill	817	0	817	817	500	547		40
	BENTON COUNTY								
(49)	Benton County	8747	8534	213	335	65			270
(50)	Corvallis	3726	3513	213	266	115	8	4	143
(51)	Monroe	7331	6593	738					
(52)	Philomath	2853	2853	0	551	386	271	131	20
(53)	West Oregon Forestry	990	990	0	55	0	40	40	15
(54)	Adair Rural	1198	981	217					
	LANE COUNTY								
(55)	Coburg	3627	2550	1077					
(56)	Creswell	2905	2700	205					
(57)	Eugene	932	787	145					
(58)	Junction City	11054	8673	2381					
(59)	Lane #1	9346	7281	2065					
(60)	Lane County	2756	2478	278					
(61)	Santa Clara	122	52	70					
(62)	Thurston-Walterville	30	0	30	5	5	5	5	
(63)	West Lane	586	428	158	50	16			34
(64)	Pleasant Hill	790	460	330					
	LINN COUNTY								
(65)	Albany	15978	12890	3088					
(66)	Brownsville	20669	17629	3040					
(67)	Halsey	50989	45093	5950					
(68)	Harrisburg	34368	32403	1965					
(69)	Lebanon	14737	11373	3364					
(70)	Lyons	663	609	54	65				65
(71)	Scio	6188	5081	1107	1049	584	125		340
(72)	Tangent	23309	20497	2812					

111 Questionnaries returned by 103 growers

26-013 LIMITATION AND ALLOCATION OF ACREAGE TO BE OPEN BURNED.

(5) For the {1976} 1977 burning season, in the event that more than {195,000} 95,000 acres are registered to be burned, the Department may issue acreage allocations to growers totaling not more than {195,000} 95,000 acres plus ten (10) percent or {214,500} 104,500 acres. The Department shall monitor burning and shall cease to issue burning quotas when a total of {195,000} 95,000 acres have been reported burned.

{a.--Allocations-to-growers-will-be-made-by-applying-a-first and-second-allocation-procedure.}

{{A)-A-first-allocation-will-be-made-to-each-grower-based-on all-of-his-registered-acreage-up-to-and-including-100-acres.}

{{B)-A-second-allocation-will-be-made-to-each-grower-having-more-than-100-registered-acres-based-on-the-grower's-proportional--share-of-the-unallocated-remainder-of-the-total-{214,500} 104,500 acre-grower-allocation.}

{{b)-The-fire-district-allocation-shall-be-the-sum-of-all-first allocations-applied-to-growers-within-the-district-plus-the proportionate-district-share-of-the-unallocated-portion-of the-{195,000} 95,000-total-burnable-acres.}

(a) The Department shall sub-allocate the 104,500 acre allocation established by the Commission to the respective growers on the basis of individual acreage registered as of April 1, 1977 to the total acreage registered as of April 1, 1977.

(b) The Department shall sub-allocate the 95,000 acre allocation established by the Commission to the respective fire permit issuing agencies on the basis of the acreage registered within each fire permit issuing agency's jurisdiction as of April 1, 1977 to the total acreage registered as of April 1, 1977.

(c) In an effort to insure that permits are available in areas of greatest need, to coordinate completion of burning, and to achieve the greatest possible permit utilization, the Department may adjust, in cooperation with the fire districts, allocations of the ~~{195,000}~~ 95,000 burnable acres made to those fire districts.

(d) Transfer of allocations for farm management purposes may be made within and between fire districts on a one-in/one-out basis under the supervision of the Department. Transfer of allocations between growers are not permitted after ~~{195,000}~~ 95,000 acres have been burned within the Valley.

(e) Except for additional acreage allowed to be burned by the Governor pursuant to ORS 468.475(5), no fire district shall allow acreage to be burned in excess of their allocations assigned pursuant to (b), (c), and (d) above.

(f) In ~~1976~~ 1977 the Department may supervise "wide area energy concentrated convective ventilation experiments" to investigate the possible use of the techniques as an alternative to open burning. The total acreage involved with such experimentation shall be deducted from the total acreage allocations prior to making the sub-allocations of (a) and (b), shall not exceed that amount specifically authorized in writing by the Department, and shall not exceed 10,000 acres.

REFERENCES: AIR QUALITY AND THE ROLE OF FIRE IN OREGON'S FORESTS, MAUL, 3/1/77.

THE ROLE OF FIRE IN OREGON FORESTS, OSDF GENERAL FILE 1-1-3-400, 3/77.

ENVIRONMENTAL EFFECTS OF FOREST RESIDUES MANAGEMENT IN THE PACIFIC NORTHWEST, USDA REPORT PNW-24, 1974.

FORESTRY PROGRAM FOR OREGON, OSDF, APRIL, 1977.

ANNUAL REPORTS, OREGON SMOKE MANAGEMENT PLANS 1975 AND 1976.

REFORESTATION MANUAL (DRAFT), OREGON STATE UNIVERSITY, 1977.

II. WHY WE BURN FOREST LANDS, AND TYPES OF BURNING; HAZARD REDUCTION AND SILVICULTURAL

FIRE HAS LONG BEEN A NATURAL, OFTEN DESTRUCTIVE, COMPONENT OF THE WESTERN OREGON FOREST ECOSYSTEM. WITHOUT FIRE WE WOULD NOT HAVE THE DOUGLAS-FIR FORESTS WE ENJOY AND DEPEND ON IN THE PACIFIC NORTHWEST TODAY.

FIRE INFLUENCES THE FOREST ENVIRONMENT IN SEVERAL WAYS:

IT INFLUENCES THE PHYSICAL-CHEMICAL ENVIRONMENT TO ALLOW GERMINATION OF SEEDS AND GROWTH OF SEEDLINGS. WHEN TOXIC CHEMICAL COMPOUNDS ARE LEACHED FROM PLANT MATERIALS AND BUILD UP IN SOIL, CREATING A CONDITION TERMED "ALLELOPATHY", GERMINATION AND GROWTH ARE RETARDED. RESEARCH HAS DEMONSTRATED THAT HEAT FROM A FIRE VOLATIZES THE TOXIC COMPOUNDS AND RE-ESTABLISHES CONDITIONS SUITABLE FOR SEEDLING DEVELOPMENT.

FIRE REGULATES THE AMOUNT OF DRY MATTER ACCUMULATION IN THE FORESTS TO PREVENT BUILD-UPS WHICH WOULD RETARD TREE GROWTH AND CREATE FIRE HAZARDS. IN OREGON'S CLIMATE, PRODUCTION OF RESIDUES EXCEEDS DECOMPOSITION, AND FIRE IS IMPORTANT IN REDUCING THIS EXCESS DEBRIS.

FIRE CONTROLS AND PERPETUATES PLANT SPECIES AND COMMUNITIES BY PERIODICALLY ADJUSTING THE ENVIRONMENT WHERE THEY ARE FOUND AND CAN FLOURISH.

FIRE DETERMINES WILDLIFE PATTERNS AND POPULATIONS BY HELPING TO MAINTAIN AND CREATE DESIRABLE HABITAT FOR THE VARIETY OF ANIMALS WHICH POPULATE OREGON'S DYNAMIC FORESTS. WITHOUT FIRE, MANY SPECIES WOULD BE FORCED TO ADAPT TO LESS DESIRABLE ENVIRONMENTS.

FIRE HELPS CONTROL FOREST INSECTS, PARASITES AND FUNGI. PERIODIC BURNING REDUCES THE BREEDING SITES OF MANY INSECTS AND SANITIZES FORESTS TO PREVENT POTENTIALLY DAMAGING POPULATION BUILD-UPS. SOME FOREST DISEASES ARE KNOWN TO BE RETARDED BY BURNING.

FIRE CONTROLS MAJOR ECOSYSTEM PROCESSES AND CHARACTERISTICS SUCH AS NUTRIENT CYCLES, ENERGY FLOW, SUCCESSION, DIVERSITY, PRODUCTIVITY AND STABILITY.

DISTURBANCE OF THE FOREST BY FIRE TENDS TO RECYCLE THE SYSTEM AND MAINTAIN DIVERSITY. MODIFICATION OF THE SYSTEM BY ELIMINATING DISTURBANCES AND RECYCLING BECOMES DETRIMENTAL TO THE SYSTEM.

BEFORE THE ARRIVAL OF THE EARLY SETTLERS IN THE OREGON TERRITORY, LIGHTNING WAS THE PRINCIPLE FIRE SOURCE IN THE EASTERN PART OF THE STATE. LIGHTNING WAS A LESS IMPORTANT SOURCE ON THE WEST SIDE WHERE INDIANS CUSTOMARILY BURNED THE INTERIOR VALLEYS TO PROVIDE ADDITIONAL FOOD-GATHERING SOURCES AND PRODUCE FORAGE FOR GAME ANIMALS. LATER ON, THE SETTLERS INTRODUCED FIRE TO CLEAR LARGE AREAS FOR AGRICULTURE.

FIRE HAS ALWAYS BEEN PART OF THE FOREST ENVIRONMENT WITH DAMAGE AND SMOKE, WHEN UNCONTROLLED, DIRECTLY PROPORTIONAL TO THE ACCUMULATION OF FOREST DEBRIS. THE FORESTER ATTEMPTS TO DUPLICATE SOME OF THE RESULTS OF WILDFIRE WITH SOME VERY IMPORTANT DIFFERENCES. THE BIGGEST DIFFERENCE IS IN THE AMOUNT OF PARTICULATE PRODUCTION OR SMOKE PRODUCED. COMBUSTION ROOM EXPERIMENTS INDICATE THAT WILDFIRE OFTEN PRODUCES UP TO TEN TIMES MORE SMOKE VOLUME THAN PRESCRIBED BURNING, WHILE CONSUMING THREE TIMES AS MUCH FUEL. OTHER MAJOR DIFFERENCES INCLUDE REDUCED DAMAGES TO FOREST AND RELATED RESOURCES. WILDFIRE IS NOT SELECTIVE BECAUSE THE HIGH BURNING INTENSITIES PRODUCED UNDER MORE SEVERE WEATHER CONDITIONS COMBINE TO CONSUME REAL PROPERTY AS WELL AS THE STANDING FOREST RESOURCE.

CONTROLLED BURNING ON FOREST LAND IS AN IMPORTANT FOREST MANAGEMENT TOOL RECOGNIZED PRIMARILY AS AN AID IN ESTABLISHING NEW CROPS AND PREVENTING EXCESS FUEL BUILD-UPS. FORESTERS REFER TO PRESCRIBED USES OF FIRE AS "SILVICULTURAL

BURNING" WHEN USED TO CONVERT UNDERPRODUCTIVE BRUSHLANDS AND TO PREPARE PLANTING SITES. "HAZARD REDUCTION" REFERS TO FIRE USED TO REDUCE THE QUANTITY OF DEBRIS OR BREAK THE CONTINUITY OF FOREST FUELS. THESE ARE DISTINCTLY DIFFERENT APPLICATIONS OF BURNING.

HAZARD REDUCTION. THE OLD-GROWTH DOUGLAS-FIR FORESTS OF WESTERN OREGON CAN PRODUCE LOGGING RESIDUES AS HIGH AS 275 TONS PER ACRE. IF UNTREATED, SUCH FUELS AMOUNT TO A "FIRE WAITING TO HAPPEN". ALL THE MAJOR WILDFIRES IN RECENT OREGON HISTORY SUCH AS THE TILLAMOOK AND OXBOW FIRES, WERE IN OLD-GROWTH FORESTS AND WERE STOKED BY SUCH FUEL CONCENTRATIONS. IF SUCH DEVASTATING CONFLAGRATIONS AS THESE ARE TO BE REDUCED OR ELIMINATED, THESE TYPES OF FUEL CONCENTRATIONS MUST ALSO BE REDUCED OR ELIMINATED.

EFFECTIVENESS OF THE FIRE PREVENTION SYSTEM ITSELF HAS INCREASED THE NEED FOR PRESCRIBED BURNING. AROUND 1910, CONCERN OF THE OREGON FOREST LANDOWNERS FOR THE WILDFIRE PROBLEM RESULTED IN THE BEGINNINGS OF CURRENT FOREST FIRE FIGHTING SYSTEMS. LIKE MOST FIRE FIGHTING SYSTEMS, IT BECAME MORE EFFICIENT, EFFECTIVE AND POWERFUL WITH THE PASSING OF TIME. CONTROL OF LARGE AND MORE POWERFUL FIRES HAS BECOME REALITY. HOWEVER, SUPPRESSION ACTIVITIES THEMSELVES OFTEN PRESERVE THE AVAILABLE FUELS BY DELAYING OR SUPPRESSING WILDFIRES. WITH THE INCREASED FUEL LOAD, THE NEXT FIRE MAY STAND A BETTER CHANCE OF ESCAPING THE FIRE CONTROL ORGANIZATION. PRESCRIBED BURNING IS THE MOST EFFECTIVE TOOL IN THE PREVENTION OF THIS TYPE OF SITUATION.

DEPARTMENT RECORDS INDICATE THAT ABOUT 47 PERCENT OF ALL THE ACRES HARVESTED IN WESTERN OREGON WERE TREATED BY FIRE IN THE 1970'S. DURING THE 1960'S NEARLY 70 PERCENT OF THE ACRES HARVESTED WERE TREATED. IN 1975, 93,300 ACRES WERE TREATED. OF THAT, 80.1 PERCENT (75,666 ACRES) WAS FOR HAZARD REDUCTION; IN 1976, 73.1 PERCENT (83,047 ACRES) WAS FOR HAZARD REDUCTION.

BROADCAST BURNING TO DISPOSE OF SLASH HAS BEEN GENERALLY DECREASING FOR SOME TIME AND THE USE OF PILING AND BURNING HAS INCREASED AS A METHOD OF REDUCING HAZARDS. THIS PRACTICE PRODUCES LESS SMOKE AND EXTENDS THE BURNING SEASON.

ACREAGES OF UNTREATED SLASH ARE INCREASING AS LAND-OWNERS ELECT OPTIONS TO PROVIDE EXTRA PROTECTION OR PURCHASE RELEASES IN LIEU OF ABATING SLASH HAZARDS CREATED BY OPERATIONS. AN IMPORTANT FACTOR IN THE DECREASED BURNING DECISIONS HAS BEEN THE AIR QUALITY REQUIREMENTS THAT PREVENT BURNING ON MANY DAYS BECAUSE OF INADEQUATE SMOKE DISPERSION. CONSEQUENTLY, HAZARD FROM FUELS REMAINING AFTER LOGGING HAS BEEN INCREASING. WITH FUELS ON THE INCREASE, AND THE NATURAL AND HISTORIC METHODS OF ABATING THEM SEVERELY LIMITED, THE CHANCES OF AIR QUALITY IMPACTS FROM LARGE WILDFIRES DURING CRITICAL PERIODS ARE GROWING. THESE IMPACTS MAY EXCEED THOSE FROM PRESCRIBED BURNING.

<u>SILVICULTURAL BURNING</u>. PRESCRIBED BURNING IS USED EXTENSIVELY IN MANAGEMENT OF DOUGLAS-FIR FORESTS TO PREPARE PLANTING SITES AND REDUCE COMPETITION. ON STEEP TERRAIN

AND EASILY COMPACTED SOILS, FIRE IS OFTEN REGARDED BY THE FORESTER AS THE ONLY FEASIBLE MEANS OF CONVERTING BRUSHFIELDS AND REMOVING UNDERGROWTH AND EXCESS DEBRIS FOLLOWING LOGGING. FIRE IS OFTEN USED IN COMBINATION WITH OTHER SITE PREPARATION METHODS INVOLVING MECHANICAL AND CHEMICAL TECHNIQUES. EACH METHOD HAS ITS APPROPRIATE APPLICATION IN FOREST LAND MANAGEMENT AND THERE IS NO ONE "BEST" METHOD. ALTERNATIVE TECHNIQUES CANNOT REPLACE PRESCRIBED BURNING AT THIS TIME.

THE CONVERSION OF BRUSHLANDS TO TIMBER AND THE CONVERSION OF UNMERCHANTABLE ALDER TO SOFTWOODS FREQUENTLY PRODUCES LARGE VOLUMES OF RESIDUES WHICH ARE FIRE HAZARDS. NEVERTHELESS, WE TERM THESE OPERATIONS "SILVICULTURAL" TREATMENTS BECAUSE THE RESIDUE RESULTED FROM MAN'S ATTEMPTS TO MANAGE VEGETATION.

SO CALLED "SILVICULTURAL" BURNING HAS BEEN INCREASING IN WESTERN OREGON DURING THE LAST FEW YEARS AS A RESULT OF ATTEMPTS TO RECLAIM UNDERPRODUCTIVE FOREST LANDS AND TO RE-ESTABLISH STANDS WITHOUT LONG REGENERATION LAGS FOLLOWING LOGGING. IN 1975 APPROXIMATELY 18 PERCENT (16,607 ACRES) OF THE PRESCRIBED BURNING WAS FOR SILVICULTURAL PURPOSES; IN 1976 APPROXIMATELY 25 PERCENT (28,856 ACRES) WAS FOR SILVICULTURAL PURPOSES. THIS TREND MAY CONTINUE FOR THE NEXT THREE DECADES AS UNDERPRODUCTIVE BRUSHLANDS ARE RECLAIMED.

A RECENT STUDY OF UNDERPRODUCTIVE LANDS ON 3.8 MILLION ACRES OF HIGH SITES IN THE COAST RANGE REVEALED THAT 567 THOUSAND ACRES (18 PERCENT) ARE UNDERPRODUCTIVE

(CONTAINED LESS THAN 150 SEEDLINGS PER ACRE). BECAUSE OF THE STEEPNESS OF TERRAIN, FIRE IS AN IMPORTANT FACTOR IN EFFORTS TO RECLAIM THESE LANDS. WITHOUT FIRE, MOST OF THESE LANDS (80 TO 85%) AND SIMILAR BRUSH-IMPACTED AREAS THROUGHOUT WESTERN OREGON WILL NOT LIKELY BE RETURNED TO SOFTWOOD PRODUCTION IN THE FORESEEABLE FUTURE.

FUTURE APPLICATIONS. LAST WEEK THE BOARD OF FORESTRY ADOPTED A FORESTRY PROGRAM FOR OREGON WHICH CONTAINS POLICIES AND ACTION PROGRAMS NECESSARY TO PREVENT PROJECTED TIMBER SUPPLY DECLINES OF 22 PERCENT IN WESTERN OREGON DURING THE NEXT THIRTY YEARS. ONE OF THE KEY ELEMENTS IN THE PROGRAM IS TO INCREASE MANAGEMENT INTENSITY ON ALL FOREST OWNERSHIPS TO GROW MORE TIMBER IN ORDER TO MAINTAIN CURRENT HARVEST LEVELS AND AVOID SEVERE SOCIAL AND ECONOMIC IMPACTS.

DURING THE NEXT DECADE, THE PROGRAM CALLS FOR A 29 PERCENT HARVEST INCREASE FROM NATIONAL FORESTS; 6 PERCENT INCREASE FROM BLM LANDS; 44 PERCENT INCREASE FROM STATE AND OTHER PUBLIC LANDS; AND NEARLY A 300 PERCENT INCREASE FROM OTHER PRIVATE LANDS TO OFFSET THE PROJECTED DECLINE OF 32 PERCENT IN FOREST INDUSTRY HARVESTS.

ACCOMPLISHING THE OBJECTIVES IN THE PROGRAM REQUIRES PROMPT REGENERATION OF HARVESTED ACRES AND CONVERSION OF BRUSHLANDS TO PRODUCTIVE CONIFER STANDS. PROJECTIONS OF TREATMENTS NEEDED SHOW THAT THE NUMBER OF ACRES CONVERTED DURING THE NEXT THREE DECADES MUST INCREASE OVER CURRENT LEVELS BY AN AVERAGE OF NEARLY 60 PERCENT. REGENERATION

ACRES MUST INCREASE BY 7 TO 10 PERCENT DURING THIS SAME PERIOD TO ACCOMPLISH THE PROGRAM OBJECTIVES. IN ADDITION, THE PROGRAM CALLS FOR INCREASED HARVESTING OF MATURE AND OVERMATURE TIMBER ON FEDERAL LANDS IN WESTERN OREGON TO FILL THE GAP CREATED AS PRIVATE OWNERS BEGIN GROWING NEW STANDS. AN AVERAGE 11 PERCENT INCREASE IN ACRES HARVESTED IS CALLED FOR OVER THE NEXT THIRTY YEARS ON THESE FEDERAL LANDS. HAZARDS ASSOCIATED WITH HARVESTING THIS OLD GROWTH, OFTEN DEFECTIVE, TIMBER WILL BE GREATLY INCREASED WITHOUT FIRE AS A TOOL FOR FUEL MANAGEMENT.

WE CAN ASSUME THAT FUTURE HARVESTED ACRES SHOULD BE BURNED IN ABOUT THE SAME PROPORTION AS THEY ARE NOW (45 TO 50 PERCENT AVERAGE). AS OLD-GROWTH STANDS ARE REPLACED BY REGULATED FORESTS WITH LESS DEFECT, MORE ACRES WILL BE HARVESTED ANNUALLY TO MAINTAIN OREGON'S CONTRIBUTION TO THE TIMBER SUPPLY. THIS MEANS THAT THE NEED FOR PRESCRIBED BURNING ASSOCIATED WITH HARVESTING WILL ALSO INCREASE, ALTHOUGH THE NEED MAY BE PARTIALLY OFFSET BY GREATER UTILIZATION AND ADVANCED TECHNOLOGY.

CONVERSION OF OVER 297,000 ACRES OF UNDERPRODUCTIVE LANDS IS CALLED FOR DURING THE NEXT DECADE AND SIMILAR AMOUNTS DURING THE 1990 AND 2000 DECADE IN WESTERN OREGON. PRELIMINARY ESTIMATES INDICATE THAT FAILURE TO RECLAIM THESE LANDS WILL DECREASE THE EFFECTIVE TIMBER-GROWING BASE IN WESTERN OREGON BY ABOUT 7 PERCENT. SINCE MOST OF THESE LANDS ARE ON VERY PRODUCTIVE SITES, HARVEST REDUCTIONS OF 14 PERCENT OR MORE COULD RESULT BY 2070 IF THEY ARE NOT BROUGHT BACK INTO PRODUCTION DURING THE NEXT THIRTY YEARS.

ANOTHER IMPORTANT ASPECT OF THE FORESTRY PROGRAM FOR OREGON IS PROTECTION OF THE FOREST RESOURCE. THE PROJECTED 22 PERCENT DECLINE IN TIMBER HARVESTS BY THE YEAR 2000 IS BASED ON THE ASSUMPTION THAT THERE WILL BE NO CATASTROPHIC LOSSES FROM FIRES, INSECTS AND DISEASE.

UNCONTROLLED FIRES BURNED AN AVERAGE OF 14,000 ACRES OF FOREST LAND ANNUALLY OVER THE PAST FIVE YEARS, DESTROYING 65 TO 70 MILLION BOARD FEET EACH YEAR. SINGLE WILDFIRES IN THE PAST HAVE PERIODICALLY DESTROYED 10 TO 15 TIMES THIS AMOUNT AND THE POTENTIAL FOR FUTURE CATASTROPHIC LOSS INCREASES AS FUEL ACCUMULATES. LOSSES OF WILDLIFE HABITAT, RECREATION OPPORTUNITIES AND OTHER MULTIPLE USES ALSO RESULT FROM WILDFIRE, BUT THESE IMPACTS ARE DIFFICULT TO QUANTIFY.

CONTROL OF INSECTS AND DISEASE THROUGH SOUND SILVICULTURAL PRACTICES IS ALSO CALLED FOR IN THE FORESTRY PROGRAM TO MINIMIZE THE ESTIMATED 5.8 BILLION BOARD FEET LOST ANNUALLY TO THESE PESTS. PRESCRIBED BURNING IS RECOGNIZED AS A STAND SANITATION PRACTICE WHICH ELIMINATES BREEDING SITES AND CONDITIONS WHICH FAVOR BUILD-UPS OF INSECTS AND DISEASES. RESEARCH HAS NOT IDENTIFIED THE MAGNITUDE OF THE CONTRIBUTION OF FIRE IN REDUCING INSECT AND DISEASE LOSSES, BUT IT IS CLEARLY AN IMPORTANT FACTOR.

IN SUMMARY

FIRE IS BEING USED LESS AS A ROUTINE TOOL IN FOREST MANAGEMENT AND MORE AS A PRESCRIBED TOOL. IT IS ESSENTIAL FOR DEBRIS REDUCTION IN SOME INSTANCES WHERE THERE IS NOT A SATISFACTORY SUBSTITUTE. THE ENVIRONMENTAL SAFEGUARDS ARE OF A PREVENTIVE NATURE. THAT IS, UNDER A PROGRAM OF FUEL MANAGEMENT, THE TOTAL FUEL BURNED AND THE SMOKE PRODUCED OVER THE LONG RUN WILL LIKELY BE LESS THAN THE CONSEQUENCES OF WILDFIRES, WHICH WILL SURELY COME WITHOUT FUELD MANAGEMENT. WITH FUEL MANAGEMENT, THE AREA BURNED DESTRUCTIVELY BY WILDFIRE WILL CERTAINLY BE REDUCED. AND MOST IMPORTANT, THE SMOKE FROM PRESCRIBED BURNING, WOULD RESULT WHEN DISPERSION CONDITIONS WERE FAVORABLE UNDER A SUCCESSFUL SMOKE MANAGEMENT PROGRAM. REGULATIONS SHOULD BE AIMED AT PREVENTING SMOKE PROBLEMS, NOT AT PROHIBITING THE USE OF FIRE AS A FOREST MANAGEMENT TOOL.

IF AIR QUALITY WAS THE ONLY FACTOR THAT WE NEED TO BE CONCERNED WITH, THE NEED FOR PRESCRIBED FOREST LAND BURNING WOULD NOT EXIST. HOWEVER, WE ARE CONCERNED ABOUT OTHER FIRE-DEPENDENT ELEMENTS OF OUR ENVIRONMENT SUCH AS FORESTS AND WILDLIFE.

TRADEOFFS IN THE ELIMINATION OF PRESCRIBED FIRE ON FOREST LAND WOULD BE:

1. INCREASE LOSSES OF OUR FOREST RESOURCES DUE TO WILDFIRE;

2. Loss in productive capacity of our forest lands due to long delays in establishing new forests and reclaiming lands taken over by brush and lesser tree species, due to past mistakes in forest land management; and

3. Economic and social losses to the people of the State of Oregon.

We believe that the Smoke Management Program can protect air quality and still allow the essential use of fire.

Item H.

F-10
February 1972

DIRECTIVE
1-1-3-410 p 1

SMOKE MANAGEMENT PLAN

Approved by Oregon State Board of Forestry, January 5, 1972

Approved by Environmental Quality Commission, January 24, 1972

OBJECTIVE:

To keep smoke resulting from burning on forest lands from being carried to or accumulating in designated areas (Exhibit 1) or other areas sensitive to smoke.

DEFINITIONS:

Deep mixed layer - extends from the surface to 1,000 feet or more above the designated area ceiling.

Smoke drift away - occurs where projected smoke plume will not intersect a designated area boundary downwind from the fire.

Smoke drift toward - occurs when the projected smoke plume will intersect a designated area boundary downwind from the fire or when wind direction is indeterminate due to wind speed less than 5 mph at smoke vent height.

Smoke vent height - level, in the vicinity of the fire, at which the smoke ceases to rise and moves horizontally with the wind at that level.

Stable layer of air - a layer of air having a temperature lapse rate of less than dry adiabatic (approximately 5.5 degrees F per 1,000 feet) thereby retarding either upward or downward mixing of smoke.

Tons available fuel - an estimate of the tons of fuel that will be consumed by fire at the given time and place. Low volume is less than 75 tons per acre, medium volume 75 to 150 tons per acre, and high volume over 150 tons per acre.

Residual smoke - smoke produced after the initial fire has passed through the fuel.

Field administrator - a forest officer who has the direct responsibility for administering burning permits on a unit of forest land within the boundaries of an official fire district.

Restricted area - that area delineated in Exhibit 1 for which permits to burn on forest land are required year round, pursuant to Rule OAR 43-041.

Designated area - those areas delineated in Exhibit 1 as principal population centers.

Heavy use - unusual concentrations of people using forest land for recreational purposes during holidays, special events, etc.

Major recreation area - areas of the state subjected to concentrations of people for recreational purposes.

CONTROL:

The State Forester is responsible for the coordination and control of the smoke management plan. The plan applies state-wide with full inter-agency cooperation with the U. S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, private forest industry and the Department of Environmental Quality.

Certain "designated areas" are established in consultation with the Environmental Quality Commission. The major objective of smoke control efforts will be to keep smoke from forest land burning out of these designated areas (Exhibit 1).

During periods of heavy use, major recreation areas in the State shall be provided the same consideration as "designated areas".

ADMINISTRATION:

Each Field Administrator issuing burning permits under this plan will manage the prescribed burning on forest land in connection with the management of other aspects of the environment in order to maintain a satisfactory atmospheric environment in designated areas (Exhibit 1). Likewise this effort may be applied in special situations where local conditions warrant and that are not defined as designated areas but nevertheless are sensitive to smoke. Accomplishment will entail a consideration of weather forecasts, acreages involved, amounts of material to be burned, evaluation of potential smoke column vent height, direction and speed of smoke drift, residual smoke, mixing characteristics of the atmosphere, and distance from the designated area of each burning operation. Designated areas are outlined and vertical extents or ceilings are indicated in Exhibit 1.

Each Field Administrator will evaluate down-wind conditions prior to implementation of burning plans. When a field administrator determines that visibility in a designated area, or other area sensitive to smoke is already seriously reduced or would likely become so with additional burning, or upon notice from the State Forester through the Division of Fire Control, or upon notice from the State Forester following consultation with the Department of Environmental Quality that air in the entire state or portion thereof is, or would likely become adversely affected by smoke, the affected field administrator will terminate burning. Upon termination, any burning already under way will be completed, residual burning will be mopped up as soon as practical, and no additional burning will be attempted until approval has been received from the State Forester.

REPORTS:

Field Administrators will report daily at such times and in such manner as required by the State Forester covering their daily burning operations. Any wildfire that has the potential for smoke input into a designated area will be reported immediately to the State Forester's office.

KEY TO SMOKE DRIFT RESTRICTIONS:

1. Smoke drift away from designated area

    a. No specific acreage limitation will be placed on prescribed burning when smoke drift is away from designated area. Burning should be done to best accomplish maximum vent height and to minimize nuisance effect on any segment of the public.

2. Smoke drift toward designated area

    a. Smoke plume height below designated area ceiling. Includes smoke that for reasons of fire intensity, location, or weather, will remain below the designated area ceiling. Also included are fires that vent into layers of air, regardless of elevation, that provide a downslope trajectory into a designated area.

        (1) Upwind distance less than 10 miles outside designated areas. No new prescribed fires will be ignited.

        (2) Upwind distance 10-30 miles outside designated area boundary. Burning limited to 1,500 tons per 150,000 acres on any one day.

        (3) Upwind distances 30-60 miles outside designated area boundary. Burning limited to 3,000 tons per 150,000 acres on any one day.

        (4) Upwind distances more than 60 miles beyond designated area boundary. No acreage restriction unless otherwise advised by the Forester.

b. Smoke will be mixed through deep layer at designated area. This section includes smoke that will be dispersed from the surface through a deep mixed layer when it reaches the designated area boundary.

(1) Upwind distance less than 10 miles from designated area boundary. Burning limited to 3,000 tons per 150,000 acres on any one day.

(2) Upwind distance 10-30 miles from designated area boundary. Burning limited to 4,500 tons per 150,000 acres on any one day.

(3) Upwind distances 30-60 miles outside designated area boundary. Burning limited to 9,000 tons per 150,000 acres on any one day.

(4) Upwind distances more than 60 miles beyond designated area boundary. No acreage restriction unless otherwise advised by the forester.

c. Smoke above a stable layer over the designated area. Smoke in this group will remain above the designated area, separated from it by a stable layer of air.

(1) Upwind distance less than 10 miles outside designated area. Burning limited to 6,000 tons per 150,000 acres on any one day.

(2) Upwind distance 10-30 miles outside designated area. Burning limited to 9,000 tons per 150,000 acres on any one day.

(3) Upwind distances 30-60 miles outside designated area. Burning limited to 18,000 tons per 150,000 acres on any one day.

(4) Upwind distances more than 60 miles beyond designated area boundary. No acreage restriction unless otherwise advised by the forester.

d. Smoke vented into precipitation cloud system. When smoke can be vented to a height above the cloud base from which precipitation is falling, there will be no restrictions to burning.

3. Changing conditions

When changing weather conditions, adverse to the Smoke Management objective, occur during burning operations, aggressive mop-up will be initiated as soon as practical.

ANALYSIS AND EVALUATION:

The State Forester will be responsible for the annual analysis and evaluation of state-wide burning operations under this Plan. Copies of the summaries will be provided to all interested parties.

DISTRIBUTION: F-2

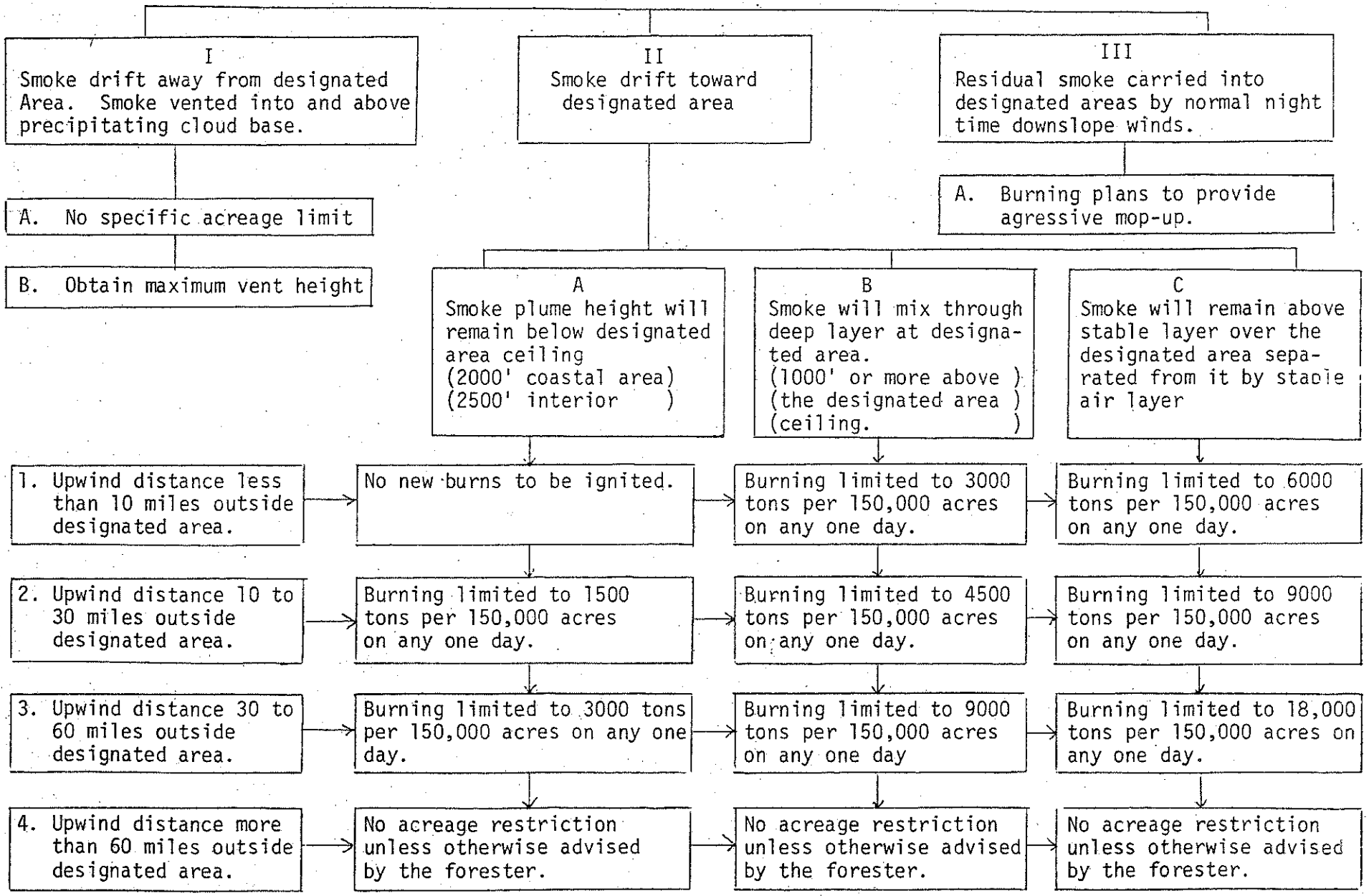
Informational item
Provided by NWO

GENERAL FILE
1-1-3-410

3-5-76
ROB:ab

SMOKE MANAGEMENT PLAN

OUTLINE



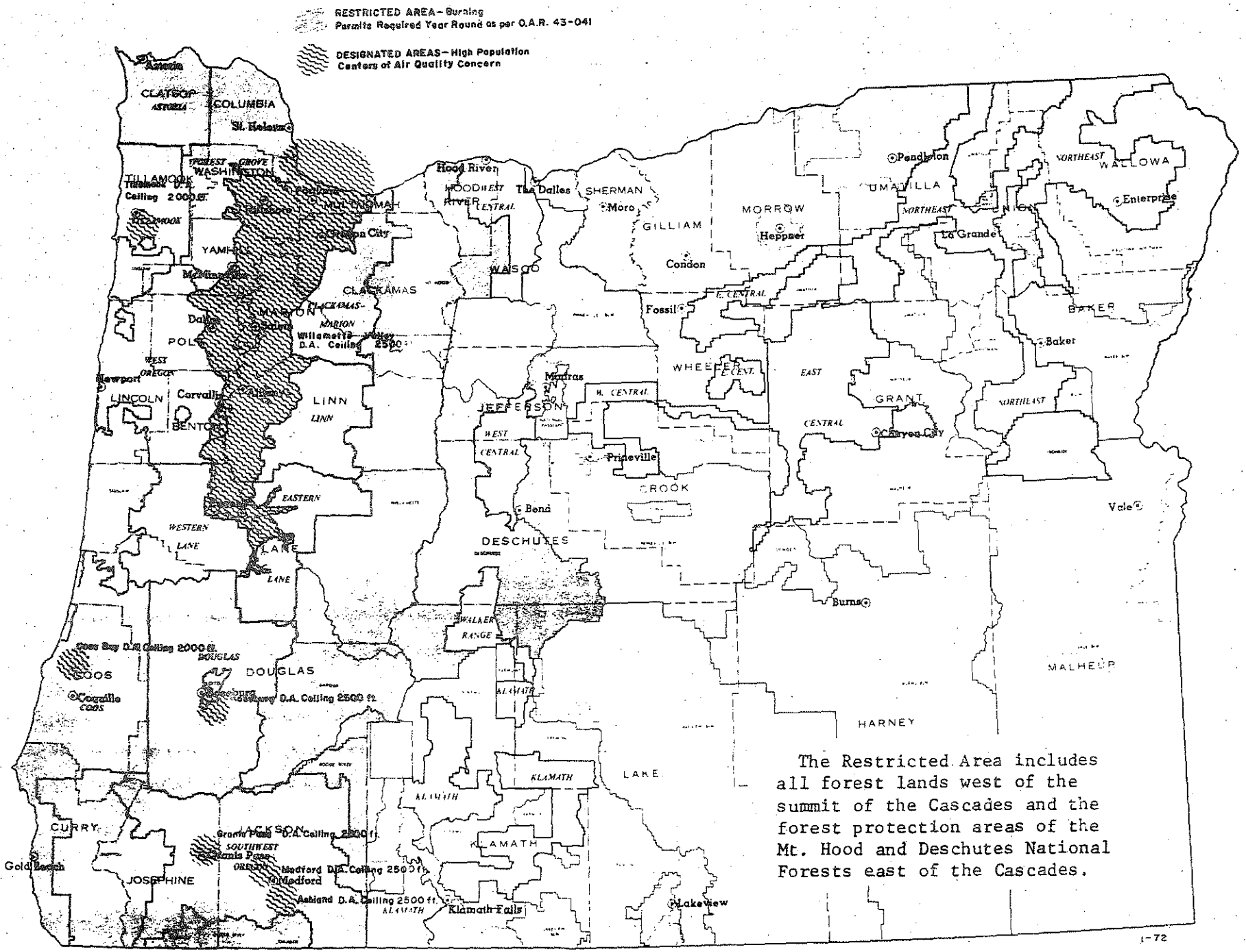

RESTRICTED AREA – Burning
Permits Required Year Round as per O.A.R. 43-041
DESIGNATED AREAS – High Population
Centers of Air Quality Concern
The Restricted Area includes all forest lands west of the summit of the Cascades and the forest protection areas of the Mt. Hood and Deschutes National Forests east of the Cascades.
I-72

EXHIBIT I

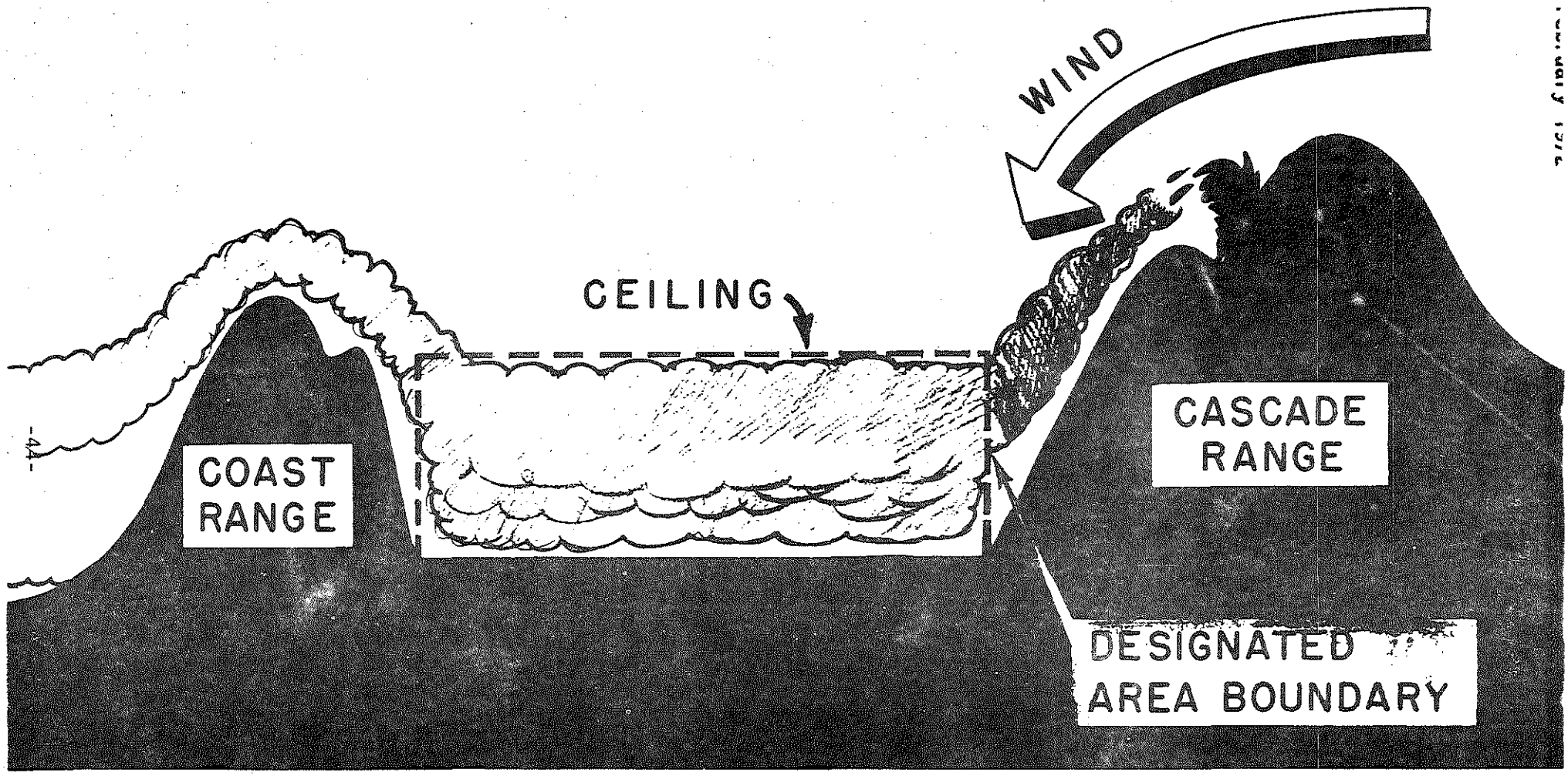


EXHIBIT 2. SMOKE WILL REMAIN BELOW DESIGNATED AREA CEILING ..... EAST WIND

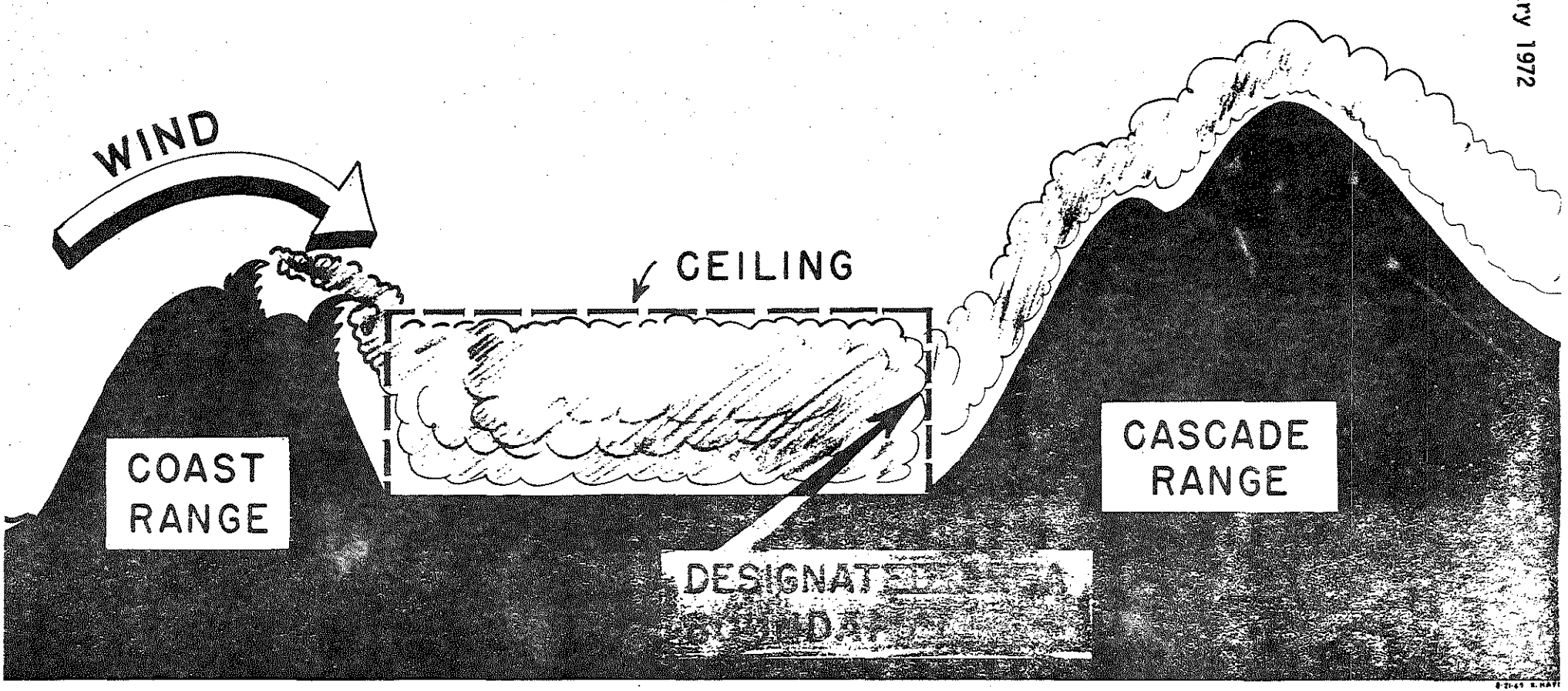


EXHIBIT 2. SMOKE WILL REMAIN BELOW DESIGNATED AREA CEILING ..... WEST WIND

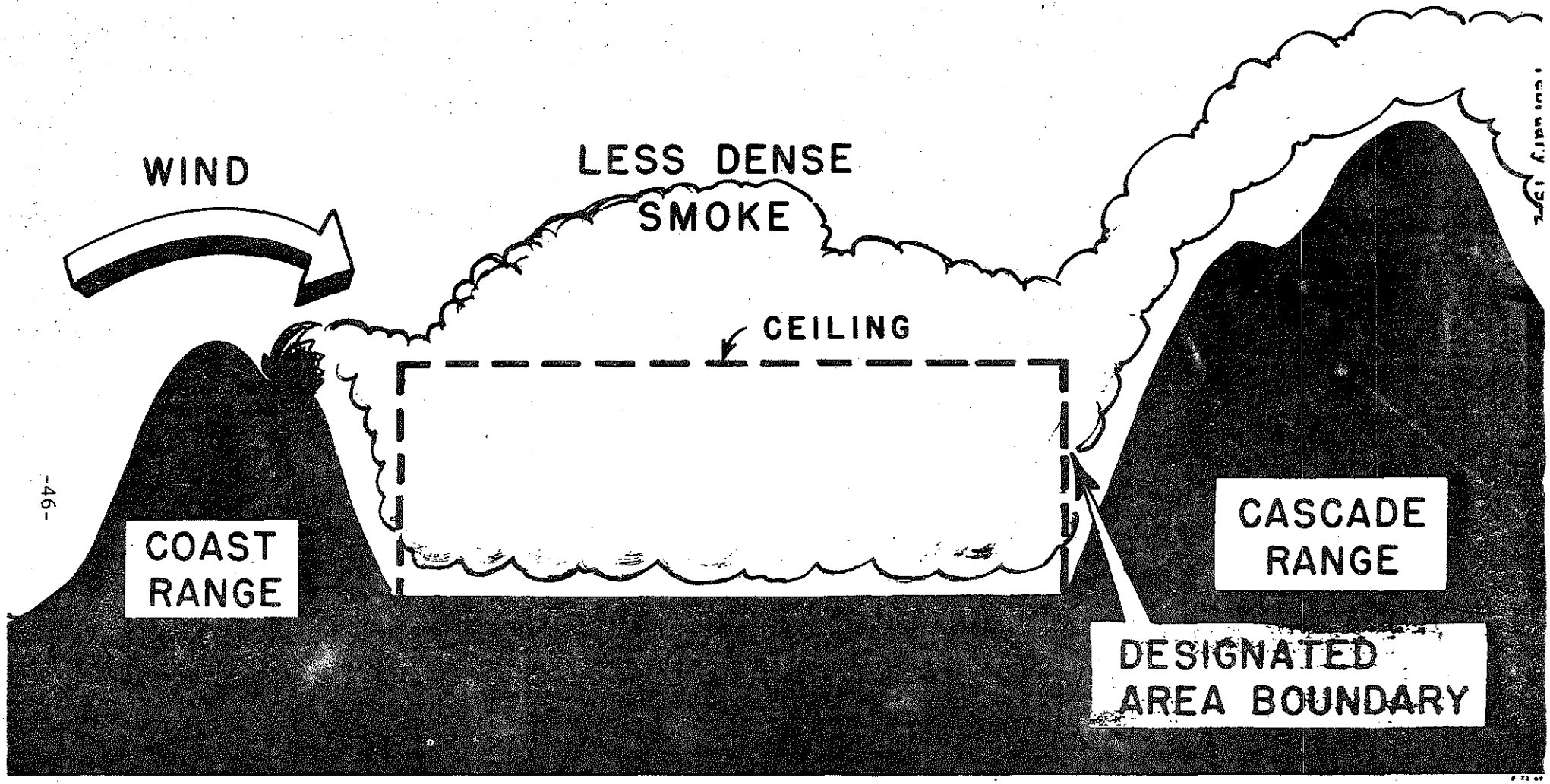


EXHIBIT 3. SMOKE MIXED THROUGH DEEP LAYER AT DESIGNATED AREA.

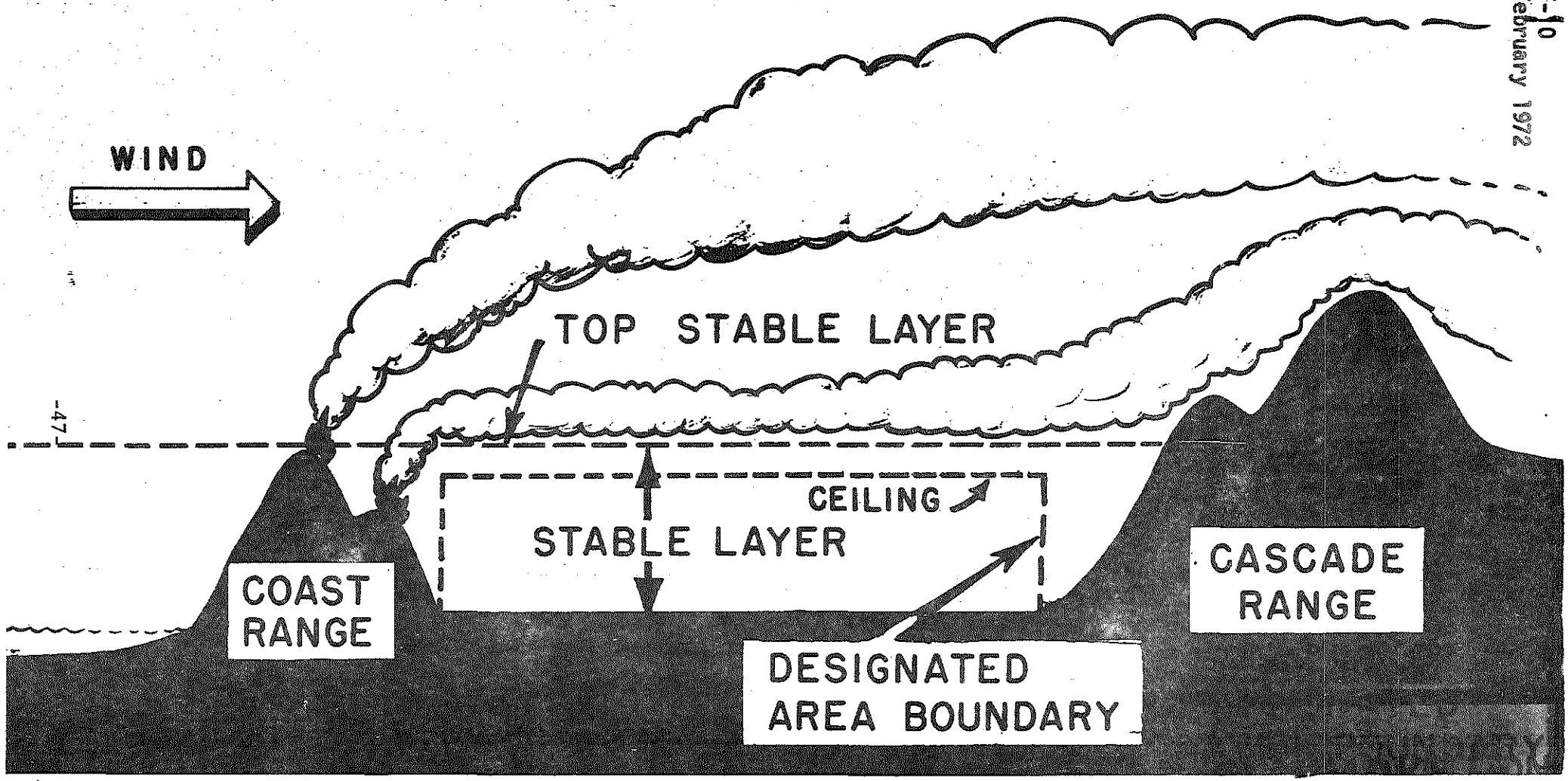


EXHIBIT 4. SMOKE REMAINS ABOVE A STABLE LAYER OVER DESIGNATED AREA.

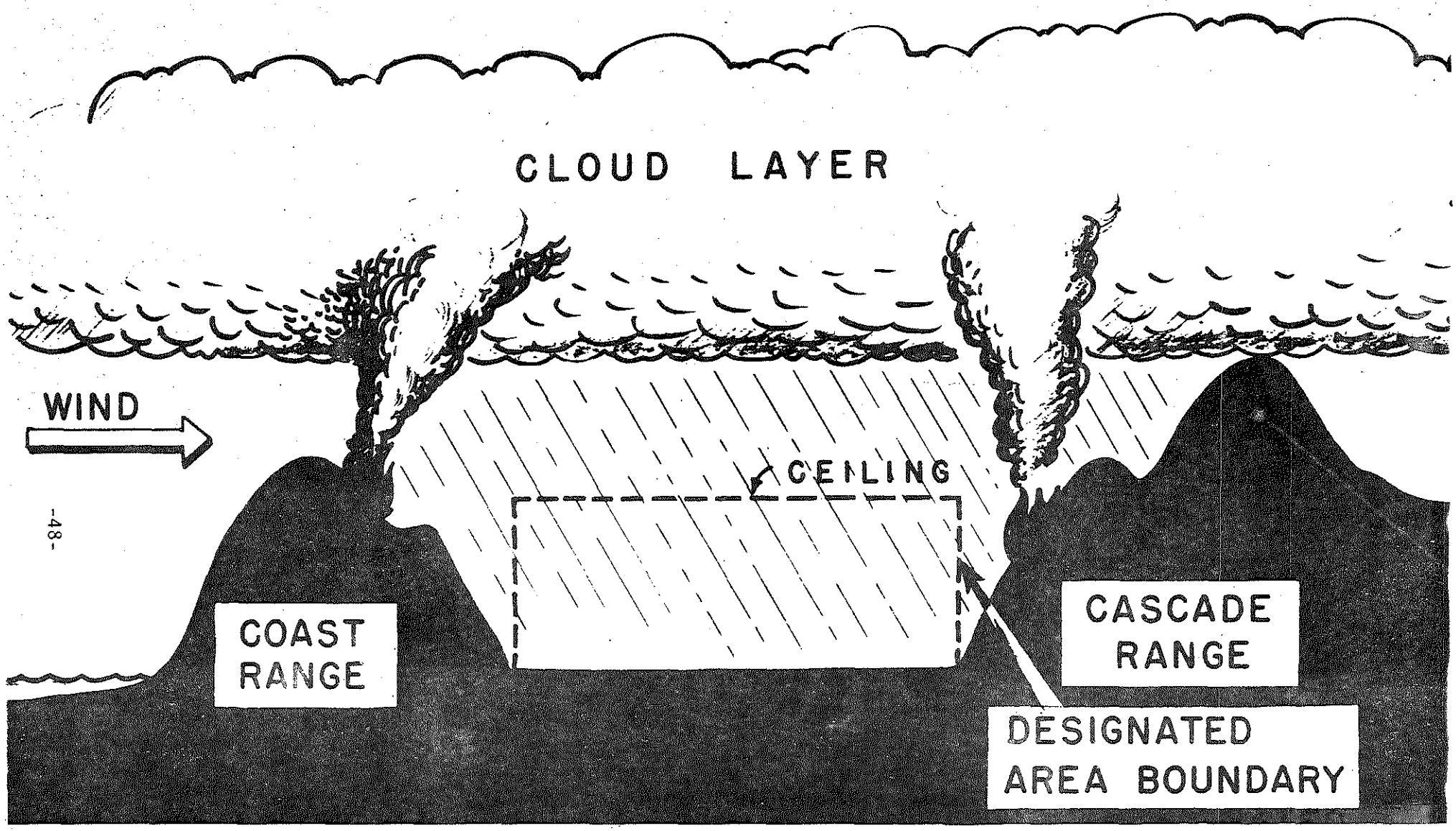


EXHIBIT 5. UNRESTRICTED BURNING WHEN SMOKE VENTED ABOVE CLOUD BASE FROM WHICH PRECIPITATION IS FALLING.

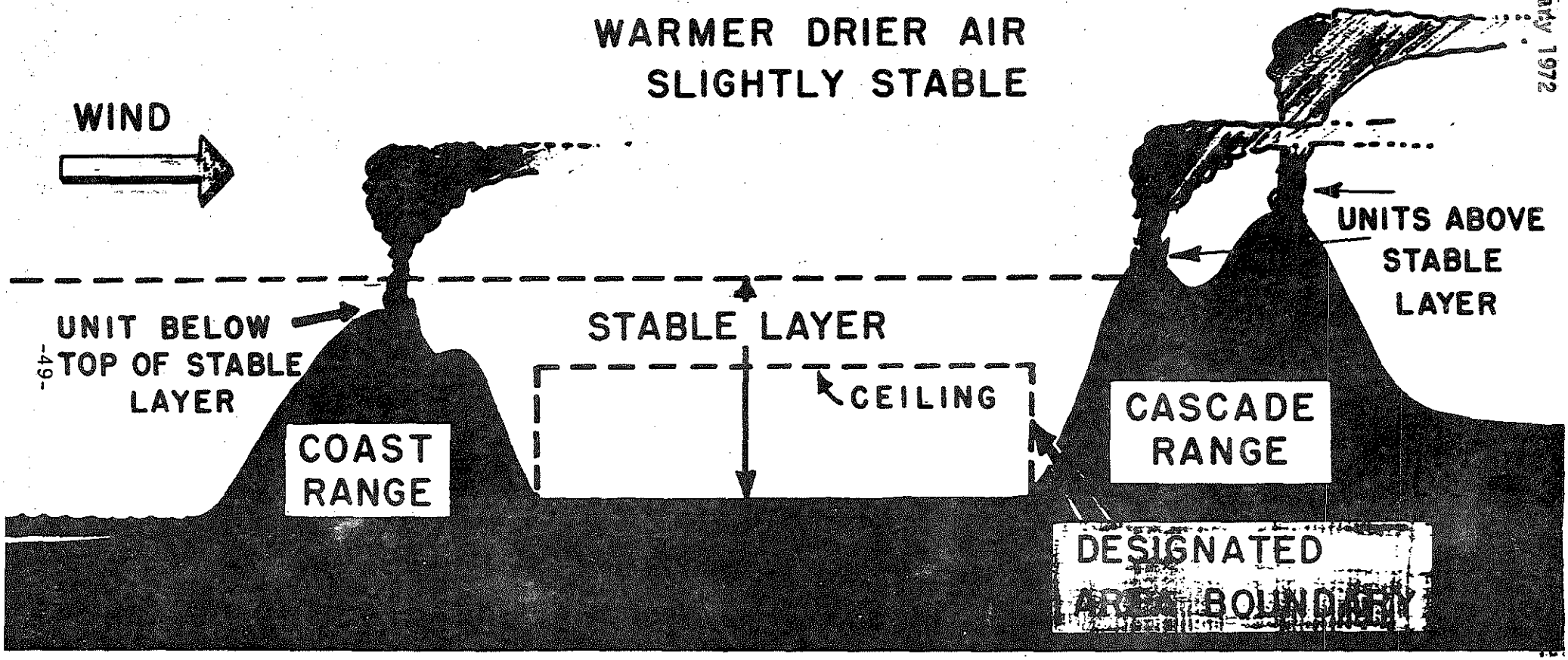


EXHIBIT 6. NIGHT AND EARLY MORNING ATMOSPHERIC CONDITION

February 1972

1-1-3-410 p 11

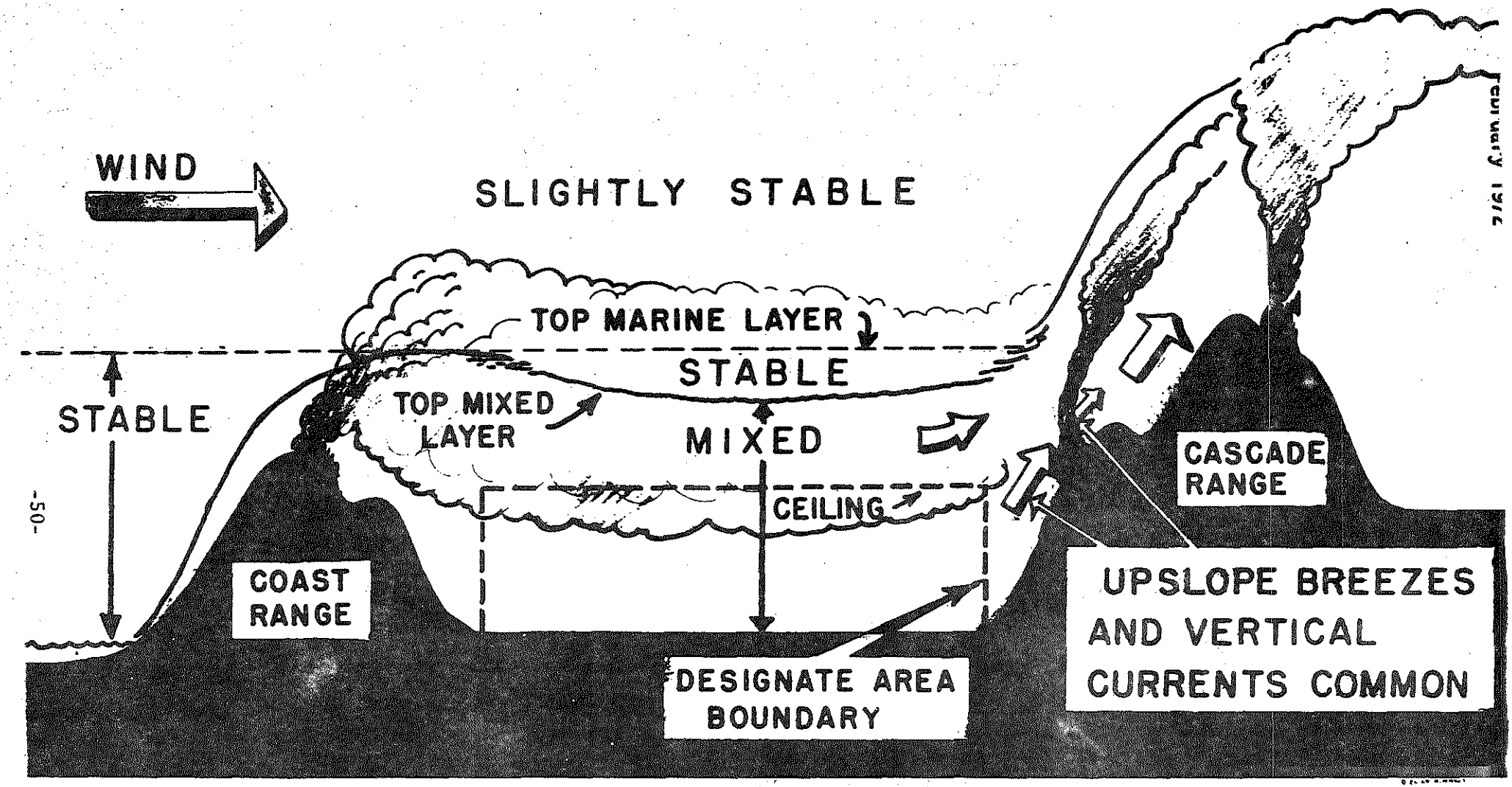


EXHIBIT 7. LATE SUMMER AFTERNOON HEATED UNSTABLE LAYER NEAR EARTH'S SURFACE.

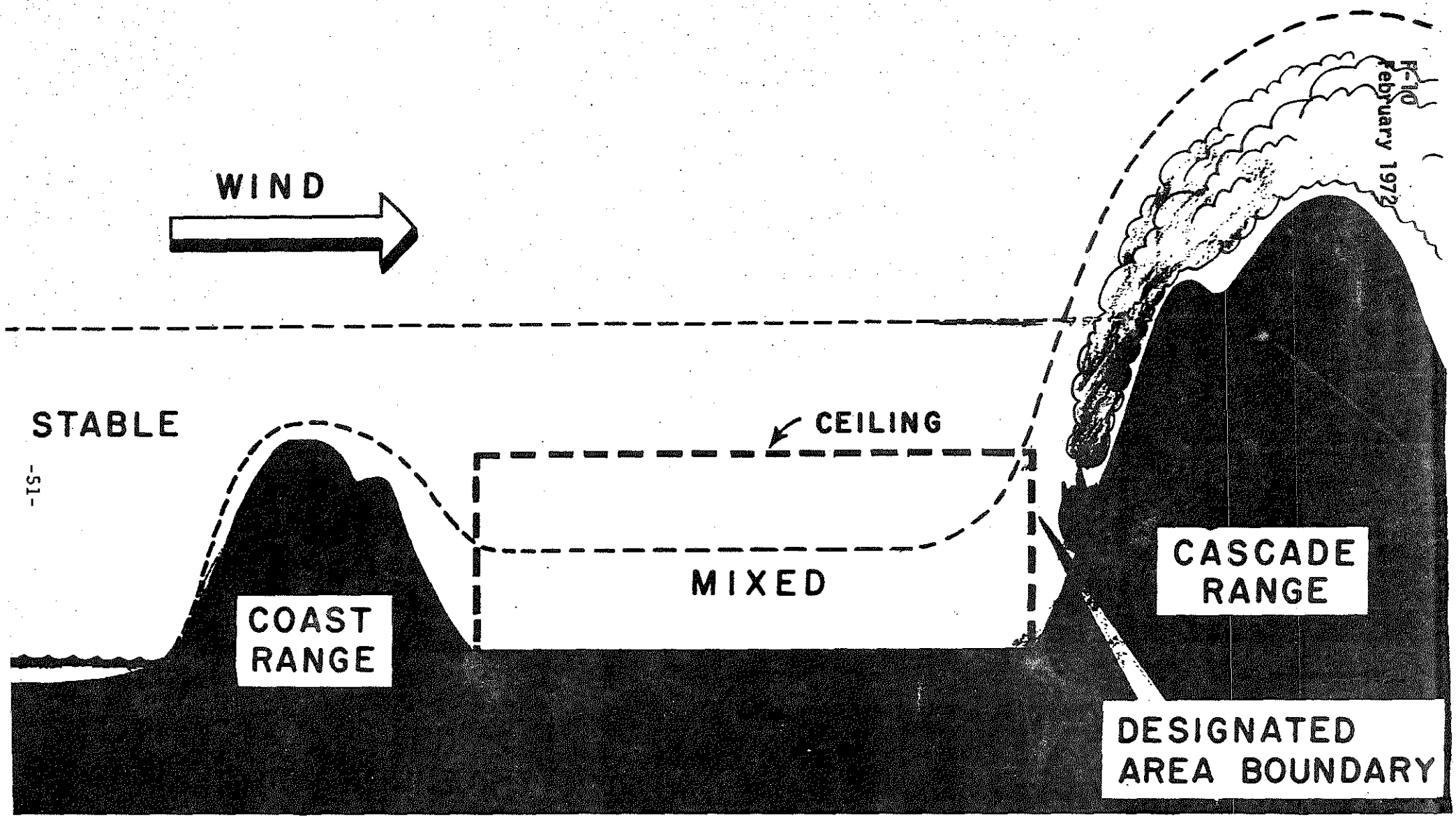
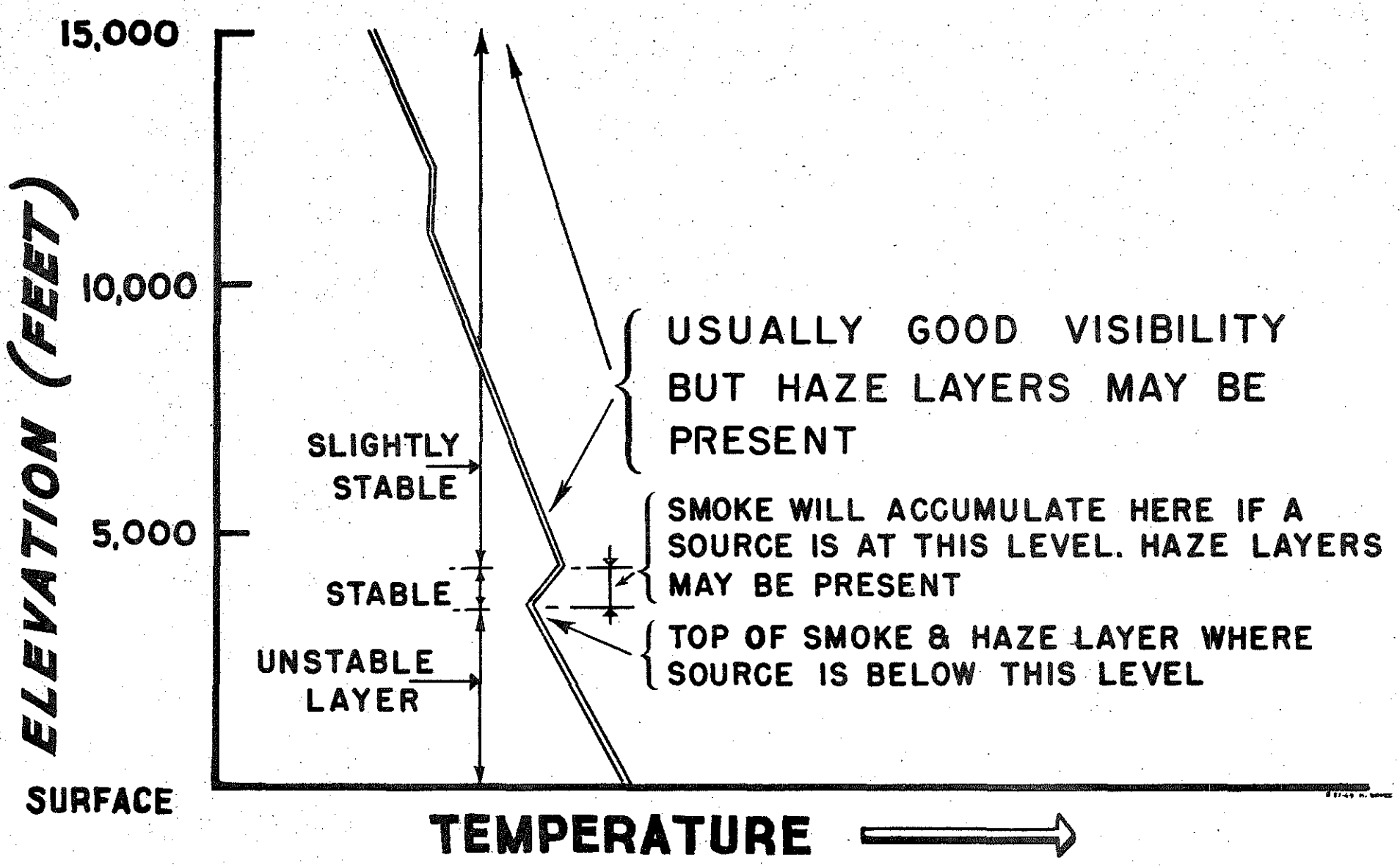


EXHIBIT 8. FALL SEASON····USUAL SUNNY AFTERNOON ATMOSPHERIC CONDITIONS



ATMOSPHERIC TEMPERATURE - ELEVATION VARIATION

EXHIBIT 9. A HAZE LAYER INDICATES THE PRESENCE OF A STABLE LAYER---USUALLY THE LEVEL OF THE BASE.

DETAILED INSTRUCTIONS FOR USE OF THE

OREGON SMOKE MANAGEMENT REPORTING SYSTEM CODING SHEET
(Form 1-1-3-400)

ENTRY EXAMPLES - COMPLETE EXERCISE IN SMOKE MANAGEMENT RECORD PLAN

RAW DATA: Purpose of burn: Hazard Reduction; 35 tons*; 15 acres; elevation of 1,500'; 10-30 miles distant from a designated burn; location: T 11 S, R 7 W, Sec 12; Type of burn: Broadcast; February 1, 1975. Estimated ignition time: 1200 PST.

*If 20 tons or less, enter "20".

PART I - UNIT DESCRIPTION REPORT

(1) Required entry by field: WO,02,11S-7W-12,1500,10-30,BCST,15,35,H

(2) Computer return printout to field:

SMOKE MANAGEMENT
UNIT VERIFICATION AND NUMBER ASSIGNMENT REPORT FOR 02/01/75
WEST OREGON BENTON

*Unit No.	Twp.Rng.Sec.	Elev.	Distance	Type	Acres	Tons	** Tons/Acre
912	11S-7W-12	1500	10-30	BCST-H	15	35	2.333

*Automatically assigned by computer
**Automatically assigned by computer

Whenever needed, a district printout of all proposed burns in the historical file can be provided.

PART II - PLANNED BURNS

Part I has been accomplished by field.

Today on February 12, 1975, field, at 0800 PST, makes decision to burn Unit No. 912 (the number previously assigned by the computer). Estimated ignition time (EIT) is 1200 PST.

(1) Required entry by field: 912,1200

(2) Computer return printout to field:

SMOKE MANAGEMENT
PLANNED BURNS FOR 02/12/75
WEST OREGON BENTON

Unit No.	Twp.Rng.Sec.	Elev.	Distance	Type	Acres	Tons	**Tons/Acre
912	11W-7W-12	1500	10-30	BCST-H	15	35	2.333

(Any other planned burns for this date would also be listed out by district and county)

PART III - ACCOMPLISHMENT REPORT

Part I and II has been accomplished by field.

Field accomplished planned burn February 12, 1975, with an ignition time of 1235. However, only 80% of the original tonnage was burned (see special instructions below).

(1) Required entry by field: 912,1235,1,80

(2) Computer return printout to field:

SMOKE MANAGEMENT
ACCOMPLISHMENT REPORT

Unit No.	Twp.Rng.Sec.	Elev.	Distance	Type	Acres	Tons	Tons/Acre	Smoke
912	11S-7W-12	1500	10-30	BCST-H	15	28	1.866	Minor

Any units planned for a given day must be accounted for even if not burned as planned.

PERCENT OF ORIGINAL PROPOSED TONNAGE ACTUALLY BURNED
(Part III, Field No.4)

Percent is the percent of tons in each original unit which are to be burned and which are actually burned. Example: A proposed burn has 100 tons on 50 acres, but only 80% of the total tonnage burned. This will require that the number 80 be entered in field No. 4 of Part III.

The computer will then indicate that 80% of that unit's tonnage has been burned; in this case, 80 tons, with 20%, or 20 tons, of the original burn still left to be burned.

The computer will retain the unit on file under the original unit number indicating that 20% of the unit's original tonnage, or 20 tons are remaining to be burned.

If at a future date you wanted to burn the unit again, you would enter the unit number as previously assigned and the estimated ignition time in accordance with Part II of the PLANNED BURN INSTRUCTIONS. If upon completion of the second burn there are still 5 tons remaining, the number 95 will be required to be entered in field No.4 of Part III.

The computer will then indicate that 95% of that original unit's tonnage has been burned, in this case 95 tons, with 5% or 5 tons of the original unit's tonnage still left.

The computer will continue to retain the remaining 5 tons, or 5%, of the original unit on file until 100% of the unit has been burned.

All units which have not been 100% burned will be retained on historical file until the end of the calendar year, at which time they will be purged from the file.

The determination of the percentage burned of a unit should be based upon the tonnage originally planned to be burned and not the acreage.

A burn may be considered 100% accomplished if the administrator feels that the significant heavy concentrations of fuel have been satisfactorily burned and no more burning in the unit will be required.

PRINTOUTS AVAILABLE

In addition to the computer printouts of parts I, II and III, the following additional printouts will be available:

1. The Accomplishment Report: Computer printout is a report on what has been burned by the field. This information is provided in two forms:

   a. The Accomplishment Report - is a summation of all the burns this calendar year to date by forest or district. This will be returned to the field as needed (i.e., weekly or monthly; refer to Part III of example exercise for computer printout format).

   b. Results summary - is the daily printout by forest/district or county of what was burned the previous day. This will not normally be transmitted to the field. The computer printout format is the same as the Accomplishment Report.

2. The Available Units - is a listing of all units still to be burned this calendar year which are on file in the computer. This listing is by forest or district only and can be furnished the field on request.

   Example: COMPUTER PRINTOUT FORMAT

   SMOKE MANAGEMENT
   AVAILABLE UNITS
   WEST OREGON

Unit No.	Twp.Rng.Sec.	Elev.	Distance	Type	Acre	Tons	Tons/Acre	Left
912	11S-7W-12	1500	10-30	BCST-H	15	35	2.333	100%

3. Smoke Management - is a printout of all units in a particular forest or district which resulted in smoke moving into a DESIGNATED AREA.

   EXAMPLE: COMPUTER PRINTOUT FORMAT

   SMOKE MANAGEMENT
   SMOKE IN DESIGNATED AREA
   WEST OREGON

Unit	Plan	Act	Smoke
912	02/01/75-1200	1235	Minor

   (Plan - Planned ignition time)

   (Act - Actual ignition time)

REPORTING SCHEDULE

1. Historical data (unit descriptions) may be reported at any time during office hours.

2. Unit verification and number assignment report will be transmitted to the field each day between 11:00 and 12:00 local time. This will include all unit description reports which were received from the field during the preceding 24 hours.

3. Planned burns will be reported at 9:30 local (normal slash report) time. Burns with planned ignition times prior to the 9:30 report must be reported the previous day.

4. Accomplished burns will be reported the day after ignition with the 9:30 burning report.

5. When reporting planned and accomplished burns at 9:30, group burns by either "planned" or "accomplished".

Example: Western Oregon

Planned
9,1210
10,1300
16,1130

Accomplished
8,1125,0,100
7,1200,1,90
14,0,0,0

F-3,F-11
3-75

DIRECTIVE
1-1-3-411

OPERATIONAL DETAILS
for the
OREGON SMOKE MANAGEMENT PLAN

AUTHORITY:

ORS 190.110 provides the authority of State agencies to cooperate with a United States governmental agency in performing their imposed duties or exercising their conferred powers.

The Oregon Smoke Management Plan adopted by the Oregon State Forestry Department, Department of Environmental Quality, and the United States Forest Service in January of 1972, provides the vehicle to keep smoke resulting from burning on forest lands from being carried to or accumulating in designated areas or other areas sensitive to smoke.

OBJECTIVE:

The objective of the Operational Details is to provide a system which will insure smooth, consistent and successful operation of the Oregon Smoke Management Plan by the various National Forests and State Districts. This will be further facilitated by the implementation and use of the Smoke Management Record System.

POLICY:

It is the policy of the Board of Forestry, the State Forestry Department and the State Forester, that the Operational Details be strictly adhered to in order to achieve the stated objectives of the Details and the Smoke Management Plan.

RESPONSIBILITY:

Each field administrator -- a forest officer who has the direct responsibility for administering burning permits on a unit of forest land within the boundaries of an official fire district -- is additionally responsible to manage the prescribed burning on forest land in connection with the management of other aspects of the environment in order to maintain a satisfactory atmospheric environment in designated areas described in the Smoke Management Plan. Likewise this effort may be applied in special situations where local conditions warrant and that are not defined as designated areas but nevertheless are sensitive to smoke.

Fire weather offices at Portland, Salem, Medford and Pendleton are responsible for issuance of regular smoke management forecasts during the course of normal prescribed burning seasons in their respective areas. Additional consultation service and special forecasting services at other times and occasions will be provided upon request of the field administrator.

The State Forester is responsible for the coordination of the Smoke Management Plan and the Operating Details between the National Weather Service, United States Forest Service, Bureau of Land Management, Oregon Forest Protective Association, Department of Environmental Quality, and the various regional air quality authorities. In addition, the State Forester, through the Forest Protection Division, has the responsibility to issue additional restrictions on prescribed burning in situations where the air quality of the entire State or any part thereof is, or would likely become adversely affected by smoke.

PROCEDURE:

The following procedures will be adhered to in burning operations and reporting.

Burning Operations: Normal hours of ignition on all districts will be between 11:00 and 16:00 hours, PDT. Ignition may be planned outside the normal hours, however no burning will be conducted before planned ignition is reported.

If for any reason a designated area receives an excessive accumulation of slash smoke, responsible district or districts will determine the source or sources and take any available remedial actions. Such actions include stopping any additional ignition within the problem slash unit, notifying the Operations Section of the Forest Protection Division, and contacting the local news media offering them a frank report of what happened.

Reporting: All prescribed burning normally will be reported from district offices by teletype directly to the Operations Section. Normal reporting time will be 0930. However, Unit Description report data may be reported by teletype at any time during office hours, or by submitting Form 1-1-3-400 by mail far enough in advance to allow entry into the computer at least one day prior to planned ignition. Entry of Unit Description Report data at "slack" times will speed up the regular 0930 report. Burns with planned ignition times prior to the 0930 reporting must be reported the previous day. Those with planned ignition times after 0930 should be reported on the day of the burn. Accomplished burns will be reported the day after ignition.

All smoke management reports should be entered on Form 1-1-3-400, Oregon Smoke Management Reporting System Coding Sheet (attachment No. 2 to this Directive) prior to transmitting to Salem. This form is largely self-explanatory and details specific reporting instructions Generally, three types of operations are reported on this form: (1) Unit Descriptions, (2) Planned Burns, and (3) Accomplished Burns. Additional instructions are contained in Attachment No. 1, Detailed instructions for use of the Oregon Smoke Management Reporting System Coding Sheet.

The use of the smoke management record system will reduce paper work required by field units and cooperating agencies with timely, accurate and complete records of prescribed burning activity. The Prescribed Burn Report which has been required in the past for individual prescribed burn will no longer be required.

Daily printouts of the Unit Verification Report will be checked by field offices against the hand copy Coding Sheet for accuracy and completeness. The Unit Description Report, Planned Burn Report and Accomplished Burn Report will be placed in an historical file which will provide summaries as needed. (See Attachment No. 1 for printouts available.)

Attachments:

(1) Detailed Instructions for Use of the Oregon Smoke Management Reporting System Coding Sheet (Form 1-1-3-400)
(2) Form 1-1-3-400 - Oregon Smoke Management Reporting System Coding Sheet

SNW:ab

ROLE OF FIRES IN OREGON FORESTS

List of Sources

State Forestry Department:

1. Oregon Revised Statutes, Chapter 477.515, (3), (4)

2. Annual Report, Oregon Smoke Management Plan, Oregon State Forestry Department, 1975 and 1976

3. Oregon Smoke Management Plan, Oregon State Forestry Department, 1972

4. Oregon Smoke Management Plan Outline, State Forestry Department, 1976

5. Operational Details for the Oregon Smoke Management Plan, State Forestry Department, 1975

6. Eugene -- Some Air Quality Problems, the Forest Log, Oregon State Forestry Department, 1975

7. Forestry Program for Oregon - Timber Supply Today and Tomorrow, State Forestry Department

8. Brief History of the Forestry Smoke Management Plan, State Forestry Department, 1976

U. S. Forest Service:

1. Environmental Effects of Forest Residues Management in the Pacific Northwest, Pacific Northwest Forest and Range Experiment Station, U. S. Department of Agriculture, Technical Report, PNW-24

2. Forester Interpreter's Primer on Fire Management, Forest Service, USDA, TT-53, 1976

3. Fire in the Environment Symposium Proceedings, Forest Service, USDA, 1972

4. Fire and the Forest: Taming Wildfire and Using Tame Fire; Southern Forest Fire Laboratory, Forest Service, USDA 1970

5. Fire in Land Management; Forest Service, USDA 1974

6. Forest Fuels, Prescribed Fire and Air Quality; Pacific Northwest Forest and Range Experiment Station. Forest Service, USDA, Hall, J.A., 1972.

7. Wildfire vs. Prescribed Fire in the Southern Environment. Forest Service, USDA, Mobley, H. and Kerr, E., 1973

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8. Factors Influencing Smoke Management Decision in Forest Areas, Forest Service, USDA, Cramer, Owen P. and Pickford, Stewart G.

9. The Trade-Offs Between Smoke from Wild and Prescribed Forest Fires; Forest Service, USDA. Cooper, Robert W.

10. Slash Burning: Pollution Can Be Reduced. Forest Service, USDA. Fire Control Notes 31 (3): 3-5. Murphy, James L; Fritschen, Leo J., and Cramer, Owen P.

Other:

1. Eight Surprises, Address to the American Institute of Chemical Engineers, San Francisco; McKetta, John J., 1975

2. Timber for Oregon's Tomorrow, Research Bulletin 19, Forest Research Laboratory, School of Forestry, Oregon State University. Beuter, John H.; Johnson, K. Norman, and Scheurman, H. Lynn. 1976

3. Field Burning in the Willamette Valley, 1975. State of Oregon, Department of Environmental Quality. 1976.

4. The Field Burning Climatology of the Willamette Valley. Technical Report No. 76-1. Oregon State University; Dennessey, Joseph P., Jr., and Craig, Charles P., 1976

5. Fire Management and Land Use Planning Today: Tradition and Change in the Forest Service. Paper presented at Society of American Foresters Convention, Wash., D.C., September 1935; Mutch, Robert W.

6. Proceedings - Number 14 - Tall Timbers Fire Ecology Conference, October 1974; Tall Timbers Research Station, Tallahassee, Florida, 1976. 675 pps.

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

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MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. I, May 27, 1977, EQC Meeting

Vehicle Emission Testing Rules - Consideration of adoption of proposed amendments to rules governing motor vehicle emission inspection to include gasoline powered heavy duty vehicles, OAR 340-24-300 through 24-350.

Background

At the Environmental Quality Commission meeting of February 15, 1977, authorization was granted to hold a public hearing to consider amendments to the inspection program rules. The purpose of the amendments is to adopt standards, criteria, and inspection procedures for heavy duty gasoline powered motor vehicles registered within the boundaries of the Metropolitan Service District including the City of Portland. The proposed rules are presented in Appendix A.

Discussion

The public hearing was held April 15, 1977 at the Multnomah County Courthouse. The Hearing Officer's report is attached as Appendix B. Department staff discussions on the testimony are presented in Appendix C. A summary of the major points presented at the hearing are as follows:

1. Initiate a trial or voluntary program.

The voluntary period was very successful for the light duty inspection program. Several trial programs have been conducted, and currently any vehicle will be tested at any station, unless physical size is a limitation. Additional voluntary testing does not appear to significantly contribute any increased benefit for the implementation of a heavy duty inspection program, though voluntary testing will continue to be made available to all.

The original proposal called for the program to be effective July 1, 1977. Based upon the request for a trial period, the need to coordinate implementation with the Motor Vehicles Division and notify the affected vehicle owners in a timely manner, and allow for inspections up to 90 days prior to registration, the effective date of the heavy duty program is proposed as July 1, 1977 to allow for the fourth quarter registration.

Oregon allows for less than annual registration of its heavy duty trucks. This is a common practice among many states. Because of this practice, however, the Attorney General's office was consulted to determine whether the Commission had the statutory authority to allow those vehicles registering less than annually to be effectively tested annually. The response indicated that the Commission has this authority.

Motor Vehicles Division records indicate that as many as half of the registered heavy duty trucks in the State register on less than an annual basis. The Department staff has been working with Motor Vehicles Division to provide for a workable document which would implement an annual inspection requirement for those applicable heavy duty vehicles.

2. Public school buses should be exempt or have special provisions.

School bus operators were the only attendees at the public hearing. No representatives of the trucking industries made an appearance or presented written testimony. The school bus operators were concerned with the impact on their operations of various proposals, currently before the Legislature, which would require publicly owned vehicles to be tested. They felt that public bodies should be allowed greater latitude for self-inspection.

It should be noted that there are four significantly different proposals now before the Legislature that would affect publicly owned vehicles. It is proposed that after the Legislature adjourns, the Commission would be presented with any rule changes necessary to effectively implement testing of publicly owned vehicles.

3. Considerations are necessary for certain engine families.

In written testimony, both International Harvester and Chrysler Corporation stated the need for special consideration for specific engine families. These considerations are based upon design differences. Such consideration is in keeping with current policy and is incorporated in the proposed rules.

4. Test criteria should be revised to reflect the Federal heavy duty engine certification.

The suggestions made by General Motors that the test criteria should better reflect Federal criteria has been adopted. Revision to the standards have been incorporated.

Other changes in the rules made since their initial presentation to the Commission include:

24-315(16) -- This rule provides that a motor vehicle registered on less than an annual basis pursuant to ORS 481.205(2) need not have more than an annual inspection to assure compliance with ORS 481.190.

24-325(3)(a) -- This has been modified to clarify its intent.

24-335 -- The standards have been modified taking into consideration the public testimony. Also included is the same clause that exists in the light duty standards which allows the Director to establish specific separate standards for vehicle classes which may have prohibitive inspection problems.

24-350(1)(c) -- This has been modified and 24-350(5)(c) has been added to cover potential problems that might develop in the licensed self-inspection fleets.

Conclusion

The public hearing provided input into the rule-making process. The public comments were evaluated, and where appropriate, were incorporated into the rules. The changes and the overall package should provide for an effective emission inspection program for heavy duty gasoline powered motor vehicles.

Director's Recommendation

It is recommended that the Commission adopt the proposed rules presented in Appendix A covering inspection maintenance of heavy duty gasoline powered motor vehicles. The effective date of these rules would be July 1, 1977, allowing for the inspection prior to the fourth quarter registrations.

Bill

WILLIAM H. YOUNG

WPJ:mg
May 5, 1977

NOTE: Sections 24-315, 24-325, and 24-335 are new sections.

Effective date, July 1, 1977.

24-315 HEAVY DUTY GASOLINE MOTOR VEHICLE EMISSION CONTROL TEST METHOD

(1) The vehicle emission inspector is to insure that the gas analytical system is properly calibrated prior to initiating a vehicle test.

(2) The department approved vehicle information data form is to be completed prior to the motor vehicle being inspected.

(3) The vehicle is to be in neutral gear if equipped with a manual transmission, or in "park" position if equipped with an automatic transmission.

(4) All vehicle accessories are to be turned off.

(5) An inspection is to be made to insure that the motor vehicle is equipped with the required functioning motor vehicle pollution control system in accordance with the criteria of section 24-325.

(6) With the engine operating at idle speed, the sampling probe of the gas analytical system is to be inserted into the engine exhaust outlet.

(7) The engine is to be accelerated with no external loading applied, to a speed of between 2200 RPM and 2700 RPM. The engine speed is to be maintained at a constant speed within this speed range for sufficient time to achieve a steady-state condition whereupon the steady-state levels of the gases measured by the gas analytical system shall be recorded on the department approved vehicle information form. The engine speed shall then be returned to an idle speed condition.

(8) The steady-state levels of the gases measured at idle speed by the gas analytical system shall be recorded on the dpeartment approved vehicle information form. The idle speed at which the gas measurements were made shall also be recorded.

(9) If the vehicle is equipped with a dual exhaust system, then steps (6) through (8) are to be repeated on the other exhaust outlet(s). The readings from the exhaust outlets are to be averaged to determine a single reading for each gas measured in each step (7) and (8).

(10) The reading from the exhaust outlet, or the average reading from the exhaust outlets obtained in each step (7) and (8) are to be compared to the standards of section 24-335.

(11) If the motor vehicle is capable of being operated with both gasoline and gaseous fuels, then steps (6) through (8) are to be repeated so that emission test results are obtained for both fuels.

(12) If it is ascertained that the motor vehicle may be emitting noise in excess of the noise standards adopted pursuant to ORS 467.030, then a noise measurement is to beconducted in accordance with the test procedures adopted by the Commission or to standard methods approved in writing by the department.

(13) If it is determined that the motor vehicle complies with the criteria of section 24-325 and the standards of section 24-335, then, following receipt of the required fees, the vehicle emission inspector shall issue the required certificates of compliance and inspection.

(14) The inspector shall affix any certificate of inspection issued to the lower left-hand side (normally the driver side) of the front windshield, being careful not to obscure the vehicle identification number nor to obstruct driver vision.

(15) No certificate of compliance or inspection shall be issued unless the vehicle complies with all requirements of these rules and those

applicable provisions of ORS 468.360 to 468.405, 481.190 to 481.200, and 483.800 to 483.825.

(16) Any motor vehicle registered on less than an annual basis pursuant to ORS 481.205(2) need not pass more than an annual inspection to assure compliance with ORS 481.190. Such vehicles shall be issued a Certificate of Compliance in a form provided by the department stating that the vehicle passed inspection by the department on a certain date and was in compliance with the standards of the Commission, and having no information to the contrary, presumes the continuance of such compliance at the date of the issuance of the Certificate through four consecutive quarterly periods.

24-325 HEAVY DUTY GASOLINE MOTOR VEHICLE EMISSION CONTROL TEST CRITERIA

(1) No vehicle emission control test shall be considered valid if the vehicle exhaust system leaks in such a manner as to dilute the exhaust gas being sampled by the gas analytical system. For the purpose of emission control tests conducted at state facilities, tests will not be considered valid if the exhaust gas is diluted to such an extent that the sum of the carbon monoxide and carbon dioxide concentrations recorded for the idle speed reading from an exhaust outlet is 8% or less.

(2) No vehicle emission control test shall be considered valid if the engine idle speed either exceeds the manufacturer's idle speed specifications by over 200 RPM on 1970 and newer model vehicles, or exceeds 1000 RPM for any age model vehicle.

(3) No vehicle emission control test conducted after June, 1977, for a 1970 or newer model vehicle shall be considered valid if any element of the following factory-installed motor vehicle pollution control systems have been disconnected, plugged, or otherwise made inoperative in violation of ORS 483.825(1), except as noted in subsection (5):

(a) Positive crankcase ventilation

(b) Exhaust modifier system

Examples: Air injection system

Thermal reactor system

(c) Exhaust gas recirculation (EGR) systems

(d) Evaporative control system

(e) Spark timing system

Examples: Vacuum advance system

Vacuum retard system

(f) Special emission control devices

Examples: Orifice spark advance control (OSAC)

Speed control switch (SCS)

Thermostatic air cleaner (TAC)

Transmission controlled spark (TCS)

Throttle solenoid control (TSC)

(4) No vehicle emission control test conducted after June, 1977, for a 1968 or newer model vehicle shall be considered valid if any element of the factory-installed motor vehicle pollution control system has been modified or altered in such a manner so as to decrease its efficiency or effectiveness in the control of air pollution in violation of ORS 483.825(2), except as noted in subsection (5). For the purposes of this subsection, the following apply:

(a) The use of a non-original equipment aftermarket part (including a rebuilt part) as a replacement part is not considered to be a violation of ORS 483.825(2), if a reasonable basis exists for knowing that such use will not adversely effect emission control efficiency. The Department will maintain a listing of those parts which have been determined to adversely effect emission control efficiency.

(b) The use of a non-original equipment aftermarket part or system as an add-on, auxiliary, augmenting, or secondary part or system, is not considered to be a violation of ORS 483.825(2), if such part or system is listed on the exemption list maintained by the department.

(c) Adjustments or alterations of a particular part or system parameter, if done for purposes of maintenance or repair according to the vehicle or engine manufacturer's instructions, are not considered violations of ORS 483.825(2).

(5) A 1970 or newer model motor vehicle which has been converted to operate on gaseous fuels shall not be considered in violation of ORS 483.825(1) or (2) when elements of the factory-installed motor vehicle air pollution control system are disconnected for the purpose of conversion to gaseous fuel as authorized by ORS 483.825(3).

(6) For the purposes of these rules, a motor vehicle with an exchange engine shall be classified by the model year and manufacturer make of the exchange engine, except that any requirement for evaporative control systems shall be based upon the model year of the vehicle chassis.

24-335 HEAVY DUTY GASOLINE MOTOR VEHICLE EMISSION CONTROL EMISSION STANDARDS

(1) Carbon monoxide idle emission values not to be exceeded:

	Base Standard %	Enforcement Tolerance Through June, 1979
ALL VEHICLES		
Pre-1970	6.0	0.5
1970 through 1973	4.0	1.0
1974 through 1977	3.0	1.0

(2) Carbon monoxide nominal 2,500 RPM emission values not to be exceeded:

	Base Standard %	Enforcement Tolerance Through June, 1979
ALL VEHICLES		
Pre-1970	3.0	1.0
1970 through 1977	2.0	1.0
Fuel Injected	No Check	

(3) Hydrocarbon idle emission values not to be exceeded:

	Base Standard PPM	Enforcement Tolerance Through June, 1979
ALL VEHICLES		
Pre-1970	700	200
1970 through 1973	500	200
1974 through 1977	300	200

(4) There shall be no visible emission during the steady-state unloaded engine idle and raised rpm portion of the emission test from either the vehicle's exhaust system or the engine crankcase.

(5) The Director may establish specific separate standards, differing from those listed in subsections (1), (2), (3), and (4) for vehicle classes

which are determined to present prohibitive inspection problems using the listed standard.

24-340 CRITERIA FOR QUALIFICATIONS OF PERSONS ELIGIBLE TO INSPECT MOTOR VEHICLES AND MOTOR VEHICLE POLLUTION CONTROL SYSTEMS AND EXECUTE CERTIFICATES

(1) Three separate classes of licenses are established by these rules.

(a) [~~Light-duty~~] Motor vehicle fleet operations.

(b) Fleet operation vehicle emission inspector.

(c) State employed vehicle emission inspector.

(2) Application for a license must be completed on a form provided by the department.

(3) Each license shall be valid for 12 months following the end of the month of issuance.

(4) No license shall be issued until the applicant has fulfilled all requirements and paid the required fee.

(5) No license shall be transferable.

(6) Each license may be renewed upon application and receipt of renewal fee if the application for renewal is made within the 30 day period prior to the expiration date and the applicant complies with all other licensing requirements.

(7) A license may be suspended, revoked, or not renewed if the licensee has violated these rules or ORS 468.360 to 468.405, 481.190 or 483.800 to 483.820.

(8) A fleet operation vehicle emission inspector license shall be valid only for inspection of, and execution of certificates for, motor vehicle pollution control systems and motor vehicles of the [~~light-duty~~] motor vehicle fleet operation by which the inspector is employed on a full time basis.

(9) To be licensed as a vehicle emission inspector, the applicant must:

(a) Be an employee of the Vehicle Inspection Division of the department, or

(b) Be an employee of a licensed [~~light-duty~~] motor vehicle fleet operation.

(c) Complete application.

(d) Satisfactorily complete a training program conducted by the department. Only persons employed by the department or by a [~~light-duty~~] motor vehicle fleet operation shall be eligible to participate in the training program unless otherwise approved by the Director. The duration of the training program for persons employed by a [~~light-duty~~] motor vehicle fleet operation shall not exceed 24 hours.

(e) Satisfactorily complete an examination pertaining to the inspection program requirements. This examination shall be prepared, conducted, and graded by the department.

(10) To be licensed as a [~~light-duty~~] motor vehicle fleet operation, the applicant must:

(a) Be in ownership, control, or management, or any combination thereof of 100 or more Oregon registered in-use [~~light-duty~~] motor vehicles.

(b) Be equipped with an exhaust gas analyzer complying with criteria established in section 24-350 of these rules.

(c) Be equipped with a sound level meter conforming to "Requirements for Sound Measuring Instruments and Personnel" (NPCS-2) manual, revised September 15, 1974, of this department.

(11) No person licensed as a [~~light-duty~~] motor vehicle fleet operation shall advertise or represent himself as being licensed to inspect motor vehicles to determine compliance with the criteria and standards of sections 24-320 and 24-330.

24-350 GAS ANALYTICAL SYSTEM LICENSING CRITERIA

(1) To be licensed, an exhaust gas analyzer must:

(a) Conform substantially with either:

(A) All specifications contained in the document "Specifications for Exhaust Gas Analyzer System Including Engine Tachometers" dated July 9, 1974, prepared by the department and on file in the office of the Vehicle Inspection Division of the department, or

(B) The technical specifications contained in the document "Performance Criteria, Design Guidelines, and Accreditation Procedures For Hydrocarbon (HC) and Carbon Monoxide (CO) Analyzers Required in California Official Motor Vehicle Pollution Control Stations", issued by the Bureau of Automotive Repair, Department of Consumer Affairs, State of California, and on file in the office of the Vehicle Inspection Division of the department. Evidence that an instrument model is approved by the California Bureau of Automotive Repair will suffice to show conformance with this technical specification.

(b) Be under the ownership, control, or management, or any combination thereof, of a licensed [~~light-duty~~] motor vehicle fleet operation or the department.

(c) [~~Be span gas calibrated and have proper operational characteristics verified by the department.~~] Be span gas calibrated a minimum of once a month (at least every 30 calendar days) by a licensed inspector. The calibration and the inspector's initials are to be recorded on the back of the exhaust gas analyzer's license for verification by the department.

(2) Application for a license must be completed on a form provided by the department.

(3) Each license issued for an exhaust gas analyzer system shall be valid for 12 months following the end of the month of issuance, unless returned to the department or revoked.

(4) A license for an exhaust gas analyzer system shall be renewed upon submission of a statement by the [~~light-duty~~] motor vehicle fleet operation that all conditions pertaining to the original license issuance are still valid and that the unit has been gas calibrated and its proper operation verified within the last 30 days by a vehicle emission inspector in their employment.

(5) Grounds for revocation of a license issued for an exhaust gas analyzer system include the following:

(a) The unit has been altered, damaged, or modified so as to no longer conform with the specifications of subsection (1)(a) of this section.

(b) The unit is no longer owned, controlled, or managed by the [~~light-duty~~] motor vehicle fleet operation to which the license was issued.

(c) The department verifies that a Certificate of Compliance has been issued to a vehicle which has been emission tested by an analyzer that has not met the requirements of subsection (1)(c) of this section.

(6) No license shall be transferable.

(7) No license shall be issued until all requirements of subsection (1) of this section are fulfilled and required fees paid.

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

To: Environmental Quality Commission

From: Hearing Officer

Subject: Hearing Report: Proposed Rules for Inspection of In-Use, Gasoline-Powered Heavy Trucks

BACKGROUND

Commencing at 1:00 p.m. on Friday, April 15, 1977, a public hearing was held in Room 602 of the Multnomah County Courthouse in Portland, Oregon.

Of the five to ten persons in attendance only Mr. Allison offered testimony. It is summarized below.

Representatives of Chrysler Corporation, General Motors Corporation, and International Harvester offered testimony in writing. Copies are attached and the testimony is summarized below.

SUMMARY OF TESTIMONY

Mr. T.J. O'Rourke, representing Chrysler Corporation:

Mr. O'Rourke supported the concept of an inspection program to encourage owner maintenance.

He cautioned that any such program should either be designed to eliminate only gross emitters or should have higher goals incorporated only to the extent that they are not inconsistent with the federal test procedure and take into account variations in:

1) Makes and models.
2) Engine speed, temperature, etc. at test time.
3) Idle set of engine.
4) Climatic difference at test time.

Mr. O'Rourke reiterated his July, 1976 views on proper standards for certain Chrysler light vehicles and advised that no inspection procedures be instituted for heavy duty vehicles at this time due to insufficient in-use data to permit inferences as to the proper test standards in view of:

1) The range of vehicle types, sizes, and uses.
2) The performance of vehicles with extensive mileage which consume much oil.
3) The impact on the trucking industry.

Mr. W.J. Martin, representing International Harvester:

Mr. Martin found the agency's proposed idle CO emissions standards to be reasonable and attainable for newer and older IH vehicles.

Speaking to hydrocarbon emissions at idle, however, he cautioned that a rigid idle test might require adjustments to the vehicle which would cause the vehicle to fail the more comprehensive multi-mode federal test.

It was noted that the federal certification process does not limit HC control at idle.

Mr. Martin predicted that a standard designed to severely limit HC emissions at idle might impair fuel economy at idle (through retarding ignition and increasing idle speed). This, it was noted, would be contrary to the fuel-conscious design of newer IH engines.

Mr. Martin contended that stringent HC idle standards (200 ppm) would fail engines which are cleaner on an overall, composite basis than those which pass.

Mr. Martin presented the results of test data tending to show:

1) A decrease in ignition retardation results in a decrease in idle HC and, also, diminished power and fuel economy.
2) Along with a decrease in idle HC, increased idle rpm causes greater fuel consumption, "dieseling," and difficulty of shifting.
3) An increase in CO settings at idle results in decreased HC.
4) Engine misfire greatly increases idle HC.

Mr. Martin recommended that DEQ run a pilot test program, as was done for light vehicles, to determine emission reduction capabilities for the entire heavy truck population.

Mr. T.M. Fisher, representing General Motors Corporation:

Mr. Fisher recommended that the test method provide for the engine to be at normal operating temperature. He recommended alignment with federal practice by dividing model years into those from 1970 to 1973 and those after 1973 and before 1979. Finally, it was recommended that CO limits for GM trucks at 2500 rpm be the same as for idle.

Mr. Don Allison, speaking for himself and as one responsible for a fleet of school buses objected that a school system which was tax-supported might (if changes contemplated by the legislature for publicly owned vehicles are passed) have to pay another tax-supported entity

to check on fleet tuneups, an area where, in Mr. Allison's view, the school was doing very well. Mr. Allison found this to be extremely inappropriate in view of the budgetary difficulties the school systems were having.

He suggested that DEQ simply send a person to check on the school's equipment from time to time and follow up on complaints.

It was contended that there are many private owners who simply register their vehicles in other towns instead of taking the test.

It was urged that if testing was to be yearly the fee should be adjusted downward.

Finally, the Department was urged to adopt a scheme which would allow smaller fleets to be licensed to do their own testing, by pooling together or otherwise.

RECOMMENDATION

Your hearing officer makes no recommendation in this matter.

Respectfully submitted,

Peter W McSwain

Peter W. McSwain
Hearing Officer

PWM:vt

5/9/77

Certified Mail

CHRYSLER CORPORATION

April 11, 1977

Mr. R. Householder
Department of Environmental Quality
1234 S.W. Morrison Street
Portland, Oregon 97205

Dear Mr. Householder:

We are pleased to have the opportunity to comment on the proposed revisions to the State of Oregon Vehicle Emission Testing Rules.

Chrysler Corporation endorses the concept of Inspection Maintenance Programs. We believe that a well conceived and administered program can go a long way toward influencing the vehicle owner to maintain his vehicle properly, and thus do his part toward the overall goal of improved air quality. Field emission tests have shown that this type of encouragement of the vehicle owner is often necessary to assure that the vehicles receive the necessary periodic maintenance. Field tests have also shown that Chrysler Corporation vehicles can and do meet the Federal emission requirements when they are properly used and maintained by the owners.

Historically, the purpose of an I/M program set up on a State or local level has been to find and eliminate the gross emitters from the highways. Chrysler has traditionally supported such programs. The stated goal of the Oregon Department of Environmental Quality has been to achieve the highest possible level of owner maintenance. To achieve this goal, a program must be much more carefully administered than one for eliminating gross emitters, in order to prevent injustice to a large number of vehicle owners. When the standards are tightened, or "fine tuned" to the particular vehicles tested, it becomes very important to follow carefully the manufacturers recommendations for idle parameters and to observe the kind of test conditions, fuel requirements and preconditioning precautions that are observed during idle set procedures. It is difficult for us to judge whether such care, commensurate with the low Oregon cutpoints, is being applied on a continual basis, in the Portland test program.

The recently promoted trend toward using I/M programs to relate emission performance on an undefined short test, to the vehicle's ability to pass the Federal Test Procedure (FTP) also leaves a number of very important issues to be settled. The first issue, of course, is that of defining the test prior to setting the cutpoints. The second issue involves the correlation of the prescribed test to the FTP. The Portland D.E.Q. Test Program has some very positive factors making it better than other idle tests being conducted at other locations in the country. The Portland program does have the ability to set multiple cutpoints based on the model of the vehicle being tested. Other test programs have tried to use a blanket cutpoint to cover all vehicles produced by all manufacturers in any given model year. Such a blanket cutpoint could only be applied, with any fairness, in a program designed only for elimination of gross emitters. The Portland climate also

provides a test condition more favorable, say, than an Arizona test would. Lengthy waiting lines would not usually present the same level of problem experienced, for instance, in New Jersey.

Even with the positive factors of the Portland D.E.Q. Test Program, however, there are several points of concern that should be raised in relation to "fine tuned" cutpoints. In order to use such cutpoints, the test procedure, ambient conditions and vehicle preconditioning should be more precisely specified. Some provision should be made for occasional long waiting lines and/or high ambient temperatures. These occasions might simply be handled by a good preconditioning cycle prior to the test, or a warning to the motorist that such conditions can affect the outcome of the test, in case he chooses to return at a more opportune time. Possibly, the high speed (2200 to 2700 RPM) run could be held for a longer specified period as a preconditioning device. As a general rule, the more closely the cutpoints are specified to the design limits of the vehicle, the more precise the test procedure needed to measure the emissions.

Returning to the subject of different standards based on different models, we feel that provision also should be made for discerning between different engine families within the fleet produced by a manufacturer in any model year. A case in point is our models with Manifold Vacuum Spark Advance (MVSA) feature manufactured during the 1976 and 1977 model years. Our 1976 models, FD-225-1-5SS and FD-318-2-5SS and our 1977 model, FD-225-1-A, all have the MVSA feature and should be tested to a higher HC cutpoint than our other engine families for those model years.

Based on the above comments, we believe that the cutpoint recommendations made in my letter to you of July 15, 1976, are still valid for light duty vehicles. Heavy duty vehicles, defined by your proposed regulations as those over 8400 pounds GVW, should not be subjected to an inspection program at this time because there is insufficient in-use data to know what would be reasonable cutpoints. The wide variation of vehicle and engine types and the broad range of service common to these vehicle classes, precludes any "blanket" type standards covering these classes. It is recommended that before the Oregon Department of Environmental Quality institute a full fledged heavy duty vehicle inspection program, a comprehensive in-use study should be started to find out how these vehicles perform on both CO and HC with extensive mileage. Oil consumption of vehicles with upwards of 50,000 and 100,000 miles may well cause the proposed HC limits to be surpassed. The impact of such standards on the trucking industry in the way of vehicle life and/or maintenance costs is essentially unknown at this time. It is essential that a more thorough investigation be made of these vehicle types before regulations are promulgated.

Again, I thank you for the opportunity to make comments at this time. If I can be of further assistance in these matters, please call on me.

Sincerely,

T.J. O'ROURKE

TJO/dd

SM-0445

Environmental Activities Staff
General Motors Corporation
General Motors Technical Center
Warren, Michigan 48090

April 14, 1977

Mr. Ron Householder, Manager
Motor Vehicle Emission Testing
Department of Environmental Quality
1234 S.W. Morrison Street
Portland, Oregon 97205

Dear Mr. Householder:

General Motors appreciates this opportunity to comment on the State of Oregon's proposed rules governing the emission testing of gasoline powered in-use heavy duty vehicles.

Section 24-315 Heavy Duty Gasoline Motor Vehicle Emission Control Test Method

It is recommended that an additional step be inserted prior to step (6) in the proposed test method outline. We recommend this step to read: "All measurements are to be made after the engine has been operating a sufficient period of time to attain normal operating temperature. This is defined as the engine condition when the choke is fully open with the engine running at curb idle speed and before the water temperature becomes too high that thermal override devices are activated to prevent overheating."

Our experience has shown this amendment to the test procedure will aid in the reduction of test variability due to engine temperature. This requirement will assure that all vehicles are tested at a normal operating temperature rather than under short duration cold-start conditions when emissions are higher.

Section 24-335 Heavy Duty Gasoline Motor Vehicle Emission Control Emission Standards

General Motors recommends the heavy-duty model year idle inspection standards be amended to categorize the standards in the same manner as the federal certification requirements. Federal heavy-duty engine and vehicle emission control requirements were first implemented in 1970. The hydrocarbon and carbon monoxide standards were the same for model years 1970 through 1973 (275 ppm HC and 1.5% CO, respectively). The 1974 through 1978 heavy-duty engine and vehicle federal emission control standards were changed to represent a mass measurement (g/brake horsepower hour) as opposed to the previous concentration expression.

An example of how Oregon's proposed idle emission standards for heavy-duty vehicles can be categorized is as follows:

Carbon Monoxide

	Base Standard %	Enforcement Tolerance Through June, 1979
pre-1970	6.0	0.5
1970 through 1973	4.0	1.0
1974 through 1978	3.0	1.0

Hydrocarbon

	Base Standard ppm	Enforcement Tolerance Through June, 1979
pre-1970	600	200
1970 through 1973	500	200
1974 through 1978	300	200

General Motors also recommends the carbon monoxide standards for the 2500 rpm requirements be the same as those for the idle requirements. The emission characteristics of General Motors heavy-duty engines are not expected to change significantly when the rpm is increased from the idle mode to the 2500 rpm level under no load.

In conclusion, the adoption of General Motors recommendations to the proposed exhaust emission regulations for heavy-duty gasoline powered in-use vehicles should enable the State of Oregon to perform an idle emission test on heavy-duty vehicles without unduly penalizing those vehicles whose design enables compliance to federal requirements but not necessarily to idle inspection standards.

If you should have any questions regarding our position to your proposed regulations, please feel free to call us.

T. M. Fisher, Director
Automotive Emission Control

LLF/rmn/t/615

INTERNATIONAL HARVESTER

March 29, 1977

Mr. Ron Householder, Manager
Motor Vehicle Emission Testing
1234 S. W. Morrison Street
Portland, Oregon 97205

Dear Mr. Householder:

International Harvester Company herein submits comments relative to Oregon's Department of Environmental Quality (DEQ) proposed standards and test procedures for heavy duty vehicles and subsequent amendment dated March 24, 1977. The standards planned would set idle CO and idle hydrocarbon levels for International trucks above 8500 Lbs. GVWR at:

Model Year	Idle CO %	Enforcement Tolerance	CO % @ 2500 RPM	Enforcement Tolerance
Pre-1968	6.0	0.5	3.0	0.5
1968 through 1969	5.0	1.0	2.0	1.5
1970 through 1971	4.0	1.0	2.0	1.5
1972 through 1974	3.0	1.0	2.0	1.5
1975 through 1977	2.5	1.0	1.5	2.0

Model Year	Idle HC PPM	Enforcement Tolerance
Pre-1968	1200	200
1968 through 1969	600	200
1970 through 1971	500	200
1972 through 1974	300	200
1975 through 1977	200	200

The above idle CO standards are shown specifically for International trucks, while the CO at 2500 RPM and HC levels are planned to be applicable to all manufacturers.

TRUCK DIVISION ENGINEERING 2911 Meyer Road Fort Wayne, Indiana 46803 Phone 219 461-5128
Address reply to P.O. Box 1109 Fort Wayne, Indiana 46801

IDLE CO

IH has reviewed its engine models for the past model years relative to DEQ's planned idle CO standards and would have the following comments.

In general, DEQ's planned standards appear reasonable relative to idle CO levels specified by IH on its EPA certification labels. These labels as required by EPA are affixed to the engine's cylinder head cover and indicate the engine's idle speed and CO setting. CO settings may be indicated as a range or a maximum setting.

EPA's certification of heavy duty engines did not become effective until the 1970 model year; therefore, no settings are available for pre-1970 models. However, DEQ's planned idle CO standards appear attainable for pre-1968 and for the 1968 through the 1969 model years. For the 1975 through 1977 models, IH certified a V-537 engine with an idle CO setting of 1.5 to 3.0%. DEQ's planned enforcement tolerances should enable all IH engines to pass inspection CO standards.

IDLE HYDROCARBONS

It is recognized that the goal of any emission-inspection program is to reduce in-use vehicle emissions. Field inspection procedures should be designed to identify, with reasonable confidence, vehicles with emission control system malfunctions requiring corrective action. EPA's new vehicle certification and quality surveillance programs prove the manufacturer's design and capability of manufacturing vehicles that, with reasonable maintenance, will conform to applicable standards. Rigid standards and procedures for corrective actions to repair in-use vehicles with high emission levels may enable the vehicle to pass an idle emission test, but actually might cause the vehicle to fail the Federal exhaust emission test.

In the development of emission control systems, the carburetor is designed to limit or reduce HC and CO levels at the various test modes such that the composite values will be in compliance with the Federal emission standards. The following table, taken from the Federal Register Vol. 40, Section 86.777-7(a)(1) is the nine-mode cycle followed in dynamometer testing of gasoline-fueled heavy duty engines:

Sequence Number	Mode	Manifold Vacuum	Time in Mode-Secs.	Cumulative Time-Secs.	Weighting Factors
1	Idle	------	70	70	0.232
2	Cruise	16" Hg	23	93	0.077
3	PTA	10" Hg	44	137	0.147
4	Cruise	16" Hg	23	160	0.077
5	PTD	19" Hg	17	177	0.057
6	Cruise	16" Hg	23	200	0.077
7	FL	3" Hg	34	234	0.113
8	Cruise	16" Hg	23	257	0.077
9	CT	------	43	300	0.143

IDLE HYDROCARBONS (Continued)

You will note that while the idle mode is weighted heavily, cumulative time is small, thus allowing a degree of latitude in controlling emission level during this mode compared with the other modes. Federal certification does not limit HC control at idle. Developing an emission control system for minimum HC emission at idle will adversely affect fuel economy at idle. Retarding ignition and increasing idle speed will reduce idle HC emissions, at an appreciable loss in idle fuel economy. Our newest design engines have emission systems tailored for maximum fuel economy.

IH has reviewed its idle mode data as obtained from official certification data for the years 1975, 1976 and 1977. This data is presented on the attached tables by engine family. For comparison purposes, idle CO levels, composite HC, CO and $HC+NO_X$ certification values, initial advance, idle RPM, idle timing and brake specific fuel consumption are listed. Comparison of the idle HC levels with DEQ's planned 1975-77 emission standards indicates that a number of IH certified engines may fail an idle hydrocarbon test. The attached tables include IH California engines. These engines exhibit low levels of idle HC and CO due to the use of air injection in the engines' exhaust ports. Although air injection is very effective at reducing emission levels, particularly at idle, it is not considered a viable means of reducing such emissions on in-use engines if considered for retrofit application.

Stringent HC idle emission standards of 200 PPM will fail engines which are cleaner on an overall composite basis than other engines which may pass idle standards. This can be seen by comparing IH's MV-8, 404 CID engine with the V-392:

Engine	Idle HC	$HC+NO_X$	BSFC	Idle Fuel Economy Hr/Gal
404-2V	377	12.46	.575	1.56
404-2VG	1179	14.90	.593	1.53
V-392-4VG	154	14.24	.736	1.29

Note that the MV engines have significantly higher idle fuel economy than the V-392. Good idle fuel economy with the increased idle HC levels is attributed to higher initial advance and idle timing.

Given the above data, it is our opinion that some engines will fail an HC standard, be it 300 or 600 PPM, by virtue of its basic design. Yet these same engines, on an overall operational basis, may be cleaner than other engines which pass idle inspection criteria.

IH performed a series of tests to determine the effect of various engine settings on idle hydrocarbons. The results of these tests are shown on Curve Sheets 1, 2 and 3. The effect on idle HC and fuel economy were plotted against spark advance, idle RPM and idle CO. The shaded area of the hydrocarbon curves is a fluctuation on the Sun instrument dial and is apparently due to engine performance over the range of settings investigated. Note that this condition is eliminated with idle speed at 700 RPM or higher.

IDLE HYDROCARBONS (Continued)

Spark Advance

Idle HC decreases with decreases in spark advance as would be expected. At specification point of 15°, idle HC is 400 to 600 PPM. Further retard to 10° lowers HC levels to 200 to 400 PPM. Note decrease in idle fuel economy. Retarding spark timing not only affects idle fuel economy but would affect part load and full load economy, as well. The engine's power performance would also be adversely affected.

Idle RPM

As expected, increasing idle RPM reduces idle HC significantly, but has the greatest effect upon idle fuel economy. At the 550 RPM idle specification point, HC is 500 to 700 PPM and fuel economy is 1.53 hours/gallon. Increasing idle speed to 700 RPM results in 150 PPM HC and 1.27 hours/gallon fuel consumption, or a 17% loss. It is doubtful that this engine could operate at a 700 RPM idle speed due to customer dissatisfaction brought on by dieseling or engine run-on. Other operating difficulties would be experienced, such as hard shifting, etc.

Idle CO

IH's specification for this engine's idle CO setting is 0.5 to 2.5%. Setting idle CO to the maximum specification reduces idle HC to 200-400 PPM. Very little effect upon idle fuel economy was noted over the range of points tested.

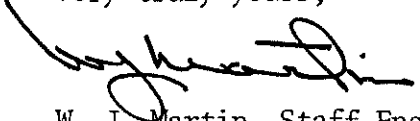
As indicated on the curve sheets, this series of tests was performed on an MV-404 engine in a Loadstar chassis using indolene fuel of 8.9 PSI RVP. The engine was tuned up to manufacturer's specifications prior to start of test sequence.

Without regard to EPA certified settings, checks were made using the most optimum settings for maximum HC reduction as indicated by the above series of tests. With idle RPM at 700, CO at 2.5% and spark advance set to 10°, idle HC was 140 PPM. Fuel economy was 1.09 Hr/gal. or a 27% loss. This same test was re-run using commercial fuel of 13.9 PSI RVP and resulted in an idle HC increase to 220 PPM at a 1.1 Hr/gal. fuel economy. It is apparent that idle HC emissions are affected by the fuel in the vehicle being tested.

To determine the effect of engine misfire on hydrocarbon levels, the engine was reset to specifications (550 RPM, 15° advance and 1.5% CO). Idle HC levels were found to be 500-700 PPM at which time one spark plug wire was removed. Idle HC immediately shot up to 1900-2000 PPM.

Since the purpose of any state inspection program should be to detect and correct those vehicles contributing to excessive pollution levels, idle standards should be set at levels sufficient to achieve this goal without failing clean vehicles. IH would recommend that the DEQ run a pilot program, similar to that used for light duty vehicles, to establish emission reduction capability for the entire heavy duty truck population. The data thus obtained could then be used to establish appropriate standards which would achieve the goals of the program, yet would be fair and equable from the customer's point of view.

Very truly yours,



W. J. Martin, Staff Engineer
Vehicle Emissions
(219) 461-5272

jas

1977

Engine	Carburetor		Air Inj.	I.A.	Idle Timing	Idle RPM	Idle CO %	Label CO %	Idle HC-PPM	Composite (Gms/BHP-Hr) HC	CO	HC+NO	BSFC
4-196 Fed.		1-1V	No	0°	0°	525/575	1.34	0.5-2.0	141	1.11	17.53	14.42	.643
4-196 C		1-1V	Yes	0°	0°	525/575	0.84	0.5-2.0	89	0.57	14.92	5.77	.865
V-304		1-2V	No	0°	0°	650/700	1.90	2.0	145	2.26	29.95	10.04	NA
		1-2V	No	0°	0°	650/700	1.12	2.0	121	2.50	29.93	9.34	.735
V-345 Fed.		1-2V	No	0°	0°	650/700	1.63	1.5	164	2.82	31.10	9.95	.694
		1-2VG	No	0°	0°	650/700	3.95	1.5	190	1.85	25.53	11.64	.631
V-345 C		1-2V	Yes	5°	5°	625/675	0.52	0.5-1.5	55	0.54	15.95	5.88	.780
		1-2VG	Yes	0°	0°	625/675	0.36	1.0-3.0	84	0.86	13.29	6.49	.737
V-392 Fed.		1-4VG	No	0°	0°	650/700	2.02	2.0	154	4.64	23.11	14.24	.736
V-392 C		1-4VG	Yes	0°	0°	625/675	0.65	0.5-1.5	111	0.75	15.31	6.32	.870
		1-4VG	Yes	0°	0°	625/675	0.24	0.5-1.5	37	0.45	14.73	6.50	.875
MV-8 Fed.	404	1-2V	No	9°	15°	525/575	3.35	0.5-2.5	377	2.19	22.82	12.46	.575
	404	1-2VG	No	9°	15°	525/575	1.31	0.5-2.5	1179	2.98	19.39	14.90	.593
	404	1-4VG	No	9°	15°	525/575	2.96	0.5-2.5	252	1.10	19.76	12.17	.590
	446	1-4VG	No	5°	11°	525/575	1.41	0.5-2.5	838	2.52	26.55	13.78	.697
MV-8 Calif.	404	1-2V	Yes	9°	9°	525/575	0.50	0.5-2.5	71	0.94	21.40	7.52	.665
	404	1-2VG	Yes	9°	9°	525/575	0.42	0.5-2.5	88	1.02	15.82	7.60	.782
	404	1-4VG	Yes	9°	9°	525/575	0.38	0.5-2.5	310	1.29	19.25	6.40	.829
	446	1-4VG	Yes	5°	11°	525/575	0.49	0.5-2.5	272	0.80	15.85	4.97	.833
V-537 Fed.		1-4VG	No	7°	7°	500/550	1.77	1.5-3.0	171	0.76	18.28	11.66	.734
		1-2VG	No	7°	7°	500/550	2.06	1.5-3.0	198	0.37	11.18	10.76	.734
V-537 Calif.		1-2VG	Yes	7°	7°	500/550	1.53	1.0-2.0	74	0.19	16.89	6.27	.771

1976

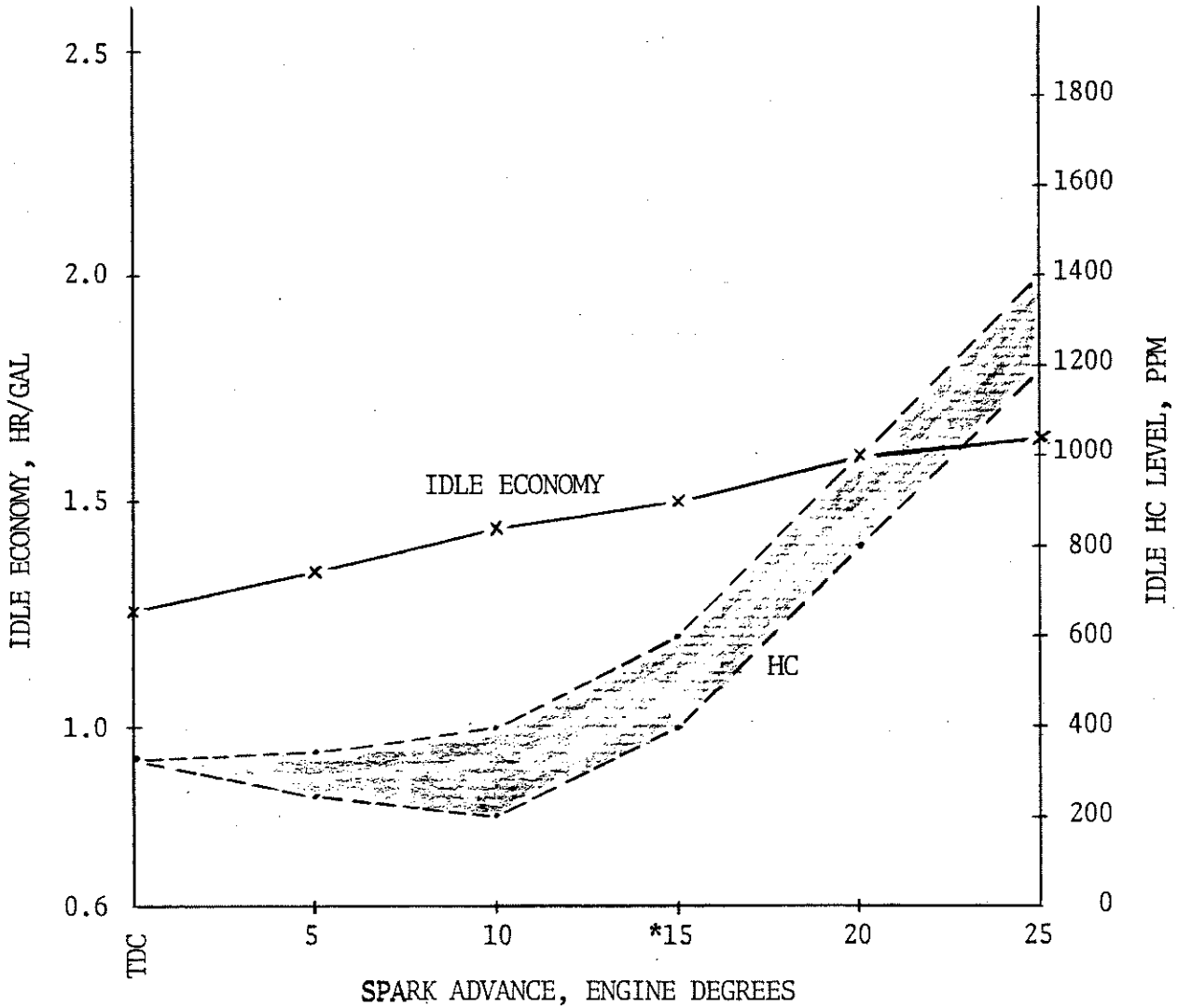
Engine	Carburetor		Air Inj.	I.A.	Idle Timing	Idle RPM	Idle CO %	Label CO %	Idle HC-PPM	Composite (Gms/BHP-Hr) HC	CO	HC+NO	BSFC
4-196 Calif.		1-1V	No	0°	0°	525/575	0.93	0.5-2.0	109	0.55	14.64	7.59	0.650
V-304		1-2V	No	0°	0°	650/700	2.31	2.0 Max	150	2.11	25.99	8.64	0.700
V-345 Calif.		1-2V	Yes	5°	5°	625/675	0.77	0.5-1.5	55	0.47	21.55	6.87	0.637
		1-2VG	Yes	5°	5°	625/675	0.55	0.5-1.5	305	1.67	21.77	7.31	0.700
V-392 Calif.		1-4VG	No	0°	0°	625/675	1.14	0.5-1.5	72	0.74	17.11	7.56	0.724
MV-8 Calif.	404	1-2V	Yes	9°	15°	525/575	0.27	0.5-2.5	119	0.90	22.12	7.32	0.614
	404	1-4VG	Yes	9°	15°	525/575	0.43	0.5-2.5	356	2.01	23.42	6.91	0.670
	446	1-4VG	Yes	5°	11°	525/575	0.40	0.5-2.5	412	1.18	16.64	7.11	0.683
	404	1-2VG	Yes	9°	15°	525/575	0.67	0.5-2.5	1110	4.72	21.95	8.90	0.740
LV-8		1-4VG	No	12°	12°	500/550	3.35	0.5-2.0	843	1.93	31.89	11.68	0.710
		1-4VG	No	7°	7°	500/550	1.33	3.0 Max	205	1.07	17.88	12.16	0.657
V-537/605 Fed.		1-4VG	No	7°	7°	500/550	2.82	1.5-3.0	138	0.56	22.63	12.23	0.782
V-537 Calif.		1-4VG	Yes	7°	7°	500/550	0.37	1.0-2.0	106	0.28	10.55	6.52	0.869

1975

6-258		1-1V	No	5°	5°	600/650 650/700	0.77	2.5 Max	113	1.73	14.15	11.67	0.675
V-392 Fed.		1-4VG	No	5°	5°		0.77	1.0-2.0	147	2.44	13.51	15.02	0.661
V-392 Calif.		1-4VG	No	0°	0°	650/700 500/550	1.93	2.0 Max	114	0.98	19.15	8.20	0.687
RD-406/450		1-2VG	No	5°	5°	500/550	2.06	3.5 Max	487	1.60	21.37	12.80	1.068
		1-2VG	No	5°	5°	500/550	4.25	3.5 Max	129	0.44	23.58	10.29	NA
RD-501		1-4VG	No	5°	5°	500/550	3.04	3.5 Max	928	1.69	28.80	14.47	1.002

CURVE SHEET #1

IDLE ECONOMY & HC LEVELS VERSUS SPARK ADVANCE
W/CO HELD AT 1.5% & IDLE SPEED HELD AT 550 RPM

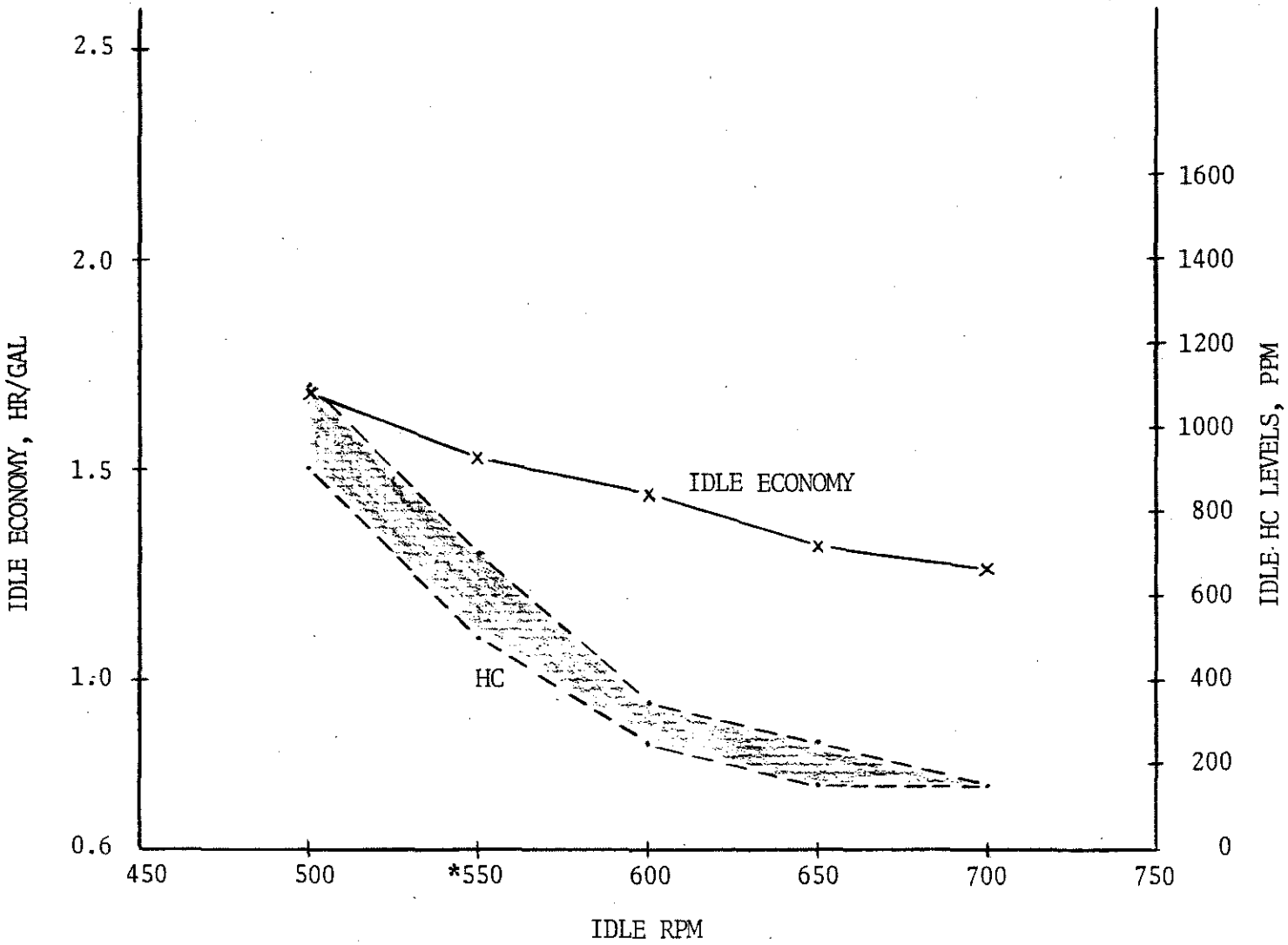


1850 LOADSTAR, CODE 861
MV-404 NO. 148
465528-C91, LIST 7213, 2300G
FEDERAL CARBURETOR
INDOLENE FUEL
SUN INFRA-RED ANALYZER

* SPECIFICATION AT IDLE WITH VACUUM SPARK ADVANCE (9° MECH. + 6° VAC.)

CURVE SHEET #2

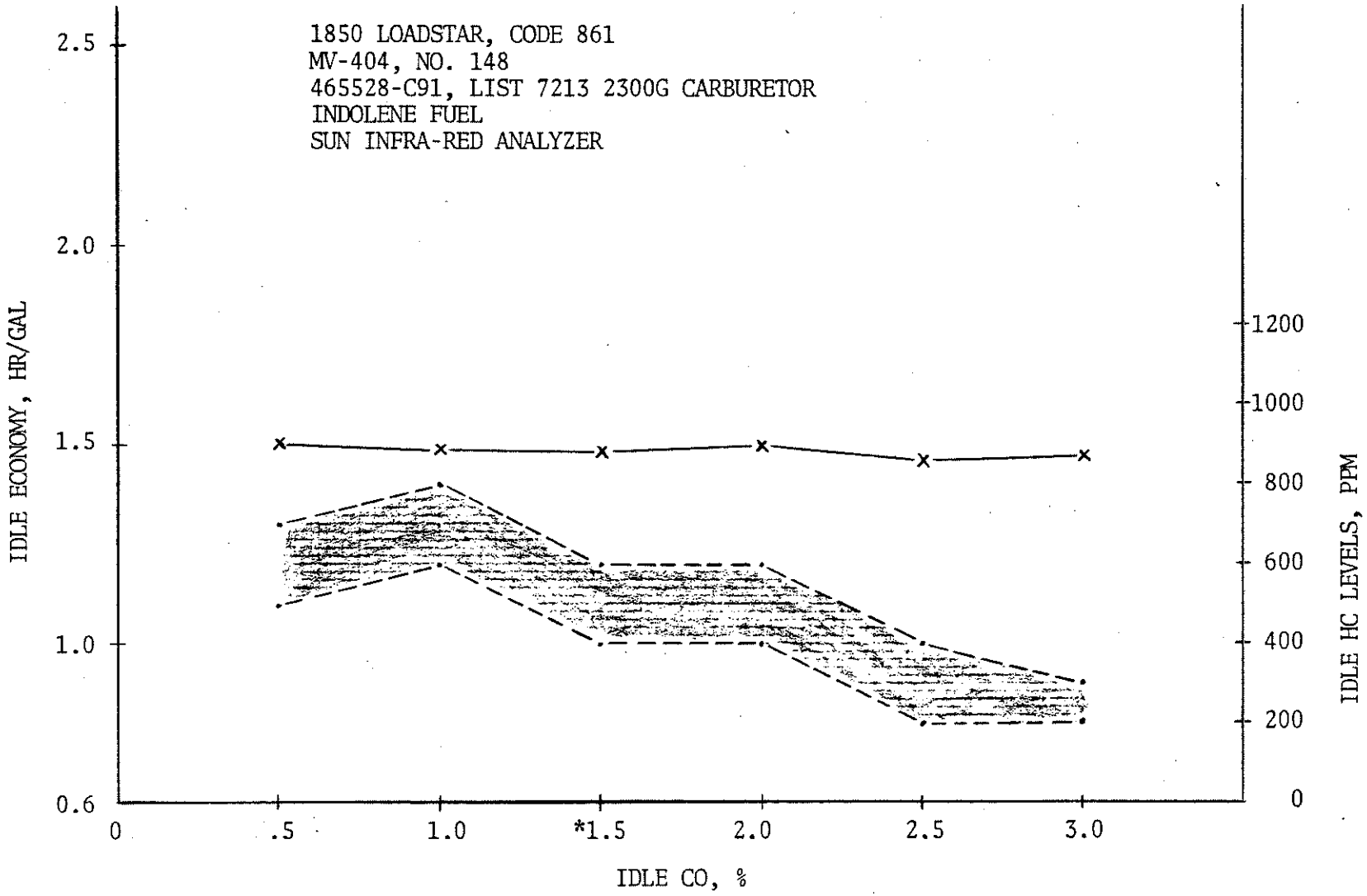
IDLE ECONOMY & HC LEVELS VERSUS IDLE RPM
W/IDLE CO HELD AT 1.5% & TOTAL SPARK ADVANCE
HELD AT 15° BTDC



1850 LOADSTAR, CODE 861
MV-404, NO. 148
465523-C91, LIST 7213
2300G FED. CARB.
INDOLENE FUEL
SUN INFRA-RED ANALYZER

* SPECIFICATION SET POINT

IDLE ECONOMY & HC LEVELS VERSUS IDLE MIXTURE SETTING
W/IDLE SPEED HELD AT 550 RPM AND TOTAL SPARK ADVANCE HELD AT 15° BTDC



Comments From Public Hearing April 15, 1977

A Public Hearing was held April 15, 1977 to obtain comments regarding the amendments to the vehicle inspection rules. The specific amendments update the program to include testing of heavy duty gasoline powered motor vehicles. Written comments were received from International Harvester, Chrysler Corporation, and General Motors. Oral testimony was presented by a Mr. Allison of the Hillsboro Union School District.

Public Testimony

Mr. Allison spoke primarily of the effect the pending legislation could have on publicly owned school bus fleets. Under existing rules, a fleet size for the purpose of self-inspection is set at 100 or more vehicles. Mr. Allison pointed out that few public school district fleets were of that size and that some provision should be provided to accommodate them. At this time, publicly owned vehicles are exempt by statute. There are several different proposals before the legislature which address publicly owned vehicles. It would be appropriate to wait for legislative action before modifying the rules on fleet size.

Written Testimony

International Harvester submitted written testimony generally supportive of the proposed rules. They stated that the carbon monoxide levels proposed were reasonably relative to IH specifications. They expressed concern on the hydrocarbon standards, especially as it would affect the MV-8, 404 engine family. IH presented substantial test data indicating that the test engine from that family had an inherently high idle hydrocarbon level, while meeting Federal test standards. Timing changes aimed at improving fuel economy were indicated as the reason for the higher hydrocarbon level.

Testing done by the Department in early March of this year was reviewed with International when their letter was presented to the Department. There was test data in that group from an engine of the MV-8, 404 engine family. That data did not indicate similar hydrocarbon levels. It should be noted that the data presented by both IH and DEQ was based upon limited sample sizes.

The MV-8, 404 engine was designed as a replacement for International's 345 engine. It currently accounts for about 20% of International's gasoline engine production. This would indicate that in Oregon there are about 1,500 of the engine type in service (1975 through 1977). It is estimated that the

total number that would be subject to the inspection is quite small. It is proposed that no special hydrocarbon limit be set at this time, but rather that all test data on the engine family be carefully reviewed and if the data confirms that this is a problem, the standards be modified within the provisions of the regulations.

Chrysler Corporation submitted testimony on the inspection program. While much of the letter discussed the inspection program in general, they specifically commented that there should be allowance for differences of engine families, and that a pilot study be conducted. Regarding the point on differing standards for different engine families, the Department currently provides for this. Department staff had maintained communications with Chrysler specifically regarding the two engine families mentioned. Several studies of the program data have been made, and there has not been evidenced the need for a separate HC limit for the 225 or 318 families. It should be noted that these specific engine families discussed are light duty classes and not the subject of these proposed rule changes.

General Motors submitted testimony regarding the proposed heavy duty inspection program. There were two suggested changes to the proposed rules; the first related to the test method, and the other comments related to the selection of the standards.

Regarding the section on the modifications to the proposed test method, GM suggests that a step be included to determine if the vehicle is off choke and not into a thermal override. In the course of an ordinary inspection, it is not always possible to determine if these items are adversely effecting the test results. Every effort is made through the pre-conditioning step and various instructions to the motorist to make sure that this is not a problem. Additional changes in this area do not appear to be beneficial.

The second point raised by General Motors is more complex. It discusses the Federal test procedures as it relates to heavy duty vehicles. General Motors counterproposes a regime of inspection criteria quite similar to the original staff recommendation, with the exception of the hydrocarbon limits, listed prior to the addendum. That addendum was based upon additional testing in March of this year. The Department concurs with this suggestion and has reformulated the standards.

The design differences in these classes of vehicles are not as complex as those in the light duty vehicles. Therefore, the simpler approach would be workable. No other testimony was received from either vehicle manufacturers or the trucking industry.

WPJ:mg
May 5, 1977

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

To: Environmental Quality Commission

From: Director

Subject: Agenda Item No. J, May 27, 1977, EQC Meeting. Proposed Revisions to Rules Governing Air Contaminant Emissions From Kraft Pulp Mills. OAR 340-35-150 through 25-200.

Introduction

The proposed amendments to the Air Quality Regulations relative to kraft pulp mills (OAR Chapter 340, Section 25-150 through 25-200) appear in Attachment 1. These amendments are presented to the Commission for adoption.

Background

Section 25-200 of the current kraft pulp mill regulation required that a public hearing be held to review current technology and the adequacy of the regulation. This hearing was held on January 22, 1976 and the kraft industry testified that changes should be made in the regulation. Primarily, the industry testimony objected to that portion of the existing regulation which required that Total Reduced Sulfur (TRS) emissions from recovery furnaces not exceed 5 ppm after July 1, 1983. This objection was based on the anticipated high cost of achieving this emission level, since the strategy would be to replace existing direct contact evaporator furnaces with the more modern indirect contact evaporator types.

(As a matter of reference, the current rule requirement was adopted after consultation with the kraft industry and considerations that direct contact evaporator recovery furnaces would not reduce TRS emissions to significantly minimize odor nuisance without substantial modification. The long term compliance schedule (1983) was to allow industry to phase out or modify the exisiting direct contact evaporator furnaces after a reasonable useful life through an industry trend of periodically expanding production by installing new facilities or significantly modifying existing equipment.)

After reviewing the January 22, 1976 testimony the Department concluded that a review of the regulation was warranted and obtained authorization from the Commission at the June 25, 1976 meeting to hold public hearings to receive testimony relative to revising the kraft mill regulation.

On August 16, 17, 18 and 19, 1976 the Department held four public hearings in areas where kraft mills are located to obtain public input concerning the acceptability of the current level of kraft mill emissions or the need for further reducing TRS emissions from both new and existing recovery furnaces as required by current rules. At these hearings and in subsequent correspondence only two people submitted testimony stating that they would like to see odor levels reduced. This lack of testimony is construed to mean that people in general, are reasonably satisfied with the current level of emissions from kraft mills even though odors are still discernable.

After these hearings the Department drafted a proposed revision to the kraft mill regulation, held three meetings with an industry committee to discuss the revisions and conducted a public hearing on March 18, 1977 to receive testimony on the proposed amendments to the kraft mill regulation.

The 14 changes of substance to the current regulation as proposed at the March 18, 1977 public hearing (see Attachment 3 for Staff Report for the Public Hearing) were:

1. Metric units were added and made the primary units of the regulation.

2. A definition for "modified" and "modification" was added to delineate which facility changes are subject to plan review and/or new source requirements.

3. All mill site emission limits were removed from the regulation. In the present regulation, mills which have one recovery furnace are required to meet lower limits from 1975 to 1983 than an identical recovery furnace would have to meet at mills where there are two recovery furnaces. The removal of the mill site emission limit eliminates this inequity.

4. The limits for recovery furnaces of 40 ppm and 20 ppm of TRS for more than 60 cumulative minutes in any one day were removed as these are not significant restrictions in as much if a recovery furnace is in compliance with the daily average, it was found it is always in compliance with these limits.

5. The existing 1978 recovery furnace TRS limit of 10 ppm and 0.15 kilograms of sulfur per metric ton (kg S/metric ton) (0.3 lb. S/ton) would become immediately effective upon adoption of the proposed regulation because all recovery furnaces have demonstrated compliance with this limit.

6. The 1983 recovery furnace 5 ppm TRS limit for recovery furnaces placed in operation before January 1, 1969 was deleted as a result of public testimony of a significantly high cost to benefit ratio (it would require installation of seven new low odor type recovery furnaces).

7. Lime kiln TRS and particulate limits were defined as monthly averages which legally establishes time limits as implemented in program operations but which were undefined in the current rule.

8. A lime kiln TRS limit of 20 ppm as a daily average effective July 1, 1983 was added as a more restrictive limit to improve odor levels around mill sites.

9. A TRS limit of 0.1 kg S/metric ton effective July 1, 1978 was added for "other sources" to establish an emission limit for sources which were previously required to meet highest and best practicable treatment and control.

10. Concentration limits were added to the recovery furnace and lime kiln particulate mass emission limit as the staff believes fewer variables are involved in making measurements and will result in greater accuracy in reporting emissions.

11. The monitoring requirements were modified to include a continual opacity monitoring requirement for recovery furnaces to provide information on variability of opacity and allow determination of the feasibility of establishing a regulatory opacity requirement.

12. The section on "upset conditions" was modified to require a monthly reporting of upsets to provide a consolidated record for the company and the Department.

13. A section on "Chronic Upsets" was added to allow initiation of Civil Penalty authority relative to correctable recurring upsets.

14. A special study to determine the character and amount of fine particulate emissions was added as a requirement.

Discussion

A. Testimony.

The only persons attending the March 18, 1977 public hearing were representatives of the industry. (See Attachment 2 for Hearings Officer's Report.) They supported the proposed regulation except for the following itemized changes:

2. The definition of "Modification" or "Modified".

8. The 1983 lime kiln TRS limits.

9. The limit for "other sources".

11. The continual opacity monitoring requirements.

12. The "upset condition" section.

14. The "special studies" section.

The itemized proposed rule changes supported by testimony at the March 18, 1977 public hearing are as follows:

1. Addition of metric units.

3. The removal of mill site emission limits.

4. The removal of the recovery furnace cumulative time limits.

5. Making the 10 ppm recovery furnace TRS limit effective upon adoption of the regulation.

6. The deletion of the 5 ppm recovery furnace TRS limit for furnaces placed in operation before January 1, 1969.

7. The specification of lime kiln TRS and particulate limits as monthly averages.

10. The addition of concentration limits to the recovery furnace and lime kiln particulate mass emission limits.

13. The addition of the "Chronic Upsets" section.

B. Testimony Response and Proposed Changes.

As a result of the testimony presented at the March 18, 1977 public hearing and subsequent review by the Department, twelve of the proposed changes, but some with modification, have been incorporated in the current proposed rule.

Proposed changes for which supportive testimony was received (items 1, 3, 4, 5, 6, 10 and 13) have been retained in the rule currently proposed for adoption without further comment.

Proposed changes on which significant testimony was received were again reviewed in detail by the Department in the light of the testimony and are discussed below (items 2, 8, 9, 11, 12 and 14).

Item 2. The definition of "modification" or "modified".

In initial discussions with the kraft mill committee, members requested a further definition of when a modified source would be subject to new source requirements.

The Department modified the proposed rule and proposed that lime kilns and recovery furnaces "modified significantly to expand production" would be subject to new source emission limits.

This change was not acceptable to the committee and they suggested that the Department define modified by using the EPA definition for modified. In response to the committee request, the Department proposed in the rule presented at the public hearing on March 18, 1977 that a definition of modification means "(a) a facility expansion which would require significant Department staff review or, (b) a change of facilities or a process modification which would change the character, quantities or point of emissions or result in a new emission".

Testimony opposed the definition and recommended that the definition as used by EPA be substituted. In consideration of the testimony the Department concluded the proposed definition did not clarify the rule. Review of the EPA definition of modification has shown that it is very complex and would represent a significant change in administration of the kraft mill rule.

The Department believes deletion of the definition is not a deterrent to rule interpretation and that lime kilns and recovery furnaces "modified significantly to expand production" is sufficiently clear to interpret the rule and is consistent with administration of the rule since its adoption in 1969. The rationale used here is to relax the TRS emission limits for existing direct contact evaporator recovery furnaces by maintaining existing 1978 limits and deleting 1983 limits. As an additional part of the rationale, the Department proposes to require newly constructed facilities or facilities modified significantly to increase production to meet "highest and best practicable" limits. Therefore, it maybe that eventually all recovery furnaces will have to meet the 5 ppm TRS limit.

Item 8. The 1983 Lime Kiln TRS Limits.

Industry testimony questioned the desirability or the need of the 1983 lime kiln TRS limit of 20 ppm daily average. They also stated that retrofit technology has not been conclusively demonstrated and that limits should not be set until technology is proven. In addition they stated that large amounts of energy and resources would be required with little improvement in odor levels as a result.

The Department has reviewed this testimony and proposes that the 1983 lime kiln TRS limit be retained for the following reasons:

1. The limit, in the Department's opinion, represents currently available highest and best practicable control technology.

2. Meeting the limits will require minimizing peak emissions which are believed to be contributing to occasional mill site odors.

3. Generally the emissions are a low elevation source (four of the seven mills) and thus believed to be contributing significantly to mill site odors.

4. Lime kiln TRS emissions can be reduced without spending large (although significant) amounts of money by improved operating and control procedures and improved mud washing.

Item 9. The limit for "Other Sources".

One industry representative testified that in order for his mill to achieve compliance with the 0.2 lb/adt "other source" limit, they would have to expend a large sum of money and use large amounts of energy.

The Department has reviewed this testimony and proposes that the limit should be retained. It is the Department's opinion that this limit represents available technology since six of the seven mills are presently complying with the proposed limit. Some of these mills have installed control equipment and have made the necessary expenditures.

Item 11. Particulate and Opacity Monitoring and Reporting Requirements.

After considering testimony stating that the opacity monitoring requirement would require sizable expenditures of money for mills which already have installed particulate monitors, the Department now proposes to modify the particulate monitoring requirement to allow the monitoring of either opacity or particulate emissions. The proposed change will allow industry to monitor particulates by alternative methods, and will not require mills to purchase additional particulate monitoring equipment where an acceptable monitoring program has been approved.

The Particulate Monitoring Section 25-180(3) was modified by changing the word "and" to "or". The Department has also added the words "from the recovery furnace" after the word "atmosphere" to clarify the section.

Because of change in the monitoring section the Department is proposing to change Section (7) of the Reporting Section (25-185) by adding the words "or particulate" after the word "opacity".

Item 12. The "Upset Condition" Section.

The industry committee representative testified that the "Upset Condition" Section 25-190(1) was unclear. The Department has reviewed this section and has concluded that upset conditions are clearly defined. Therefore, no change is proposed for this section.

Item 14. The "Special Studies" Section.

At the public hearing the industry presented testimony that they were stongly opposed to the proposed "special studies" because the studies were vaguely worded, undefined as to scope, and not appropriate for inclusion in the regulations.

After considering this testimony, the Department developed a detailed scope of work and proposes to retain the "special studies" section in the proposed regulation. The Department's rationale for including the special studies section is that little is known about the emission of fine particulate matter from kraft mills, there is increasing concern about the health effects of fine particulate, and special studies requirements previously included in the kraft mill regulation have been beneficial in understanding and controlling the emissions from kraft mills.

It is the Department's opinion that particulate emissions from kraft mills will have to be reduced in the future and that the special study will give both the Department and the industry a basis for the further reductions.

The Department is specifically proposing that each mill cooperate in a study with a scope of work consisting of the following:

1. Particle size and chemical distribution of emissions from a minimum of three non-direct contact evaporator recovery furnaces.

2. Particle size and chemical distribution of emissions from a minimum of three separate direct contact evaporator recovery furnaces.

3. Particle size and chemical distribution of emissions from lime kilns at a minimum of three mills. Weyerhaeuser Company lime kilns should be one of the sources tested.

4. Particle size and chemical distribution of emissions from a minimum of three smelt dissolving tanks vents.

   The sources to be tested are subject to agreement by the industry and the Department. At least three tests should be completed on each source for each parameter tested.

Summary and Conclusions

A. Six public hearings have been held by the Department to receive testimony relative to modifying the kraft pulp mill regulation. At these hearings two people stated they would like to see odor levels reduced. The lack of substantial testimony otherwise is construed to mean that people, in general, are reasonably satisfied with the current level of emissions from kraft mills. However, kraft odor is still readily discernable in substantial areas in the vicinity of kraft mills and further reductions of low level odors and eliminating the wide fluctuations in TRS emissions are desirable and necessary, at least as an offset to expanded production capacity.

B. Significant opposition to six of the proposed changes was registered by the kraft industry.

C. The Department has considered the testimony and now proposes changes as follows:

   1. The definition of "modified" has been deleted.

   2. The 10 ppm recovery furnace TRS limit has been changed to clarify that it applies to furnaces placed in operation prior to January 1, 1969.

   3. The particulate monitoring section has been changed to allow monitoring of either opacity or particulate instead of both opacity and particulate.

   4. A scope of work for the special studies section was developed and included in this report.

D. The Department has changed the requirement for monitoring of opacity consistent with testimony received.

E. The proposed amended rules impose less strigent TRS emission limits for existing recovery furnaces than current rules, since they establish TRS emission limits for existing direct contact evaporator recovery furnaces of 10 ppm rather than 5 ppm after 1983 as required by the present rule. Only recovery furnaces placed in operation since January 1, 1969 or modified significantly to increase production would be required to meet the 5 ppm TRS emission limit.

F. The proposed amended rules impose more stringent TRS emission limits from all lime kilns after July 1, 1983.

Director's Recommendation

The Director recommends that the Commission adopt the proposed revised rule which is attached as Attachment I and that the rule promptly be filed with the Secretary of State.

Bill

WILLIAM H. YOUNG
Director

CRC:ds
5/11/77

Attachments

1. Proposed Kraft Pulp Mill Rule.

2. Hearing Officer's Report on March 18, 1977, Public Hearing.

3. Staff Report for Public Hearing on March 18, 1977 without Attachments.

ATTACHMENT 1
DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY CONTROL DIVISION

EXISTING KRAFT PULP MILL RULE MODIFIED TO
SHOW PROPOSED ADDITIONS AND DELETIONS

25-150 DEFINITIONS

As used in these regulations, unless otherwise required ~~by context:~~

(1) "Continual Monitoring" means sampling and analysis, in a continuous or timed sequence, using techniques which will adequately reflect actual emission levels or concentrations on a continuous basis.

(2) "Department" means the Department of Environmental Quality.

(3) "Emission" means a release into the atmosphere of air contaminants.

[~~(13)~~](4) "Kg S/metric ton" means kilograms of Total Reduced Sulfur per metric ton of production. The corresponding English unit is "lb S/ton".

[~~(4)~~](5) "Kraft Mill" or "Mill" means any industrial operation which uses for a cooking liquor an alkaline sulfide solution containing sodium hydroxide and sodium sulfide in its pulping process.

[~~(5)~~](6) "Lime Kiln" means any production device in which calcium carbonate is thermally converted to calcium oxide.

[~~(6)~~](7) "Non-condensibles" means gases and vapors, contaminanted with TRS gases, from the digestion and multiple-effect evaporation processes of a mill that are not condensed with the equipment used in said processes.

[~~(7)~~](8) "Other Sources" means sources of TRS emissions in a kraft mill other than recovery furnaces and lime kilns, including but not limited to:

(a) vents from knotters, brown stock washing systems, evaporators, blow tanks, smelt tanks, blow heat accumulators, black liquor storage tanks, black liquor oxidation system, pre-steaming vessels, tall oil recovery operations;

*Additions are underlined and deletions are lined out.
**Additions made since the March 18 hearing are double underlined and deletions are "/" out.

(b) any operation connected with the treatment of condensate liquids within the mill, and

(c) any vent which is shown to be a significant contributor of odorous gases.

[~~(8)~~](9) "Particulate Matter" means all solid material in an emission stream which may be removed on a glass fiber filter maintained during sampling at stack temperature or above the water vapor dew point of the stack gas, whichever is greater but not more than 202°C (400°F). The glass-fiber filter to be used shall be MSA 1106BH or equivalent.

[~~(9)~~](10) "Parts Per Million (ppm)" means parts of a contaminant per million parts of gas by volume on a dry-gas basis (1 ppm equals 0.0001% by volume).

[~~(10)~~](11) "Production" means the daily average amount [~~tons~~] of air-dried unbleached Kraft pulp or equivalent produced as determined by dividing the monthly total production by the number of days specific production equipment operates and expressed in air-dried metric tons (admt) per day. The corresponding English unit is air-dried tons (adt) per day.

[~~(11)~~](12) "Recovery Furnace" means the combustion device in which pulping chemicals are converted to a molten smelt and wood solids are incinerated. For these regulations, and where present, this term shall include the direct contact evaporator.

[~~(11A)~~](13) "Standard dry cubic meter" means the amount of gas that would occupy a volume of one cubic meter, if the gas were free of uncombined water, at a temperature of 20°C (68°F) and a pressure of 760 mm of Mercury (29.92 inches of Mercury). The corresponding English unit is standard dry cubic foot. When applied to recovery furnace gases "standard dry cubic meter" requires adjustment of the gas volume to that which would result in a concentration of 8% oxygen if the oxygen concentration

exceeds 8%. When applied to lime kiln gases "standard dry cubic meter" requires adjustment of the gas volume to that which would result in a concentration of 10 percent oxygen if the oxygen concentration exceeds 10%.

[(12)](14)"Total Reduced Sulfur (TRS)" means the sulfur in hydrogen sulfide, mercaptans, dimethyl sulfide, dimethyl disulfide, and any other organic sulfides present in an oxidation state of minus two.

[(15) "Modification" or "modified" means

(a) a facility expansion which results in a significant increase in the Department staff review or

(b) a change of facilities or a process which results in a significant change in the nature or quantity of emissions or results in a new emission or a change in the nature of any air contaminant or in exposed product]

25-155 STATEMENT OF POLICY

Recent technological developments have enhanced the degree of malodorous emission control possible for the kraft pulping process. While recognizing that complete malodorous and particulate emission control is not presently possible, consistent with the meteorological and geographical conditions in Oregon, it is hereby declared to be the policy of the Department to:

(1) Require, in accordance with a specific program and time table for all sources at each operating mill, the highest and best practicable treatment and control of atmospheric emissions from kraft mills through the utilization of technically feasible equipment, devices and procedures. Consideration will be given to the economic life of equipment, which when installed complied with the highest and best practicable treatment requirement.

(2) Require degrees and methods of treatment for major and minor emission points that will minimize emissions of odorous gases and eliminate ambient odor nuisances.

(3) Require effective monitoring and reporting of emissions and reporting of other data pertinent to air quality or emissions. ~~The Department~~ will use these data in conjunction with ambient air data and observation of conditions in the surrounding area to develop and revise emission and ambient air standards, and to determine compliance therewith.

(4) Encourage and assist the kraft pulping industry to conduct a research and technological development program designed to progressively reduce kraft mill emissions, in accordance with a definite program, including specified objectives and time schedules.

25-160 HIGHEST AND BEST PRACTICABLE TREATMENT AND CONTROL REQUIRED

Notwithstanding the specific emission limits set forth in Section 25-165 of these regulations, in order to maintain the lowest possible emission of air contaminants, the highest and best practicable treatment and control currently available shall in every case be provided, with consideration being given to the economic life of the existing equipment.

All installed process and control equipment shall be operated at full effectiveness and efficiency at all times, such that emissions of contaminants are kept at lowest practicable levels.

25-165 EMISSION LIMITATIONS

(1) Emission of Total Reduced Sulfur (TRS).

(a) Recovery Furnaces.

(A) ~~[As soon as practicable, but not later than July 1, 1975,]~~ The emissions of TRS from each ~~[existing]~~ recovery furnace[s] placed in operation before January 1, 1969 ~~[shall]~~ shall not

[~~(e)~~] (d) Other Sources.

(A) As soon as practicable, but not later than July 1, [~~1975~~] 1978, the total emission of TRS from other sources, i ncluding but not limited to knotters and brown stock washer vents, brown stock washer filtrate tank vents, black liquor oxidation vents, and contaminated condensate stripping shall not exceed 0.1 Kg S/metric ton (0.2 lbs/ton) of production [~~be limited, controlled or treated to the lowest practicable levels in accordance with a specific program and time table submitted to and approved by the Department~~].

(B) Miscellaneous Sources and Practices. When it is determined that sewers, drains, and anaerobic lagoons significantly contribute to an odor problem, a program for control shall be required.

[~~(G) Compliance programs required by these subsections shall be established by not later than May 1, 1973 with each individual mill and incorporated in the Air Contaminant Discharge Permit issued for each mill.~~]

(e) Compliance Programs. Each mill with any sources not in compliance with the 1978 emission limits shall submit a program and schedule for achieving compliance to the Department for approval by no later than [~~JULY~~] August 1, 1977. As soon as practicable but not later than January 1, 1980 each mill with lime kiln(s) not in compliance with the 1983 limits shall submit a program and schedule for achieving compliance.

~~(A) Age and condition of existing facilities,~~

~~(B) Geographical locations,~~

~~(C) Overall control of emissions,~~

~~(D) Severity of problems related to emissions from the facility, and,~~

~~(E) Ease of compliance.~~]

[~~(d)~~] (c) Non-condensibles

(A) Non-condensibles from digesters and multiple-effect evaporators shall be continuously treated to destroy TRS gases by thermal incineration in a lime kiln or incineration device capable of subjecting the non-condensibles to a temperature of not less than 650°C (1200°F) for not less than 0.3 seconds.

[~~(A) Non-condensibles from digesters and multiple-effect evaporators shall be treated to destroy TRS gases by thermal incineration in a lime kiln or equivalent treatment.~~

~~(B) On mill sites where a lime kiln or combination of lime kilns is used for incinerating non-condensibles, as soon as possible but not later than July 1, 1975, the means shall be provided to immediately and automatically treat the non-condensibles in an incineration device capable of subjecting the non-condensibles to a temperature of not less than 1200°F for not less than 0.3 seconds whenever the kiln or combination of kilns is out of service or otherwise incapable of incinerating non-condensibles.~~]

(C) When steam-or air-stripping of condensates or other contaminated streams is practiced, the stripped gases shall be subjected to treatment in the non-condensible system or otherwise given equivalent treatment.

[~~(ii) 20-ppm-for-more-than-60-cumulative-minutes-in-any-one day.~~]

(b) Lime Kilns. Lime Kilns shall be operated and controlled such that emissions of TRS shall [~~be-kept-to-lowest-practicable-levels and~~] not exceed:

(A) [~~By-no-later-than-July-1,-1975,~~] 40 ppm and 0.1 Kg S/metric ton (0.2 lb S/ton) of production as monthly arithmetic averages [~~determined-by-a-monitoring-procedure-approved-by the-Department~~].

(B) As soon as practicable, but not later than July 1, 1978, 20 ppm and 0.05 Kg S/metric ton (0.1 lb S/ton) of production as monthly arithmetic averages [~~determined-by-a-monitoring procedure-approved-by-the-Department~~].

(C) As soon as practicable, but not later than July 1, 1983, 20 ppm as a daily arithmetic average and 0.05 Kg S/metric ton (0.1 lb S/ton) of production as a monthly arithmetic average.

(D) 20 ppm as a daily arithmetic average and 0.05 Kg S/metric ton (0.1 lb S/ton) of production as a monthly arithmetic average from each new lime kiln placed in operation or any lime kiln modified significantly to expand production.

[~~(c) Compliance-Programs.--Recovery-furnaces-and-lime-kilns-in-operation-on-or-before-the-effective-date-of-these-regulations-shall be-brought-into-compliance-with-subsections-25-165-(1)-(a)-and 25-165-(1)-(b)-above-in-accordance-with-specific-programs-and schedules-to-be-established-with-each-individual-mill-and-approved-by-the-Department-by-not-later-than-May-1,-1973,-taking into-consideration-the-following:~~

exceed [~~:-(i)~~] 10 ppm as a daily arithmetic average and 0.15 Kg S/metric ton (0.30 lb S/ton) of production as a monthly arithmetic average [~~on-a-mill-site-basis,~~].

[~~(ii) 40-ppm-for-more-than-60-cumulative-minutes-in-any-one day-from-each-recovery-furnace-stack;~~

~~(iii) 15-ppm-as-a-daily-arithmetic-average-and-0.45-lb-S/ton of-production-from-each-recovery-furnace-stack.~~

~~(B) As-soon-as-practicable,-but-not-later-than-July-1,-1978,-the emission-of-TRS-shall-not-exceed:~~

~~(i) 5-ppm-as-a-daily-arithmetic-average-and-0.15-lb-S/ton of-production-on-a-mill-site-basis.~~

~~(ii) 40-ppm-for-more-than-60-cumulative-minutes-in-any-one day-from-each-recovery-furnace-stack.~~

~~(iii) 10-ppm-as-a-daily-arithmetic-average-and-0.30-lb-S/ton of-production-from-each-recovery-furnace-stack.~~

~~(C) As-soon-as-practicable,-but-not-later-than-July-1,-1983,-the emission-of-TRS-from-each-recovery-furnace-shall-not-exceed:~~

~~(i) 5-ppm-as-a-daily-arithmetic-average-and-0.15-lb-S/ton of-production,~~

~~(ii) 20-ppm-for-more-than-60-cumulative-minutes-in-any-one day.~~]

[~~(B)~~] (B) TRS emissions from each new recovery furnace placed in operation after January 1, 1969 or any recovery furnace modified significantly to expand production [~~the-effective date-of-this-regulation~~] shall be controlled [~~immediately~~] such that the emissions of TRS shall not exceed [~~:-(i)~~] 5 ppm as a daily arithmetic average and 0.08 Kg S/metric ton (0.15 lb S/ton) of production as a monthly arithmetic average[~~,~~].

(2) Particulate Matter.

(a) Recovery Furnaces. [~~As soon as practicable but not later than May 1, 1975,~~] The emissions of particulate matter from each recovery furnace[s] stack shall not exceed a monthly arithmetic average of:

(A) 2.0 kilograms per metric ton (four (4) pounds per ton) of production and [~~on a mill site basis and from each recovery furnace stack,~~]

(B) 0.30 grams per standard cubic meter (0.13 grains per standard cubic foot).

(b) Lime Kilns. [~~As soon as practicable, but not later than May 1, 1975,~~] The emissions of particulate matter from each lime kiln[s] stack shall not exceed a monthly arithmetic average of:

(A) 0.50 kilogram per metric ton (one (1) pound per ton) of production and [~~on a mill site basis and from each lime kiln stack,~~]

(B) 0.46 grams per standard cubic meter (0.20 grains per standard cubic foot).

(c) Smelt Dissolving Tanks. The emission of particulate matter from each smelt dissolving tank[s] stack shall not exceed a monthly arithmetic average of 0.25 Kg/metric ton (One-half (1/2) pound per ton of production) [~~on a mill site basis and from each smelt dissolving tank~~].

(3) Sulfur Dioxide (SO_2). [~~As soon as practicable, but not later than July 1, 1975,~~] Emissions of sulfur dioxide from each recovery furnace stack shall not exceed a [~~daily~~] arithmetic average of 300 ppm on a dry-gas basis except during start-up and shut-down periods.

(4) New Facility Compliance. As soon as practicable, but not later than within 180 days of the start-up of a new kraft mill or of any new or modified facility having emissions limited by these regulations, that facility shall be operated, controlled, or limited to comply with the applicable provisions of these regulations and the mill shall conduct source sampling or monitoring as appropriate to demonstrate compliance.

[~~(5) Compliance Schedules.--As soon as practicable, but not later than May 1, 1973, each mill shall submit to the Department a proposed compliance program, including means and methods to the extent possible, and a schedule for complying with the emission limits of these regulations. The approved compliance program shall be incorporated in the Air Contaminant Discharge Permit issued to each mill.~~]

25-170 MORE RESTRICTIVE EMISSION LIMITS

The Department may establish more restrictive emission limits than the numerical emission standards contained in Section 25-165 and maximum allowable daily mill site emission limits in kilograms per day for an individual mill upon a finding by the Commission that the individual mill is located or is proposed to be located in a special problem area or an area where ambient air standards are exceeded or are projected to be exceeded [~~and compliance schedules after notice and hearing if applicable for different geographical areas of the state~~].

25-175 PLANS AND SPECIFICATIONS

Prior to construction of new kraft mills[~~,~~] or [~~expansion of production or~~] modification of facilities [~~significantly~~] affecting emissions at existing kraft mills, complete and detailed engineering plans and specifications for air pollution control devices and facilities and such other data as may be required to evaluate projected emissions and potential effects on air quality shall be submitted to and approved by the Department. All construction shall be in accordance with plans as approved in writing by the Department.

25-180 MONITORING

(1) General.

(a) The details of the monitoring program for each mill shall be submitted to and approved by the Department. This submittal shall include diagrams and descriptions of all monitoring systems, monitoring frequencies, calibration schedules, descriptions of all sampling sites, data reporting formats and duration of maintenance of all data and reports. Any changes that are subsequently made in the approved monitoring program shall be submitted in writing to the Department for review and approved in writing prior to change.

(b) All records associated with the approved monitoring program including but not limited to original data sheets, charts, calculations, calibration data, production records and final reports shall be maintained for a continuous period of at least 365 days and shall be furnished to the Department upon request.

[~~(1)~~](2) Total Reduced Sulfur (TRS). Each mill shall [~~provide~~] continually monitor[~~ing of~~] TRS in accordance with the following:

(a) The monitoring equipment shall [~~be capable of~~] determine[~~ing~~] compliance with the emission limits and reporting requirements established by these regulations, and shall [~~be capable of~~] continually sample[~~ing~~] and record[~~ing of~~] concentrations of TRS. [~~contaminants during a time interval not greater than 30 minutes.~~]

(b) The sources monitored shall include, but are not limited to, the recovery furnace stacks and the lime kiln stacks.

(c) At least once per year, vents from other sources as required in 25-165 (1) (d) [~~(e)~~] Other Sources, shall be sampled to demonstrate the representativeness of the emissions of TRS and the results shall be reported to the Department.

[~~(2)~~](3) Particulate Matter. Each mill shall sample the recovery furnace(s), lime kiln(s) and smelt dissolving tank(s) for particulate emissions with, (a) the sampling method and (b) the analytical method approved in writing by the Department. [~~Each mill, after the adoption of this regulation, shall establish and have approved in writing by the Department a regular sampling schedule. As soon as practicable,~~] Each mill shall provide continual monitoring of opacity of emissions discharged to the atmosphere from the recovery furnace or [~~and~~] particulate matter from the recovery furnace(s) [~~and lime kiln(s)~~] in a manner approved in writing by the Department.

(4) Sulfur Dioxide (SO_2). Representative sulfur dioxide emissions from the recovery furnace(s) shall be determined at least once each month.

(5) Combined Monitoring. The Department may allow the monitoring of a combination of more than one emission stream if each individual

emission stream has been demonstrated to be in compliance with all the emission limits of Section 25-165. The emission limits for the combined emission stream shall be established by the Department.

25-185 REPORTING

Unless otherwise authorized or required by permit, data shall be reported by each mill for each calendar month by the fifteenth day of the subsequent calendar month as follows:

(1) Daily average emissions of TRS gases expressed in parts per million of H_2S on a dry gas basis for each source included in the approved monitoring program.

[~~(2) Unless excused in writing by the Department, the number of cumulative minutes each day the TRS gases from the recovery furnaces exceed 20 ppm and 40 ppm and the maximum concentration TRS measured each day, expressed as H_2S on a dry gas basis.~~]

[~~(3)~~](2) Monthly average emissions of TRS gases in kilograms [~~pounds~~] of sulfur per [~~equivalent air dried~~] metric ton of pulp processed [~~in the kraft cycle~~] for each source included in the approved monitoring program.

[~~(4)~~](3) Monthly average emission of SO_2 based on all samples collected from the recovery furnace(s), expressed as ppm, dry basis.

[~~(5)~~](4) Monthly average emission of particulates in grams per standard cubic meter and kilograms [~~pounds~~] per [~~equivalent air dried~~] metric ton of pulp produced [~~in the kraft cycle~~] based upon the sampling conducted in accordance with the approved monitoring program.

[~~(6) Cumulative hours of operation of the lime kiln(s) used for non-condensible incineration and the number of cumulative hours of stand-by incinerator operations.~~]

[~~(7)~~](5) Average monthly [~~daily~~] equivalent kraft pulp production [~~in air dried tons~~].

(6) Average daily and the value of the maximum hourly opacity, and/or the average daily and the value of the maximum hourly particulate emissions in grams per standard cubic meter for each recovery furnace stack on a daily basis.

(7) The results of each recovery furnace particulate source test in grams per standard cubic meter and for the same source test period the continual average opacity or the particulate monitoring record obtained in accordance with the approved continual monitoring program required in section 25-180 (3).

(8) The cumulative number of hourly averages each day that the recovery furnace particulate and TRS, and lime kiln TRS emissions exceed the numerical regulatory or permit limits.

(9) Upset conditions shall be reported in accordance with Section 25-190 (3).

[~~(8)~~](10) Each kraft mill shall furnish, upon request of the Department, such other pertinent data as the Department may require to evaluate the mill's emission control program.

25-190 UPSET CONDITIONS

(1) Each mill shall immediately report abnormal mill operations including control and process equipment maintenance, or breakdowns which result in [~~increased emissions of any air contaminants, in accordance with the provisions of the Oregon Administrative Rules, Chapter 340, "Upset Conditions."~~] violations of regulatory or air contaminant discharge permit limits. The mill shall also take immediate corrective action to reduce emission levels to regulatory or permit levels.

(2) Significant upsets shall be reported in writing with an accompanying report on measures taken or to be taken to correct the condition and prevent its reoccurrence.

(3) Each mill shall report the cummulative duration in hours each month of the upsets reported in subsection (1) and classified as ~~to:~~

(a) Recovery Furnace

(i) TRS

(ii) Particulate

(b) Lime Kiln

(i) TRS

(ii) Particulate

(c) Smelt Tank Particulate

~~[25-190-SPECIAL-STUDIES~~

~~(1) Where-warranted-by-conditions-at-particular-mills-special-studies-of specific-vents-or-air-contaminant-emissions-may-be-required-as-a condition-of-issuing-an-Air-Contaminant-Discharge-Permit.~~

~~(2) Each-mill-shall-participate-in-special-studies-sufficient-to-identify at-each-mill:~~

~~(a) The-amount-and-effects-of-sulfur-oxides,-including-SO_2,-SO_3,-SO_4 in-recovery-furnace-stack-gases.~~

~~(b) The-extent-of-interference-from-the-formation-of-sulfate-ion-from SO_2-and-SO_3-in-wet-collection-devices-used-in-particulate-sampling trains,-and~~

~~(c) The-occurrence-of-acid-mist-(H_2SO_4-in-water-droplets)-in-recovery furnace-stack-gases.~~

~~These studies are to be completed by January 1, 1975, and final reports submitted to the Department by July 1, 1975. Reports of progress concerning these studies shall be submitted to the Department by January 1 and July 1 of each year.~~

~~(3) Each mill shall for all furnaces, allowing a reasonable start up period for new furnaces, conduct a special study sufficient to evaluate the stability and efficiency of the electrostatic precipitators used on recovery furnace(s). All sampling and analytical procedures to be approved in writing by the Department.]~~

25-195 CHRONIC UPSET CONDITIONS

If the Department determines that an upset condition is chronic and correctable by installing new or modified process or control procedures or equipment, a program and schedule to effectively eliminate the deficiencies causing the upset conditions shall be submitted. Such reoccurring upset conditions causing emissions in excess of applicable limits may be exempted from Section 21-065 and 21-070 through 21-075 and may be subject to civil penalty or other appropriate action.

~~[25-196 OTHER ESTABLISHED AIR QUALITY LIMITATIONS~~

~~The emission limits established by these regulations are in addition to visible emissions and other ambient air standards, established or to be established by the Department, unless exempted therefrom by this regulation.~~

~~25-200 PUBLIC HEARING~~

~~A public hearing shall be held by the Department no later than January 1976, to review current technology and the adequacy of these regulations and to adopt any revisions or additional emission standards that are necessary.]~~

25-200 Special Studies

(1) Each mill shall conduct or participate in special studies sufficiently detailed to identify chemical composition and size distribution of particulate matter emitted from [~~company~~] recovery furnaces, lime kilns and smelt dissolving tank vents.

(2) A schedule and outline for the above studies, including the sampling method(s) and the analytical method(s) shall be submitted by December 31, 1977 and approval obtained in writing by the Department before the studies are initiated. Such studies shall be completed and reports submitted to the Department by December 31, 1979.

ATTACHMENT 2

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GOVERNOR

Department of Environmental Quality

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To: Hearings Officer

From: Air Quality Control Division

Sugject: March 18, 1977 Public Hearing on Proposed Revisions to Rules Governing Air Contaminant Emissions from Kraft Pulp Mills

Introduction

On January 22, 1976, the Department held a public hearing as was required by section 25-200 of the Kraft mill regulation (Appendix B) to review current technology and the adequacy of regulation. At this hearing the kraft industry testified (see Appendix C) that certain changes should be made to the current regulation.

After reviewing the testimony of the January 22, 1976 public hearing the Department concluded that a revision of the regulation was necessary. At the June 25, 1976 EQC meeting, the Department requested and received authorization to hold hearings for the purpose of receiving testimony relevant to revising the kraft mill regulation.

On August 16, 17, 18 and 19, 1976 the Department held public hearings in areas where kraft mills are located to obtain public input concerning the acceptability of the present level of kraft mill emissions and the need of further reducing emissions as required by current rules. At these hearings and in subsequent correspondence only two people submitted testimony (Appendix D) stating that they would like to see odor levels reduced.

After considering the testimony of the five hearings, the Department drafted a proposed revised kraft mill regulation and has held three meetings with an industry committee to discuss the drafted provisions. These meetings were held on September 30, 1976, November 16, 1976 and January 21, 1977. After the final meeting with the committee, the Department made some additional revisions in the proposed draft regulation. The revised rule subsequently became the proposed regulation which is the subject of this hearing. This hearing is being held under authorization granted at the June 25, 1976 EQC meeting. The proposed rule is Attachment A.

Background

The kraft pulping process involves the cooking of wood chips to remove the material (lignin) that bonds the wood fibers. The chemicals used in the process are reclaimed in a recovery furnace, smelt dissolving tank and lime kiln which are the primary sources of air contaminants. Kraft mills are known for their particulate and rotten-egg smelling emissions. A detailed description of the kraft pulping process is available for those who are interested.

The initial regulation pertaining to kraft pulp mills was adopted on April 2, 1969 by the Oregon State Sanitary Authority. The Environmental Quality Commission adopted revisions on January 26, 1973. The current regulation is set forth in OAR Chapter 340, Sections 25-150 through 25-200 (Appendix B).

Review of Current Regulation

The current kraft mill regulation has daily average limits for recovery furnace Total Reduced Sulfur (TRS) emissions which decrease in three steps. The regulation also has TRS limits for lime kilns which decrease in two steps. It requires the continuous incineration of digester and evaporator noncondensible gases. The following table is an outline of the regulatory odor control requirements.

Source & Pollutant	Limit Or Treatment 7/1/75	7/1/78	7/1/83	Averaging Period
Individual Recovery Furnace, TRS	15 ppm	10 ppm	5 ppm	Daily
Mill Site Recovery Furnace, TRS	10 ppm	5 ppm	5 ppm	Daily
Lime Kiln, TRS	40 ppm	20 ppm	20 ppm	Not defined
Other sources, TRS	Best Practicable Treatment			--
Digester and Evaporator Noncondensible Gases	Continuous Incineration			--

The regulation has particulate emission limits for recovery furnaces, lime kilns and smelt dissolving tanks which are respectively four pounds per air dried, unbleached ton of pulp produced (lb/adt), one lb/adt and one-half lb/adt. These limits do not have an averaging period defined in the current rule.

The kraft mill industry committee recommended at the January 22, 1976 public hearing (Appendix C) that the following changes be made to the regulation:

1. All undefined limits (lime kiln TRS and all particulate) should be defined as monthly averages.

2. All emission limits should be on a mill site basis and not on each stack.

3. Highest and best practicable technology should only apply where environmentally required.

4. The July 1, 1983 limit of 5 ppm for individual recovery furnace TRS emissions should be eliminated.

Discussion of Proposed Changes

After considering testimony presented at the January 22, 1976 and August 16, 17, 18 and 19, 1976 public hearings and at meetings with industry, the Department has prepared a proposed revision to the kraft mill regulation (Appendix A). A copy of the current regulation with all proposed deletions and additions shown is attached as Appendix E.

The following major changes in the regulation are proposed:

1. Metric units are substituted for English units. The English units are retained in parentheses for reference. This change is proposed to be consistent with the directives given to the Department by the Commission to convert to the metric system.

2. All references to mill site emission limits are removed because when each individual source meets the limit the mill site will be in compliance. The industry had requested that the limits be on a mill site basis only. The Department did not make this change because it was concluded that such a change would preclude the installation of highest and best control technology on all sources.

3. The limits for recovery furnaces of 40 ppm and 20 ppm for more than 60 cumulative minutes in any one day are removed. These limits were originally included in the regulation to make sure that peak emissions did not cause problems. However, the monitoring data indicates in order to meet the daily limits, a recovery furnace also has to meet the cumulative time limits.

4. The 1978 individual recovery furnace TRS limits of 10 ppm and 0.15 KgS/metric ton (0.3 lb S/ton) would become effective upon adoption of the proposed regulation. This change was made since all recovery furnaces have demonstrated that they are capable of meeting the limit. Some recovery furnaces are not presently consistently meeting this limit. However, it is the Department's position that these furnaces can be operated in compliance with the limit.

5. The July 1, 1983 recovery furnace 5 ppm TRS limit is deleted, except for furnaces installed after January 1, 1969 or those significantly modified to expand production. Industry committee contended that to meet the 1983 limits all direct-contact evaporator recovery furnaces would have to be replaced with new furnaces at a statewide cost of approximately $150 million. The Department concurs that the furnaces would have to be replaced or significantly modified at substantial cost to meet the 5 ppm limit.

   The Industry Committee has pointed out that both the existing rule and the proposed rule (see 25-170) provides for the adoption of more restrictive mill site emission limits in problem areas. The Department concurs. Additionally, since only two people submitted testimony complaining of odor and the majority testified that the current odor levels were satisfactory especially if the control of odor were to cost large sums of money at the four public hearings, the Department interpreted this to mean that the public was reasonably satisfied with current level of odors from kraft pulp mills.

6. Lime kiln TRS, Section 25-165(1)(b)(A and B), Sections 25-165(2)(a, b and c), and all particulate emission limits are defined as monthly averages. In the present regulation, these limits do not have an averaging time defined.

7. A lime kiln TRS limit of 20 ppm as a daily average effective July 1, 1983 is proposed. This change is proposed to obtain improvements in odor levels in the vicinity of the mills. The Department is of the opinion that a daily average limit is necessary to maintain continuous high performance and thereby minimize odor problems. To achieve these emission limits the mills in the opinion of the Department, would have to install equipment to minimize the lime mud sulfide content. They would also have to control oxygen concentrations and temperatures in the kilns. All but one of the seven mills have demonstrated the capability of complying with the 1978 limits (Appendix G). None of the mills have demonstrated the capability of complying with the 1983 limits. However, the Department believes that five of the mills could achieve compliance by better controlling process variables and that the limits represent highest and best available control technology. Limits for new lime kilns or significantly modified kilns were added which are identical to the 1983 limits.

8. A limit of 0.1 kilograms of sulfur per metric ton of production effective July 1, 1978 is added to the TRS requirements for "other sources" replacing the wording, "be kept to lowest practicable level", requirement in order to define lowest practicable levels. All but one mill has demonstrated the capability of complying with this limit.

9. Compliance schedule submission dates for any source not in compliance are proposed as follows: July 1, 1977 for the 1978 limits and January 1, 1980 for the 1983 limit.

10. The recovery furnace particulate emission limit is changed by adding a concentration limit of 0.30 grams per standard cubic meter to the 4 lb/ton limit. This change is proposed because the concentration determination involves fewer variables and therefore is considered more accurate. The 0.30 grams per standard cubic meter is equivalent to 4 lbs/ton, based on averaging the data from all Oregon mills.

11. The lime kiln particulate mass emission limit is changed by adding a concentration limit of 0.46 grams per standard cubic meter to the 1 lb/ton limit for the same reasons as the recovery furnace particulate limit above. The 0.46 grams per standard cubic meter is considered equivalent to 1 pound per ton.

12. The recovery furnace sulfur dioxide limit is modified to reflect an average of all samples collected during each month.

13. A section on combined monitoring (25-180(5)) is proposed because the Department has had requests from industry to permit monitoring of combined emission streams.

14. The continual particulate monitoring requirement is modified by adding a requirement for continual opacity monitoring of recovery furnace emissions. The requirement for continual lime kiln particulate monitoring is removed. Lime kiln emissions are about one-fourth of recovery furnace emissions. Four particulate source tests per month would still be required for lime kilns. The opacity monitoring requirement is added because opacity represents what is seen by the public and Department. The Department wishes to develop specific data on opacity for evaluation as a control method.

15. Section 25-185 dealing with reporting requirements is modified to reflect the rule changes and to obtain data in a format meaningful to the Department.

16. The "Upset Conditions" section is modified to require a summary of upsets in the monthly report. This would give the Department a summary of upsets each month and provide the Department with a tool to easily evaluate the frequency of upsets.

17. A section on "Chronic Upsets" is proposed to give the Department Civil Penalty authority relative to correctable recurring upsets.

18. A special study to determine the character and the amount of fine particulate emissions of kraft mills is proposed.

19. Housekeeping, such as removing expired dates and clarifying language is also proposed.

A table comparing the limits of the current regulation and the proposed regulation is attached in Appendix F.

The U. S. Environmental Protection Agency has proposed New Source Performance Standards for Kraft pulp mills. Nationally, the industry is objecting to these standards and there is the possibility that some of the standards might be modified. Therefore, the Department has not included the New Source Performance Standards in the proposed regulation, but when they are adopted, the Department would propose to add them to the Department's regulation as applicable.

The Department is not proposing lowering the particulate emission limits at the present time. However, when more data is obtained from the continuous opacity and particulate monitors and from ambient studies that the Department is conducting, it is possible that lower particulate emission limits will be proposed.

Conclusions

It is believed that the proposed regulation will provide acceptable odor levels around the kraft pulp mills while not imposing an undue economic burden on the mills.

Although particulate limits remain the same, violations of ambient air standards are not expected to be caused by kraft pulp mills. The monitoring, reporting and special studies sections have been designed to facilitate the Department's needs in developing further regulatory requirements as appropriate.

Recommendation

It is recommended by the Air Quality Control Division that OAR Chapter 340, Sections 25-150 through 25-200 be amended as proposed herein, with such further amendments as may be deemed appropriate after consideration of information presented at this hearing.

Attachments:

Appendix A - Proposed Kraft Pulp Mill Rule
Appendix B - Existing Kraft Pulp Mill Regulation
Appendix C - January 22, 1976 Hearing Record
Appendix D - August 16, 17, 18 and 19, 1976 Hearing Record
Appendix E - Existing Kraft Pulp Mill Rule Modified to Show Proposed Additions and Deletions
Appendix F - Chart of Existing and Proposed Regulation
Appendix G - Compliance Status of Mills

APPENDIX F

EMISSION SOURCE(S)	POLLUTANTS AND UNITS	Emission Limits 6/ Current (Proposed) 1975	1978	1983	PROPOSED CHANGES
I. Recovery Furnace(s)					
A. Individual furnaces	TRS-Daily average concentration (ppm)	15 (10)	10 (10)	5 (10)	1978 limits made effective immediately and 1983 limits deleted.
	TRS-Monthly average mass rate (lb/adt)	0.45 (0.3)	0.3 (0.3)	0.15 (0.3)	
	TRS-Maximum daily cumulative (ppm)	40	40	20	Daily cumulative limits deleted.
	Particulate Monthly average mass rate(lb/adt) 1,7/	4.0 (4.0)	4.0 (4.0)	4.0 (4.0)	Averaging time defined.
	SO_2- Average concentration (ppm) 2,3/	300 (300)	300 (300)	300 (300)	Modified to reflect monthly average.
B. Average of all furnaces at mill site	TRS- Daily average concentration (ppm)	10	5	5	Mill site limits are deleted.
	TRS- Monthly average mass rate (lb/adt)	0.3	0.15	0.15	Mill site limits are deleted.
II. Lime Kiln(s)	TRS-Average concentration (ppm) 1,4/	40 (40)	20 (20)	20 (20)	Averaging time defined and 1983 limits added.
	TRS-Monthly average mass rate (lb/adt)	0.2 (0.2)	0.1 (0.1)	0.1 (0.1)	1983 limits added.
	Particulate-Monthly average mass rate (lb/adt) 1,7/	1.0 (1.0)	1.0 (1.0)	1.0 (1.0)	Avg. time defined.
III. Smelt Dissolving Tank(s)	Particulate-Monthly average mass rate (lb/adt) 1,7/	0.5 (0.5)	0.5 (0.5)	0.5 (0.5)	Avg. time defined
IV. Other Sources	TRS-Average mass rate (lb/adt) 2,5/	- (-)	- (0.2)	- (0.2)	Numerical limits added

Footnotes

1. Averaging time not defined in current regulation; DEQ and industry have considered it to be on a monthly basis.
2. Infrequently measured.
3. Measured at least once per month.
4. Proposed revision; average time for 1983 is on a daily basis.
5. Measured at least once per year.
6. Limits in the proposed regulation are expressed in both English and metric systems.
7. In the proposed regulation the particulate limits have been changed from pulp process limits to concentration limits.

Date: September 24, 1976

Standards for New or Modified Sources

	Current	Proposed
TRS		
Recovery Furnace, ppm	5	5
Recovery Furnace lb/adt	0.15	.0.15
Recovery Furnace, Maximum Daily Cumulative, ppm	20	20
Lime Kiln, ppm	20	-
Other Sources, ppm	-	
Particulate		
Recovery Furnace, lb/adt	4.0	4.0
Lime Kiln	1.0	1.0
Smelt dissolving tank, lb/adt	0.5	0.5

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To: Hearings Officer

From: Air Quality Division

Subject: Addendum to Memo to Hearings Officer for the March 18, 1977 Public Hearing on Proposed Revisions to Rules Governing Air Contaminant Emissions from Kraft Pulp Mills.

The Department has been informed by two company representatives that the wording of Section 25-120(3) for particulate monitoring was inappropriate. They contend that it is not possible to accurately measure opacity in stacks where condensed water is present. The two mills have developed and installed particulate monitors which do not measure opacity and they further stated that the Department would be placing an extra burden on them to require two monitoring systems.

Because of these comments the Department has reviewed the particulate monitoring section of the regulation and proposes to revise the wording of the particulate monitoring section to allow flexibility in dealing with such situations. The following two sentences at the end of section 25-180(3) are proposed to be added:

> "Where condensed water prevents the accurate measurement of opacity the Department may waive the in-stack opacity monitoring requirement. Where it can be demonstrated that particulate emissions correlate with optical density measurements the Department may waive the particulate monitoring requirement."

This wording would not require opacity monitoring in stacks where opacity monitoring was shown to be impracticable. One mill would still have to monitor opacity in a stack in which they have installed a continual particulate monitor.

CRC:ds
3/17/77

PROPOSED

REVISION OF THE PARTICULATE MONITORING REQUIREMENT

[~~(2)~~](3) Particulate Matter. Each mill shall sample the recovery furnace(s), lime kiln(s) and smelt dissolving tank(s) for particulate emissions with, (a) the sampling method and (b) the analytical method approved in writing by the Department. [~~Each mill, after the adoption of this regulation, shall establish and have approved in writing by the Department a regular sampling schedule. As soon as practicable,~~] Each mill shall provide continual monitoring of opacity of emissions discharged to the atmosphere and particulate matter from the recovery furnace(s) [~~and lime kiln(s)~~] in a manner approved in writing by the Department. Where condensed water prevents the accurate measurement of opacity the Department may waive the in-stack opacity monitoring requirement. Where it can be demonstrated that particulate emissions correlate with optical density measurements the Department may waive the particulate monitoring requirement.

*See page 9 of Proposed Rule.

ATTACHMENT 3

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

MEMORANDUM

TO: Environmental Quality Commission

FROM: Hearing Officer

SUBJECT: Hearing Report: March 18, 1977 hearing on proposed revisions to Oregon Administrative Rules governing air contaminant control of kraft mills (OAR 340-25-150 through 25-200).

SUMMARY

The hearing, scheduled for 10:00 a.m., commenced some 45 minutes late. However, there was no indication that anyone wishing to present testimony was prevented from so doing.

Present, in addition to the Air Quality Division's Mr. Harold Patterson and Charles Clinton, and the undersigned, were some ten representatives of industry. No testimony was offered by the public at large, despite the usual required public notice for rule-making activities.

SUMMARY OF TESTIMONY

Mr. L. E. Birke, Jr., representing the Northwest Pulp and Paper Association--on behalf of the Oregon kraft mills:

Mr. Birke, in both oral and written testimony, expressed support for many of the proposed rule changes while taking issue with four of them. Since his statement was endorsed by others, in written form, it's included in its entirety as Attachment A.

To summarize, Mr. Birke found the definition of "modified" vague and recommended the EPA definition which ties modification to an increase in emissions and capital outlay.

Also, the proposed Total Reduced Sulphur (TRS) emissions for lime kilns by 1983 were found too stringent, unnecessary, unwarranted by significant public complaints, cost/benefit ineffective, and beyond current retrofit technology.

The proposal to monitor particulate emissions from recovery furnaces was found sound in theory, but unsatisfactory in its drafting in that it would impose opacity monitoring on wet plumes and would substitute this method for other, more reliable methods which have been and are being developed at considerable cost.

The definition of upset conditions was said to be too vague and requiring of limitation to only those changes in normal mill operation which create a reasonable expectation that emission limits will be exceeded.

The "special studies" proposal was criticized as a late, unfair, surprise which industry had not had time to evaluate. Further, it was argued, in its present wording, to be vague and encompassing of unknown costs and obligations to the industry for uncertain purposes. Also, it was pointed out that studies to characterize small particulates were being undertaken by the industry and should further be undertaken by informal agreement on a nationwide level.

Mr. Birke expressed discontent with the Department's proposals which, in his view, had not been fairly negotiated with the industry. He expressed desire that those found acceptable by both the agency and industry should be recommended to the Commission promptly. He urged that the Department consider the relative lack of public complaints about the current performance of kraft mills throughout the state. He urged the Department to carefully document the need for more stringent controls before proposing them.

Mr. Andrew Caron, representing the National Council on Air and Stream Improvement:

Mr. Caron recalled that earlier regulations required the mills to develop means to monitor the consistency of particulate control devices. Industry had pursued this diligently, he reported, and was either in possession of or on the verge of possessing new alternatives to the traditional opacity monitoring.

A new method for measuring optical density (as opposed to opacity) and a method using a laser were sited as examples of technology which would measure performance more closely and in a more objective manner than would the use of opacity readings.

Mr. Caron found opacity measurement to be a blunt and obsolete tool because dependent upon variables such as whether measurement occurred in the stack or out, time of year, height of the sun, angle of the observer to the plume, size of the stack exit, etc.

In Mr. Caron's view, opacity monitoring should not be imposed where better alternatives are available because such imposition would be of no environmental benefit, would negate the extensive efforts of industry to find better technology, and would foster monopoly in control technology.

Mr. Caron contended that industry-developed methods had been presented to the Department for some time and the industry was frustrated in its inability to get the Department either to accept them or state why they are deemed unsound.

Finally, Mr. Caron noted that the studies conducted on the subject had been made available to the Department in case the Commission wished to study them.

Mr. Guy V. Moellendorf, representing American Can Company's Halsey Mill:

Mr. Moellendorf offered oral and written testimony urging that opacity data be required from the recovery furnaces only. He noted that the October 15 staff report to the Commission called for continual monitoring of opacity and particulate matter from recovery furnaces only.

An expensive transmissometer was reportedly installed by his company and, under a strict interpretation of proposed OAR 340-25-180 (calling for monitoring of opacity of emissions "discharged to the atmosphere...") would have to undergo expensive relocation to the main stack which receives not only recovery boiler emissions but lime kiln and dissolving tank emissions as well. Mr. Moellendorf stated himself unaware of any evidence that monitoring of the combined source would be superior to monitoring its components. He urged that the word "recovery" be inserted before "emissions" in the language quoted above.

Mr. Jerry Bollen, representing Weyerhaeuser Company's Springfield Plant. Mr. Bollen supported the views of Mr. Birke as expressed earlier.

In addition, he noted that a recent hearing in Eugene had resulted in no citizen complaints with regard to his or other kraft mills. Mr. Bollen questioned the need to change the 20 parts per million lime kiln TRS limit from a monthly average as of July 1978 to a daily average as of July 1983. Such a change, he reported, would force his company (whose present operations range from 5 to 40 parts per million on a daily average) to oversize its facilities, install caustic washing devices, or go to presently unknown technology to meet a standard not needed to prevent odor problems in the vicinity of the plant.

Mr. Bollen objected strongly to the dual opacity-particulate monitoring requirement of proposed OAR 340-25-180. He reported that the Springfield Plant had, in good faith, installed continuous particulate monitoring devices on both its wet plume stack and its dry plume stack. This had cost $100,000. There was severe doubt, he reported, that any improved information could be gleaned from installing opacity monitors on both stacks.

Even a DEQ proposal to waive opacity monitoring on appropriately monitored wet plumes and particulate monitoring on appropriately monitored dry stacks, it was argued, would still require installation of an opacity meter on one stack at a cost of $40,000 for no good purpose.

Mr. Bollen opposed the "special studies" provision, questioning the value of data which was sought. He argued that the same logic which would allow particulate monitoring to be replaced with opacity monitoring would call for the reverse arrangement.

Mr. Bollen added that there had been an inconsequential number of public complaints about kraft mills over the last year (3 to 4 in Mr. Clinton's recollection). Addressing the fact that most of them were relative to the Springfield and Toledo plants, Mr. Bollen pointed out that both these plants have wet plumes, implying (if we understand him correctly) that the presence of harmless, uncombined water may have largely prompted the complaints.

It was the recollection of Mr. Patterson that some of the complaints were based on experiences seemingly well beyond the area where water vapor would have dissipated below visibility level.

Mr. V. J. Tretter, Jr., representing the Georgia-Pacific Corporation which operates a kraft mill in Toledo, Oregon.

Mr. Tretter supported the views expressed by Mr. Birke of the Northwest Pulp and Paper Association.

He expressed his compliments to the Department, both for its efforts in evaluating the need for rule changes and the proposed changes as a whole.

Issue was taken with the proposal to limit TRS emissions from lime kilns to a daily 20 ppm average. The Toledo Plant was said to be presently using all process controls currently known to control TRS emission, to be able to meet the 20 ppm monthly average, but unable to meet the 20 ppm daily average. It was suggested the latter limitation be dropped until technology is practicably available to further reduce a problem which is currently of little public concern.

Mr. Tretter reported that the Toledo Plant employs a single 300-foot stack to disperse emissions from three lime kilns and three recovery furnaces, making it impossible to correlate the opacity of the six sources (all of which are scrubbed and produce a wet plume) with the readings on the sodium ion monitors which continuously monitor particulates from each recovery furnace and the main stack. In Mr. Tretter's view, this would make it impossible for Toledo to comply with proposed OAR 340-25-180(3). He added that opacity (and Ringleman) readings have been employed in the past because they were the only tool available to monitor the efficiency of control devices. He found these measures archaic and of less value than the technology for measuring mass emission rates which had superseded them.

It was suggested that discouraging drive-by opacity checks by agency personnel could simply be a motive to stop, enter the mill and examine more reliable monitoring reports to determine the presence or absence of problems. He urged that opacity monitoring be dropped from the standards.

Mr. Tretter's description and evaluation of this problem is set forth verbatim in Attachment B.

Mr. Tretter also took exception to the proposed "special studies" section, finding it without sufficient opportunity for industry study, without guarantee of meaningful data, beyond Georgia-Pacific's expertise in the area of size distribution on both dry and wet stacks, not justified to the extent special studies had been in the past, and more appropriate to a cooperative industry/agency effort than a rule requirement.

Mr. Joe Kolberg, representing Boise Cascade Corporation and its St. Helens Mill.

Mr. Kolberg strongly supported the comments of Mr. Birke.

Mr. Kolberg echoed concerns that the definition of modified was vague. He said, as proposed, it would encompass normal maintenance or a change in operating parameters to improve controls. It was urged that the EPA definition be adopted or, at least, that industry be made aware of the reasoning for any definition more stringent than the result of current EPA definition attempts.

Reporting that the St. Helens Mill had only recently met the current 40 ppm lime kiln TRS as a monthly average and plans to meet the 20 ppm monthly average as of July 1978, Mr. Kolberg stated that the plant could not meet the unnecessarily stringent 1983 daily average standard proposed.

An expenditure ranging from one-half to three quarters of a million dollars was projected as the expense which, coupled with high energy usage, would be necessary to meet the 0.2 lb/ton limit proposed for TRS from "other sources."

The result, unless 3 million dollars was spent, he said, would be increased discharge of effluent to secondary treatment and a substantial increase in energy use and operating costs.

The message to be learned from recent hearing in the vicinity of all mills was reported to be that the public feels satisfaction with present efforts to reduce TRS emissions and would oppose further efforts if not cost effective.

Terming them a non-health related problem, Mr. Kolberg concluded, TRS emissions should not be controlled more stringently where such would be contrary to the need to conserve energy and natural resources.

The "special studies" provision was found lacking in demonstrated need and specifics as to scope. It was suggested that it be tabled until or unless discussions with the agency demonstrate a need for it.

The record having been open until April 1 for additional mailed testimony, the hearing was closed after testimony as summarized above.

RECOMMENDATION

Your hearing officer has informally discussed possible revisions to the definitions of "modified," the designation of "existing recovery furnaces," variances from the opacity monitoring requirement, and "special studies" with staff.

It is incumbent upon the staff which is possessed of technical knowledge of the problem to weigh the testimony and decide whether to revise its proposals.

Respectfully submitted,

Peter W. McSwain

Peter W. McSwain
Hearing Officer

PWM:eve

TESTIMONY OF THE NORTHWEST PULP AND PAPER ASSOCIATION

on

PROPOSED REVISIONS TO RULES GOVERNING AIR CONTAMINANT EMISSIONS

FROM KRAFT PULP MILLS

MARCH 18, 1977

The Northwest Pulp and Paper Association (NWPPA) representing Oregon's kraft pulping industry appreciates the opportunity to testify on proposed changes to the Oregon Administrative Rules (OAR) Chapter 340, Section 25-150 through 25-200. Over the past months the NWPPA has provided information to the Oregon Department of Environmental Quality (DEQ) to develop practicable and environmentally meaningful revisions of the Oregon Kraft Air Regulations. While we have contributed to and endorse many of the Department's recommendations for changes to the Oregon Administrative Rules, there remain, however, several proposed revisions which will have negative results and/or which are unsupported by existing scientific, economic, and social data. The following outline addresses the revisions of concern to the Oregon pulping industry and suggests needed changes or clarifications:

25-150 DEFINITIONS Item (15) "Modification" or "modified"

The NWPPA Oregon Air Committee suggested to the DEQ that a definition for "modified significantly to expand production" was needed. This definition is desirable to clearly identify which facilities would be subject to new source performance standards. The NWPPA suggested that the EPA proposed definition which ties modifications to increased emissions and capital outlays was entirely appropriate. The DEQ responded with the opinion that the EPA definition is not responsive to air resource management needs and subsequently developed the wording now recommended in Item 15. The DEQ's position on the EPA definition was not supported, illustrated or justified. The arbitrary statement "not responsive to air resource management needs" was the total

answer given to the Air Committee. The definition now proposed by the DEQ is vague and unworkable. Under part (b) of the recommended definition essentially all activities of a pulp mill would qualify the mill for new source performance standards. An event as inconsequential as equipment maintenance will "change the character, quantities or point of emissions or result in a new emission." Further, the proposed definition will act as a deterrent to improvement of air emissions because as soon as an improvement is made, the entire source qualifies for new source performance standards. Certainly, this definition is not a definition which provides guidance to the air discharger, but is a counterproductive statement of vague responsibilities.

25-165 EMISSION LIMITATIONS Item (1)(b)(c) 1983 Lime Kiln TRS

The Oregon Air Committee questions the desirability or need to meet the proposed 1983 lime kiln TRS limits. Further, retrofit technology has not conclusively demonstrated the practicable ability to meet the proposed 20 ppm limit on a never to exceed basis. The DEQ responded to NWPPA concern with "the capability to meet the limits will be demonstrated shortly". Even if this is true, we contend that regulations should not be written based on assumptions of what may be possible in the future. Limits should be set based on identifiable technologies, benefits and costs so that all factors can be evaluated in assessing possible impacts of a given requirement. The NWPPA Air Committee went on to suggest that recent public hearings held by the DEQ around the state did not support the need for lime kiln TRS reductions to this level. Projections of large energy and resource requirements with little corresponding improvement in odor control were unanswered by the Department.

25-180 MONITORING Item (3) Particulate Matter

The requirement for monitoring the performance of the kraft recovery furnace

particulate control device has been modified in this section. The stated objective by the DEQ was to require the individual mill to provide the agency with real time data documenting the consistency of performance of its particulate control devices. We understand the Department's intention for changes in this section to identify "consistency of performance" for air emission sources from the kraft pulping industry. The NWPPA concurs with this objective but finds the proposed wording unacceptable.

There are several commercially available units which use a variety of principles and techniques to continuously monitor the performance of particulate control devices. Other monitors are in the development state, and hopefully will be available in the foreseeable future. This section of the regulation, as now proposed, however, limits the industry to the use of only one approach, that of opacity monitoring. While opacity monitoring is good, it cannot be applied to measurement of wet plumes. Two mills have committed themselves to monitoring approaches other than opacity prior to the writing of this regulation, and have expended considerable effort in the development of systems which have been demonstrated as workable. The industry, therefore, suggests that the second sentence in Section 25-180 (3) be changed to read as follows: "Each mill shall monitor the performance of the particulate control device on the recovery furnace to document consistency of performance in a manner approved in writing by the Department." The appropriate changes should also be made in Section 25-185 "Reporting."

We understand that visual observations of opacity will be made by the regulatory agency of pulp mill operations. It is our further understanding that high apparent visual opacity measurements will "trigger" the on-site inspection of the in-stack monitor. If the correlation between the in-stack monitor and particulate discharge level shows compliance with existing grain loading limits, no violation will be issued.

25-190 UPSET CONDITIONS Items (2)(3) Reporting

Reporting of mill "upset conditions" should be more clearly defined. "Upset conditions" are understood by the Oregon mills to be those changes in normal mill operation which create a reasonable expectation that emission limits will be exceeded. Reporting of any other operation changes would create a burdensome and unnecessary work load on both the pulp mill and regulatory agency.

25-200 SPECIAL STUDIES

The section on "Special Studies" was added by the Oregon DEQ with little or no time allowed for discussion of its costs or impacts on the industry. After several months of meetings and discussions about the proposed revisions to the Air Regulations, this section was presented to the industry one week before the last meeting with the Department. The proposed studies, as worded, are strongly opposed by the Oregon pulp mills. First, the DEQ has at no time provided their rationale or justification for including the "special studies." Second, the suggested "studies" are vaguely worded, ambiguous and do not specify a goal or objective. Third, acceptance of the "special studies" by the kraft industry would mean commitment to an undefined scope of work, with undefined costs and unspecified participation, all at the Department's discretion at a future date. The NWPPA or its Oregon Air Committee cannot in good conscience commit the Oregon mills to undefined financial obligations. Fourth, it is the Air Committee's opinion that "special studies" of this type are inappropriate for inclusion within the Oregon Administrative Rules. Finally, many other studies and agencies are addressing the issue of small particulate characterization. This type of work for the kraft industry can best be done, and is being done, on a national level. The costs, scope of work and uses of the proposed "special studies" are redundant and an unnecessary burden on the state industry.

We would like to thank the Environmental Quality Commission for their interest and evaluation of our comments. By and large, we have had and hope to continue to have a productive and affirmative relationship with the Oregon Department of Environmental Quality. Most of the proposed revisions to the Oregon Administrative Rules we heartily endorse and can only hope that the few problems we have identified can be corrected during this final review. If we can provide any additional information or assistance, please don't hesitate to ask.

LEB:vt

Section 25-180 (3)

Toledo operates three recovery furnaces and three lime kilns which are all exhausted into a common 300-foot stack in order to obtain maximum atmospheric dispersion of the emissions. Emission control systems on these sources consist of an electrostatic precipitator followed by a scrubber for each recovery furnace and a scrubber for each lime kiln. Exit gasses from each of the scrubbers on both the recovery furnaces and lime kilns are saturated with water which precludes measurement of stock opacity directly.

The mill uses sodium ion monitors developed at Toledo in 1968 to continuously monitor particulate emissions from each recovery furnace and from the main stack. Work by the National Council for Air and Stream Improvement has shown that opacity can be directly correlated with particulate grain loading or mass emission rate on a dry stack from a single recovery furnace. This work was done primarily to demonstrate the feasibility of using an in-stack optical transmissometer to obtain continuous mass emission rates. The work indicates that it might be possible to correlate readings from a sodium ion monitor with observer opacity if a single source were in question. Given Toledo's case, however, with a long persistent wet plume, and the fact that there are six sources going into a common stack, correlation with observer opacity v. readings on the sodium ion monitors would be meaningless.

Although Toledo could not comply with the proposed regulation, a more fundamental question exists regarding the need for both a continuous opacity measurement and a continuous mass emission measurement from the same source. Visual observations initially in Ringleman numbers, and later in opacity have been used for many years to check on performance of emission control equipment by regulatory agencies. The visual appearance of the stack was used because no other method of continuously determining the mass emission rate of particulates from a stack were available. The kraft industry is unique in that not one but several methods of satisfactory continuous monitoring of particulate emissions from a kraft recovery furnace are available. In the case of a dry stack, the most commonly used method is an optical transmissometer which takes continuous readings of the light transmission across the stack which can be converted directly into opacity or can be calibrated to read out in particulate mass emission rate. In the case of an optical transmissometer, a single instrument can be used to measure both mass emission rate and opacity. The variable of primary concern is mass emission rate. This is a direct measure of how much material is entering the abmient air and how well control equipment is performing. Opacity is only an indicator of the mass emission rate and is of value only when a direct measurement of mass emission rate is not available. In the case of kraft recovery furnaces, this measurement is available and measuring and reporting opacity is redundant. On any type of continuous monitoring instrument, the concentration of particulates emitted at any time is recorded and is available for inspection by regulatory agencies

any time they so desire and will be reported on a monthly basis. If agency personnel still desire a tool that can be used in monitoring a kraft recovery furnace's performance by simply driving by the stack, it is still possible to visually observe the stack and if it appears that the emissions are inordinately high, to go into the mill and simply look at the records of the mass emission rate as recorded on the continuous monitors. We strongly suggest that the requirement for continuous opacity monitoring, in addition to continuous particulate monitoring, be dropped from the standards.

ENVIRONMENTAL QUALITY COMMISSION

1234 S.W. MORRISON STREET • PORTLAND, ORE. 97205 • Telephone (503) 229-5696

ROBERT W. STRAUB
GOVERNOR

MEMORANDUM

TO: Environmental Quality Commission

FROM: Director

SUBJECT: Agenda Item K, May 27, 1977, EQC Meeting

Staff Report - Consideration of Adoption of Revisions to OAR Chapter 340, Sections 35-015 through 35-035 Pertaining to Motor Vehicle Noise Standards, Noise Control Regulations for Industry and Commerce and Motor Vehicle Procedure Manual NPCS-21

Background

Oregon Revised Statute Chapter 467 directs the Environmental Quality Commission to establish maximum permissible levels of noise emission. In 1974 the Commission adopted noise rules and associated procedure manuals for (a) new motor vehicles, (b) in-use motor vehicles and (c) industrial and commercial noise sources. Three associated procedure manuals were also approved.

The Department has been implementing these standards for approximately two years and has found that several provisions in the industrial and commercial rules are inadequately drafted and in need of clarifying amendments. These needed changes are primarily organizational, although the effect of several sections is slightly altered so as to more adequately reflect the purpose for which they were originally intended and drafted.

Staff has developed a near field test procedure for motorcycles similar to that recently adopted for automobiles. Thus, amendments were proposed in the in-use road vehicle table of standards and in the off-road table to include this new test procedure and corresponding standards. This amendment necessitated the segregation of off-road vehicles into separate classes. Instead of one standard for all classes of off-road vehicles staff recommends individual standards for each class. These standards reflect the allowable noise level that the vehicle class met when originally sold.

At the Environmental Quality Commission meeting on February 25, 1977, the Commission authorized the Department to hold a public hearing, before a hearings officer, to consider proposed Department initiated amendments to these rules and corresponding procedure manuals.

On March 23, 1977 a public hearing was held at the Multnomah County Courthouse to receive testimony on the proposed amendments. Testimony was offered by representatives of the motorcycle and snowmobile industries, the Oregon Marine Board and the Bonneville Power Administration.

Few of BPA's comments pertained to matters referenced in the hearings notice as being under consideration at this time. They instead dealt primarily with the regulations in their "totality." An informal meeting will be scheduled with BPA to give the Department an opportunity to outline for BPA the basis of our regulations, and present some of the input received from other utility companies prior to rule adoption in 1974. Discussion before the Commission of these matters would be premature at this time.

Evaluation of Hearing Testimony

The proposed rule amendments are grouped and discussed under three headings, housekeeping amendments to the industrial/commercial noise source rules, amendments to the in-use motor vehicle rules, and amendments to the procedure manual (NPCS-21) for measuring motor vehicle noise.

1. Staff "housekeeping" recommendations to the Noise Control Regulations for Industry and Commerce (OAR 340-35-035) and associated Definitions (OAR 340-35-015)

   a. BPA pointed out an apparent inconsistency concerning measurement points used when a source is located inside a Quiet Area, as opposed to when it is located outside, but near a Quiet Area. The amendment was worded in such a way that it appeared a more stringent standard might be imposed on a source located outside but within 400 feet of a Quiet Area boundary, than would be required for a source inside the boundaries.

      We have corrected this problem with new amendments indicating that sources outside the Quiet Area may encroach on the area to the extent that 400 feet from the source falls within the area. This then provides the same standard as that required of sources located within the quiet area.

b. BPA pointed out that the meaning of six total minutes in a one hour period was unclear in the octave and one-third band rules in subsections (1)(f)(A) and (1)(f)(B).

Staff amendments were proposed to satisfy the need for a statistical descriptor in these rules. Policy has been to use the L_{50} or median noise level in each band for sources in which the sound level varied.

The six minute or more limitation was originally drafted to ensure that the source would be operating some reasonable length of time. This time limitation has had no effect on the rule as it has been only used on sources that operate in a continuous manner. It should also be noted that this rule is only used after the Director establishes that the rules using the A-weighting scale are not effective for the particular source. Thus, this rule is only used under unusual circumstances and the Director's decision to impose the rule would also be based upon the length of time the specific source operates.

Staff therefore recommends the deletion of reference to six minutes or more per hour in both the octave band and one-third octave band rules. Thus, the required sound level to be measured for these rules is the 50 percentile or median during the measurement period.

The word "median" was inadvertently omitted in subsection (1)(f)(B), the one-third octave band rule, and has now been reinserted.

c. Finally, BPA found that the term "appropriate measurement point" used in subsection (1) was not clear. They also suggested the explanation of this term should be moved to the definition section. Presently, the procedure to determine the appropriate measurement point for subsection (1) is found within subsection (3), "Measurement", of the rule.

Staff does not believe this term should be moved to the definition section as it may add confusion to other noise rules and the term is only appropriate for subsection (1) of section 35-035.

Staff has recommended amendments to subsections (1)(a), (1)(b)(A), (1)(b)(B)(i), (1)(e), (1)(f)(A) and (1)(f)(B) that provide a reference to subsection (3), thus giving guidance to the reader on where to find the procedures to determine the "appropriate measurement point."

d. No comments were received on the following amendments:

i. Addition of metric units to the English units of weights and measures.

ii. Correction of various typographical errors.

iii. Limiting the exemptions for railroad and aircraft noise under subsection (5)(d) and (5)(j) only to the extent that these sources are preempted by Federal law.

iv. Amendment of language in several sections so that potential contradictions due to inconsistent choices of words do not confuse intended meanings.

v. Amending definition (13) "Industrial or Commercial Noise Levels" by moving the exemption for "construction and maintenance noise" to the "Exemption" subsection (5)(h).

vi. Adding definition (25) "Previously Unused Industrial or Commercial Site" required to clarify the rule for new sources under subsection (1)(b).

vii. Amending definition (28) "Quiet Area" in order to add clarification that "quiet areas" are to be recommended to the Department by the public and the Department would in turn make recommendations as to their approval to the Commission.

e. Legal counsel suggested miscellaneous minor word changes and the deletion of the reference to the evaluation of Table G under subsection (1)(a). Recommendations will be made to the Commission at the May 1977 meeting to comply with this requirement.

2. Staff recommended Amendments to the In-Use Motor Vehicle Regulations (OAR 340-35-030)

a. Staff recommended to replace the present 25 foot stationary test for motorcycles, found in Table B, with a 20 inch near-field test similar to that recently adopted for automobiles.

Testimony from the motorcycle industry supported this procedure for testing motorcycles. One manufacturer representative suggested the standards should be increased by one dBA and another stated "We do not know the specific sound levels which should be chosen" and "The levels proposed by DEQ are within 2 to 4 decibels of the levels we feel are appropriate." We therefore believe the proposed standards are acceptable to be approved, as one manufacturer thought we were within 1 dBA of his recommendation and the other did not have a specific recommendation.

b. The second amendment proposed would include the near field, 20 inch, motorcycle test in Table D for Off-Road Recreational Vehicles. All off-road vehicle classes are contained in Table D. This includes motorcycles, snowmobiles, dune buggies and watercraft. The present standards lump all of these classes into one category, and set a maximum noise limit based on the loudest source, the motorcycle.

Staff recommendations are to segregate Table D into the different vehicle classes. The allowable noise level for each class would then be based on the standards the vehicle met when manufactured, plus a two dBA deterioration factor.

Testimony from the motorcycle representatives supported staff recommendations.

Testimony from snowmobile interests stated that a stationary test procedure was not possible on snowmobiles as they contain a centrifugal clutch which would preclude tests at high engine speeds while stationary. These interests also stated the proposed amendments set more stringent standards

for snowmobiles than previously required. This is true, but the proposed standards now reflect the new vehicle standards for snowmobiles in Table A rather than motorcycle standards. The snowmobile interests stated, after an explanation of how the standard was calculated, that they were not opposed to in-use standards based upon the standard the vehicle met when sold. Testimony also stated that older snowmobiles built in the late 1960's could be as loud as 102 dBA. They believed, therefore, that a restrictive standard for these older, noisier, snowmobiles was not appropriate. The Department's philosophy has been that all motor vehicles must meet some minimum standard no matter how noisy the vehicle was when originally sold.

In 1971 most manufacturers built snowmobiles to meet 82 dBA. Prior to 1971, the average non-racing snowmobile produced approximately 86 dBA. However, poorly muffled machines generally ranged from 90 to 95 dBA with racing machines as high as 105 to 110 dBA.

Recognizing the problems with the proposed stationary test for snowmobiles, we propose to amend Table D to include only a 50 foot moving test for snowmobiles as recommended in the testimony. The minimum standard for all snowmobiles of model year 1971 and prior is set at 86 dBA. This level was established by evaluating data gathered from typical snowmobiles being operated in Oregon and an evaluation of information staff has researched. We believe that older, well maintained, snowmobiles will conform to this proposed minimum standard. The 1972 model snowmobiles were manufactured to meet 82 dBA and the first Oregon standard was effective for 1975 models at 82 dBA. We propose that those models built to meet 82 dBA should be allowed to deteriorate no more than 2 dBA. Thus, an in-use standard of 84 dBA is recommended for 1972 through 1975 models. Subsequent models are regulated at the time of sale by Oregon rules in Table A. Thus the proposed standards are calculated by adding a 2 dBA deterioration factor to the new vehicle standard.

c. Testimony was also received from the Oregon State Marine Board regarding Table D. The Marine Board has an administrative rule limiting maximum boat noise to 84 dBA at 50 feet (OAR 250-10-121). Their testimony suggested we maintain the 50 foot moving test for boats containing underwater exhausts and establish a near field (20 inch) stationary test for those that exhaust into the atmosphere. Their testimony states "the underwater exhausts are commonly found in propeller driven outboards, most inboard boats and all inboard/outboard craft. Those exhausting to the atmosphere are most inboard jet boats, outboard converted jet boats and some high performance inboard propeller driven boats."

We therefore propose to add a separate class of off-road recreational vehicles for watercraft. This proposal references the Marine Board standard of 84 dBA at 50 feet for a moving test and includes the near field 20 inch test for atmosphere exhausted boats.

The proposed standard for the stationary test is derived from the Marine Board standard of 84 dBA at 50 feet and correlated to the near field test distance of 20 inches. Thus, we believe the proposed near field standard for atmosphere exhausted boats is comparable to existing standards.

Most atmosphere exhausted boats use automotive engines. Therefore, the proposed near field test procedure is identical to that used for other off-road vehicles with mid or rear mounted engines.

d. The "All Others" class under Table D applies to dune buggies or other similar off-road vehicles. These standards are based on the near-field standards for automobiles.

e. Testimony received from the motorcycle industry representative noted that the titles of Table B and C could be amended to reflect the vehicle classes contained within. Staff agrees with this recommendation and has proposed amendments for the titles for Tables B and C.

3. Staff recommendation to amend procedure manual "Motor Vehicle Sound Measurement Procedure Manual NPCS-21.

a. Amendments to Chapter 6 of procedure manual NPCS-21 were proposed to include procedures to test motorcycles at a distance of 20 inches from the end of the exhaust pipe.

Comments regarding this procedure were made by an industry representative. He stated that the specifications for the engine speed tachometer was too stringent and thus it would be difficult to obtain equipment meeting this specification. Staff has investigated this concern and found that most available tachometers comply with our specifications.

The motorcycle industry representative also questioned the requirement under Section 6.5.4 prohibiting the microphone to be closer than eight

inches from the ground. Staff recommends this condition be maintained to eliminate reflective sound waves from the ground surface.

The industry representative noted that the ± 50 rpm tolerances in the procedures would be very difficult to maintain during testing. They recommend the tolerance be amended to ± 100 rpm. Staff agrees with this proposal and has proposed such amendment to Section 6.5.5.

The industry representative also noted that motorcycles with more than one exhaust outlet per side should be measured on the rearmost outlet. Staff agrees with the proposal and such amendment is added to Section 6.5.4.

b. Amendments to Chapter 6 provide for testing of boats and other off-road vehicles using the 20 inch near field test procedures as requested by the Marine Board.

c. Other housekeeping amendments to other chapters of manual NPCS-21 are also being proposed. These include previously approved procedures and incorporation of references to previous rule amendments.

   i. Chapter 2 is amended to include reference to the Federal Department of Transportation measurement procedures for trucks that are preempted by Federal noise rules. The Federal standards were adopted by reference by the Environmental Quality Commission in August 1976.

   ii. Chapter 3 is amended to provide moving tests of all in-use vehicles including road vehicles and off-road vehicles such as snowmobiles, boats and dune buggies. These minor amendments are necessary to ensure that these procedures apply to all vehicle classes.

   iii. Chapter 4 is amended to include approved test procedures for new vehicle classes.

   A vehicle test procedure for motorcycles with automatic transmissions has been approved as a standard method and thus is included in the manual as an amendment.

The test procedure for new trucks is amended to correct the reference from 6,000 pounds to 10,000 pounds which was neglected during rule amendments in August 1976.

The noise reduction benefits of demand actuated fan controls was accepted by the Department during hearings on a petition from Freightliner Corporation to amend the truck standards in 1975. This procedure is amended at this time.

Summary and Conclusions

Proposed amendments to the noise rules for industry and commerce are primarily organizational and clarify the original intent and present interpretation of these rules.

Testimony received on the proposals pointed out further inconsistancies which have now been addressed in these revised proposed amendments.

Proposed amendments to the in-use motor vehicle noise rules include a new 20 inch test for motorcycles similar to that recently adopted for automobiles. This procedure will now allow noise testing of motorcycles in confined areas such as the motor vehicle inspection stations.

Testimony was favorable on this new test, although several procedural concerns were raised and resolved. The amendments to the procedure manual, NPCS-21, have incorporated these suggested revisions.

Other amendments to the in-use motor vehicle rules provided for the segregation of vehicle class types within the broad category of "off-road recreational vehicles" in Table D. Staff proposed amendments set standards for each vehicle class based upon the maximum allowed limit each vehicle class met when originally sold, rather than basing the entire off-road category on the standards for motorcycles. This philosophy is already used in the standards set for on-road in-use vehicles and is also appropriate for off-road vehicles.

Testimony suggested that boats be separated into categories according to type of exhaust outlet system used, and that a 20 inch near field standard be established for those systems that exhaust to the atmosphere. The 50 foot moving standard is identical to that established by the Oregon Marine Board. The near field 20 inch standard was derived from the 50 foot standard and is an equivalent standard.

The Motor Vehicle Sound Measurement Procedure Manual, NPCS-21, is proposed to be amended to include procedures for testing motorcycles at a distance of 20 inches from the end of the exhaust pipe.

Other proposed amendments to the manual add specific references indicating that the appropriate procedure is applicable to boats and other off-road vehicle classes.

Staff also proposes to include amendments to the manual that incorporate standard procedural deviations that have been approved by the Department and are now appropriate for inclusion in the manual.

Director's Recommendation

It is the Director's recommendation that the Commission adopt the following as attached to this report:

1. Amendments to Noise Control Regulations for Industry and Commerce, OAR 340-35-035, and amendments to the Definitions, OAR 340-35-015.

2. Amendments to Noise Control Regulations for In-Use Motor Vehicles, OAR 340-35-030.

3. Amendments to procedure manual NPCS-21, Motor Vehicle Sound Measurement Procedure Manual.

Bill

WILLIAM H. YOUNG
Director

JH:dro
4/11/77
Attachments

DEPARTMENT OF ENVIRONMENTAL QUALITY

PROPOSED AMENDMENT TO CHAPTER 340, OREGON ADMINISTRATIVE RULES

DIVISION 3

AIR POLLUTION CONTROL STANDARDS FOR AIR PURITY AND QUALITY

Subdivision 5

NOISE CONTROL REGULATIONS

Subdivision 5 is hereby proposed to be amended as follows: new material is indicated by brackets; material deleted is lined out.

35-035 NOISE CONTROL REGULATIONS FOR INDUSTRY AND COMMERCE.

(1) ~~Noise Standards~~ [Standards and Regulations]

(a) [Existing Noise Sources]. No person owning or controlling an [existing] industrial or commercial noise source shall cause or permit the operation of that noise source if the statistical noise levels generated by that source and measured at ~~the~~ [an] appropriate measurement point [,specified in subsection (3) (b) of this section,] exceed ~~these~~ [the] levels specified in Table G, except as otherwise provided in these rules.

~~The statistical noise levels defined in Table G shall be evaluated by the Department before January 1, 1977 and recommendations shall be presented to the Commission before July 1, 1977.~~

(b) New Noise Sources.

[(A) New Sources Located on Previously Used Sites.] ~~After January 1, 1975,~~ No person owning or controlling a new industrial or commercial noise source [located on a previously used industrial or commercial site] shall cause or permit the operation of that noise source, if the [statistical] noise levels generated by that new source and measured at ~~the~~ [an] appropriate [measurement] point [, specified in subsection (3) (b) of this section,] exceed the ~~noise~~ levels [specified] in Table H, except as otherwise provided in these rules.

[(B) New Sources Located on Previously Unused Site.]

[(i)] ~~Notwithstanding the allowable levels in Table H~~ No person [owning or controlling a new industrial or commercial noise source located on a previously unused industrial or commercial site] shall cause or permit the operation of ~~a new industrial or commercial~~ [that] noise source ~~on property previously unoccupied by an industrial or commercial noise source~~ if the noise levels generated [or indirectly caused] by that ~~new industrial or commercial~~ noise source increase the ambient statistical noise levels, L_{10} or L_{50}, ~~in any one hour~~ by more than 10 dBA [in any one hour, or exceed the levels specified in Table H], as measured at ~~the~~ [an] appropriate measurement point [, as specified in subsection (3) (b) of this section.]

[(ii)] The ambient statistical noise level of ~~the~~ [a] new [industrial or commercial noise] source [on a previously unused industrial or commercial site] shall include all noises ~~emitted~~ [generated or indirectly caused] by [or attributable to] ~~the industrial or commercial~~ [that] source [including all of its related] ~~and related~~ activities. ~~Exemptions defined in subsection~~ [Sources exempted from the requirements of section 35-035(1), which are identified in subsections] (5)(b), (5)(c), (5)(d), (5)(e), (5)(f), (5)(j), (5)(k) and (5)(l) of this section, ~~will~~ [shall] not be excluded from this ambient measurement.

(c) Modified Noise Sources. After January 1, 1975 and before January 1, 1978, no person owning or controlling an existing industrial or commercial noise source shall modify that noise source so as to violate the following rules:

(A) If prior to modification an industrial or commercial noise source does not exceed the noise levels in Table H, the modified industrial or commercial noise source shall not exceed the noise levels in Table H, except as otherwise provided in these rules.

(B) If prior to modification an existing industrial or commercial noise source exceeds the noise levels in Table H, but does not exceed the noise levels in Table G, then the modification shall not cause an increase in the existing statistical noise levels, except as otherwise provided in these rules.

(d) Quiet Areas. No person [owning or controlling an industrial or commercial noise source located either within the boundaries of a Quiet Area or outside its boundaries] shall cause or permit ~~industrial or commercial noise levels to~~ [the operation of that noise source if the statistical noise levels generated by that source] exceed the ~~statistical noise~~ levels specified in Table I as measured ~~at the boundary of any area designated a~~ Quiet Area [within the Quiet Area and not less than 400 feet (122 meters) from the noise source.]

~~If the noise source lies within the boundaries of a Quiet Area, the levels detailed in Table I shall not be exceeded at 400 feet from the noise source.~~

(e) Impulse Sound. Notwithstanding the noise rules in Tables G through I, no person [owning or controlling an industrial or commercial noise source] shall cause or permit the operation of ~~an industrial or commercial~~ [that] noise source ~~which emits~~ [if] an impulsive sound [is emitted] in air [by that source which exceeds the peak sound pressure levels specified below], as measured at ~~the~~ [an] appropriate measurement point [, as specified in subsection (3) (b) of this section]: ~~which has a peak sound pressure level in exeess of~~ 100 dB during the hours 7 a.m. to 10 p.m. and 80 dB between the hours of 10 p.m. and 7 a.m., ~~except as otherwise provided in these rules.~~

(f) Octave Bands and Audible Discrete Tones. When the Director has reasonable cause to believe that ~~statistical noise levels specified in Tables G, H, or I~~ [the requirements of subsections (1)(a), (1)(b), (1)(c) or (1)(d) of this section] do not adequately protect the health, safety or welfare

of the public as provided for in ORS Chapter 467, the Department may require the noise source to meet the following rules:

(A) [Octave Bands.] No person [owning or controlling an industrial or commercial noise source] shall cause or permit the operation of ~~an industrial or commercial~~ [that] noise source ~~for more than 6 minutes-~~ [if] ~~in any one hour~~ [such operation generates a median octave band sound pressure level which], as measured at ~~the~~ [an] appropriate measurement point, [specified in subsection (3) (b) of this section,] ~~if such operation generates octave band sound pressure levels which exceed those~~ [exceeds applicable levels] specified in Table J.

(B) [One-third Octave Bands.] No person [owning or controlling an industrial or commercial noise source] shall cause or permit the operation of an ~~industrial or commercial~~ [that] noise source ~~for more than 6 minutes~~ [if] ~~in any one hour~~ [such operation generates a median one-third octave band sound pressure level which], as measured at ~~the~~ [an] appropriate measurement point [, specified in subsection (3) (b) of this section,] ~~if such operation generates an audible one-third octave band sound pressure level which when measured~~ [and] in a one-third octave band at ~~the~~ [a] preferred ~~frequencies~~ [frequency,] exceeds the arithmetic average of the median sound pressure levels of the two adjacent one-third octave bands ~~on either side of such~~

~~one-third octave band~~ by:

(i) 5 dB for such one-third octave band with a center frequency from 500 Hertz to 10,000 Hertz, inclusive. Provided: such one-third octave band sound pressure level exceeds the sound pressure level of each adjacent one-third octave band, or;

(ii) 8 dB for such one-third octave band with a center frequency from 160 Hertz to 400 Hertz, inclusive. Provided: such one-third octave band sound pressure level exceeds the sound pressure level of each adjacent one-third octave band, or;

(iii) 15 dB for such one-third octave band with a center frequency from 25 Hertz to 125 Hertz, inclusive. Provided: such one-third octave band sound pressure level exceeds the sound pressure level of each adjacent one-third octave band.

This rule shall not apply to audible discrete tones having a one-third octave band sound pressure [level] 10 [dB] or more dB below the allowable sound pressure levels specified in Table J for the octave band which contains such one-third octave band.

(2) Compliance. Upon written notification from the Director, the owner or controller of an industrial or commercial noise source operating in violation of the adopted rules shall submit a compliance schedule acceptable to the Department. The schedule will set forth the dates, terms, and conditions by which the person responsible for the noise source shall comply with the adopted rules.

(3) Measurement

(a) Sound measurements [procedures] shall conform to ~~test~~ [those] procedures [which are] adopted by the Commission [and set forth] in ~~procedure manual~~

~~entitled Noise Pollution Control Section 1~~ [Sound Measurement Procedures Manual] (NPCS-2[1]), or to [such other] ~~methods~~ [procedures as are] approved in writing by the Department.

(b) [Unless otherwise specified], the appropriate measurement point ~~used~~ shall be that point on the noise sensitive property, ~~(A) or (B) whichever~~ [described below], which is further from the noise source:

(A) 25 feet [7.6 meters)] toward the noise source from that point on the noise sensitive building nearest the noise source,

(B) ~~At~~ That point on the noise sensitive property line nearest the noise source.

(4) Monitoring and Reporting

(a) Upon written notification from the Department, persons owning or controlling an industrial or commercial noise source shall monitor and record the statistical noise levels and operating times of equipment, facilities, operations, and activities, and shall submit such data to the Department in the form and on the schedule requested by the Department. [Procedures for] such measurements shall conform to ~~the test~~ [those] procedures [which are] adopted by the Commission [and set forth] in ~~Noise Pollution Control Section 1~~ [Sound Measurement Procedures Manual] (NPCS-2[1]).

(b) Nothing in this section shall preclude the Department from conducting separate or additional noise tests and measurements. Therefore, when requested by the Department, the owner or operator of an industrial or commercial noise source shall provide the following:

(A) access to the site,

(B) reasonable facilities, where available, including but not limited to electric power and ladders adequate to perform the testing,

(C) cooperation in the reasonable operation, manipulation, or shutdown of various equipment or operations as needed to ascertain the source of sound and measure its emission.

(5) Exemptions: [Except as otherwise provided in subsection (1)(b)(B)(ii)] the rules in section 35-035 (1) shall not apply to:

(a) Emergency equipment not operated on a regular or scheduled basis.

(b) Warning devices not operating continuously for more than 5 minutes.

(c) Sounds created by the tires or motor used to propel any road vehicle complying with the noise standards for road vehicles.

(d) ~~Sounds created by railroad trains. This exception applies only when such railroad train is either in motion or idling during loading, unloading, coupling, uncoupling, refueling, or other similar operations, provided that the total idling time for such operations does not exceed 60 minutes.~~ [Sounds resulting from the operation of any equipment or facility of a surface carrier engaged in interstate commerce by railroad only to the extent that such equipment or facility is regulated by pre-emptive federal regulations as set forth in Part 201 of Title 40 of the Code of Federal Regulations, promulgated pursuant to section 17 of the Noise Control Act of 1972, 86 Stat. 1248, Pub.L. 92-576; but this exemption does not apply to any standard, control, license, regulation, or restriction necessitated by special local conditions which is approved by the Administrator of the EPA after consultation with the Secretary of Transportation pursuant to procedures set forth in section 17 (c)(2) of the Act.]

(e) Sounds created by bells, chimes, or carillons.

(f) Sounds not electronically amplified [which are] created by [or generated at] sporting, amusement, and entertainment events, except [those sounds which] as ~~controlled~~ [are regulated] under other noise standards. [An event is a noteworthy happening and does not include informal, frequent or ongoing activities such as, but not limited to, those which normally occur at bowling alleys or amusement parks operating in one location for a significant period of time.]

(g) Sounds that originate on construction sites.

(h) Sounds created in ~~repairing or replacing the~~ [construction or maintenance of] capital equipment ~~of a public utility distribution system~~.

(i) Sounds created by lawn care maintenance and snow removal equipment.

(j) Sounds ~~that originate at airports that are directly related to aircraft flight operations (i.e., taxiing, landing takeoff and flight)~~ [generated by the operation of aircraft and subject to preemptive federal regulation.] This exception does not apply to aircraft engine testing, ~~or any other~~ activity conducted at the airport that is not directly related to flight operations, [and any other activity not preemptively regulated by the federal government.]

(k) Sounds created by the operation of road vehicle auxiliary equipment complying with the noise rules for such equipment.

(l) Sounds created by agricultural activities, other than silviculture.

(6) Exceptions: - Upon written request from the owner or controller of ~~the~~ [an] industrial or commercial noise source, the Department may authorize exceptions to ~~the rules~~ [section 35-035(1)], pursuant to section ~~35-035(1)~~ [35-010], for:

(a) Unusual and/or infrequent events.

(b) Industrial or commercial facilities previously established in areas of new development of noise sensitive property.

(c) Those industrial or commercial noise sources whose statistical noise levels at the appropriate measurement point are exceeded by any noise source external to the industrial or commercial noise source in question.

(d) Noise sensitive property owned or controlled by the person who controls or owns the noise source or noise sensitive property located on land zoned exclusively for industrial or commercial use.

35-015 Definitions. As used in this subdivision:

(1) "Ambient Noise" means the all-encompassing noise associated with a given environment, being usually a composite of sounds from many sources near and far.

(2) "Any one hour" means any period of 60 consecutive minutes during the 24-hour day.

(3) "Commission" means the Environmental Quality Commission.

(4) "Construction" shall mean building or demolition work and shall include all activities thereto such as clearing of land, earthmoving, and landscaping, but shall not include the production of construction materials.

(5) "Department" means the Department of Environmental Quality.

(6) "Director" means the Director of the Department.

(7) "Emergency Equipment" means noise emitting devices required to avoid or reduce the severity of accidents. Such equipment includes, but is not limited to, safety valves and other pressure relief devices.

(8) "Existing Industrial or Commercial Noise Source" means any Industrial or Commercial Noise Source ~~in operation on or before~~ [for which installation or construction was commenced prior to] January 1, 1975.

(9) "Farm Tractor" means any Motor Vehicle designed primarily for use in agricultural operations for drawing or operating plows, mowing machines, or other implements of husbandry.

(10) "Impulse Sound" means either a single pressure peak or a single burst (multiple pressure peaks) for a duration of less than one second as measured on a peak unweighted sound pressure measuring instrument.

(11) "In-Use Motor Vehicle" means any Motor Vehicle which is not a New Motor Vehicle.

(12) "Industrial or Commercial Noise Source" means that source of noise which generates Industrial or Commercial Noise Levels.

(13) "Industrial or Commercial Noise Levels" means those noises generated by a combination of equipment, facilities, operations, or activities employed in the production, storage, handling, sale, purchase, exchange, or maintenance of a product, commodity, or service and those noise levels generated in the storage or disposal of waste products. ~~Noise levels generated in the construction or maintenance of capital equipment~~ *are not included in this definition.*

(14) "Motorcycle" means any Motor Vehicle, except Farm Tractors, designed to travel on not more than three wheels which are in contact with the ground.

(15) "Motor Vehicle" means any vehicle which is, or is designed to be self-propelled or is designed or used for transporting persons or property. This definition excludes airplanes, but includes water craft.

(16) "New Industrial or Commercial Noise Source" means any Industrial or Commercial Noise Source for which installation or construction was commenced after January 1, 1975 on a site not previously occupied by the industrial or commercial noise source in question.

(17) "New Motor Vehicle" means a Motor Vehicle whose equitable or legal title has never been transferred to a Person who in good faith purchases the New Motor Vehicle for purposes other than resale. The model year of such vehicle shall be the year so specified by the manufacturer, or if not so specified, the calendar year in which the new motor vehicle was manufactured.

(18) "Noise Level" means weighted Sound Pressure Level measured by use of a metering characteristic with an "A" frequency weighting network and reported as dBA.

(19) Noise Sensitive Property" means real property on [or in] which people normally sleep, ~~attend~~ [or on which exist facilities normally used by people as] schools, churches, ~~and~~ [or] public libraries. Property used in industrial or agricultural activities is not defined to be Noise Sensitive Property unless it meets the above criteria in more than an incidental manner.

(20) "Octave Band Sound Pressure Level" means the sound pressure level for the sound being measured within the specified octave band. The reference pressure is 20 micropascals (20 micronewtons per square meter).

(21) "Off-Road Recreational Vehicle" means any Motor Vehicle, including water craft, used off Public Roads for recreational purposes. When a Road Vehicle is operated off-road the vehicle shall be considered an Off-Road Recreational Vehicle if it is being operated for recreational purposes.

(22) "One-Third Octave Band Sound Pressure Level" means the sound pressure level for the sound being measured within the specified one-third octave band at the Preferred Frequencies. The reference pressure is 20 micropascals (20 micronewtons per square meter).

(23) "Person" means the United States Government and agencies thereof, any state, individual, public or private corporation, political subdivision, governmental agency, municipality, industry, co-partnership, association, firm, trust, estate, or any other legal entity whatever.

(24) Preferred Frequencies" means those mean frequencies in Hertz preferred for acoustical measurements which for this purpose shall consist of the following set of values: 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10,000, 12,500.

[(25)]"Previously Unused Industrial or Commercial Site" means property which has not been used by any industrial or commercial noise source during the 20 years immediately preceding commencement of construction of a new industrial or commercial source on that property. Agricultural activities and silvicultural activities of an incidental nature shall not be considered as industrial or commercial operations for the purposes of this definition.]

~~(25)~~ [(26)] "Propulsion Noise" means that noise created in the propulsion of a Motor Vehicle. This includes, but is not limited to, exhaust system noise, induction system noise, tire noise, cooling system noise, aerodynamic noise and, where appropriate in the test procedure, braking system noise. This does not include noise created by Road Vehicle Auxiliary Equipment such as power take-offs and compressors.

~~(26)~~ [(27)] "Public Roads" means any street, alley, road, highway, freeway, thoroughfare, or section thereof in this state used by the public or dedicated or appropriated to public use.

~~(27)~~ [(28)] "Quiet Area" means any land or facility ~~such as a wilderness area, national park, state park, game reserve, wildlife breeding area, amphitheater, or any other area~~ designated by the Commission as an [appropriate] area where the qualities of serenity, tranquility, and quiet are of extraordinary significance and serve an important public need, [such as, without being limited to, a wilderness area, national park, state park, game reserve, wildlife breeding area or amphitheater.] The Department ~~will~~ [shall] submit ~~recommended~~ areas [areas suggested by the public as Quiet Areas,] to the Commission ~~for designation as Quiet Areas.~~ [, with the Department's recommendation.]

~~(28)~~ [(29)] "Racing Events" means any competition using Motor Vehicles, conducted under a permit issued by the governmental authority having jurisdiction or, if such permit is not required, under the auspices of a recognized sanctioning body. This definition includes, but is not limited to, events on the surface of land and water.

~~(29)~~ [(30)] "Racing Vehicle" means any Motor Vehicle that is designed to be used exclusively in Racing Events.

~~(30)~~ [(31)] "Road Vehicle" means any Motor Vehicle registered for use on Public Roads, including any attached trailing vehicles.

~~(31)~~ [(32)] "Road Vehicle Auxiliary Equipment" means those mechanical devices which are built in or attached to a Road Vehicle and are used primarily for

the handling or storage of products in that Motor Vehicle. This includes, but is not limited to, refrigeration units, compressors, compactors, chippers, power lifts, mixers, pumps, blowers, and other mechanical devices.

~~(32)~~ [(33)] "Sound Pressure Level" (SPL) means 20 times the logarithm to the base 10 of the ratio of the root-mean-square pressure of the sound to the reference pressure. SPL is given in decibels (dB). The reference pressure is 20 micro-pascals (20 micronewtons per square meter).

~~(33)~~ [(34)] "Statistical Noise Level" means the Noise Level which is ~~equal~~ [equalled] or ~~is~~ exceeded a stated percentage of the time. An L_{10} = 65 dBA implies that in any hour of the day 65 dBA can be equalled or exceeded only 10% of the time, or for 6 minutes.

~~(34)~~ [(35)] "Warning Device" means any device which signals an unsafe or potentially dangerous situation.

TABLE A

New Motor Vehicle Standards

Moving Test At 50 Feet (15.2 meters)

Vehicle Type	Effective For	Maximum Noise Level, dBA
Motorcycles	1975 Model	86
	1976 Model	83
	1977-1982 Models	81
	1983-1987 Models	78
	Models after 1987	75
Snowmobiles as defined in ORS 481.048	1975 Model	82
	1976-1978 Models	78
	Models after 1978	75
Truck in excess of 10,000 pounds [(4536 kg)] GVWR	1975 Model	86
	1976-1981 Models or Models manufactured after Jan. 1, 1978 and before Jan. 1, 1982	83
	Models manufactured after Jan. 1, 1982 and before Jan. 1, 1985	80
	Models manufactured after Jan. 1, 1985	(Reserved)
Automobiles, light trucks, and all other road vehicles	1975 Model	83
	1976-1980 Models	80
	Models after 1980	75
Bus as defined under ORS 481.030	1975 Model	86
	1976-1978 Models	83
	Models after 1978	80

TABLE B

In-Use [Road] Vehicle Standards

Stationary Test

Vehicle Type	Model Year	Maximum Noise Level, dBA	Minimum Distance from Vehicle to Measurement Point
Vehicles in excess of 10,000 pounds **[(4536 kg)] GVWR or GCWR engaged in interstate commerce as permitted by Title 40, Code of Federal Regulations,** Part 202, Environmental Protection Agency (Noise Emission Standards-Motor Carriers Engaged in Interstate Commerce)	All	88	50 feet (15.2 meters)
All other trucks in excess of 10,000 pounds **[(4536 kg)] GVWR**	Before 1976	94	25 feet (7.6 meters)
	1976-1981	91	25 feet (7.6 meters)
	after 1981	88	25 feet (7.6 meters)
Motorcycles	~~Before 1976~~	~~94~~	~~25 feet (7.6 meters)~~
	[1975 and Before]	[102]	[20 inches (1/2 meter)]
	~~1976~~	~~91~~	~~25 feet (7.6 meters)~~
	~~1977-1982~~	~~89~~	~~25 feet (7.6 meters)~~
	~~1983-1987~~	~~86~~	~~25 feet (7.6 meters)~~
	~~After 1987~~	~~83~~	~~25 feet (7.6 meters)~~
	[After 1975]	[99]	[20 inches (1/2 meter)]
Front-engine automobiles, light trucks and all other front-engine road vehicles	All	95	20 inches (1/2 meter)
Rear-engine automobiles and light trucks and mid-engine automobiles and light trucks	All	97	20 inches (1/2 meter)
Buses as defined under ORS 481.030	Before 1976	94	25 feet (7.6 meters)
	1976-1978	91	25 feet (7.6 meters)
	After 1978	88	25 feet (7.6 meters)

TABLE C

In-Use [Road] Vehicle Standards

Moving Test At 50 Feet (15.2 meters) or Greater At Vehicle Speed

Vehicle Type	Model Year	Maximum Noise Level, dBA	
		35 mph [(56 kph)] or less	Greater than 35 mph [(56 kph)]
Vehicles in excess of 10,000 pounds [(4536 kg)] GVWR or GCWR engaged in interstate commerce as permitted by Title 40, Code of Federal Regulations, Part 202, Environmental Protection Agency (Noise Emission Standards-Motor Carriers Engaged in Interstate Commerce)	All	86	90
All other trucks in excess of 10,000 pounds [(4536 kg)] GVWR	Before 1976	86	90
	1976-1981	85	87
	After 1981	82	84
Motorcycles	Before 1976	84	88
	1976	81	85
	1977-1982	79	83
	1983-1987	76	80
	After 1987	73	77
Automobiles, light trucks and all other road vehicles	Before 1976	81	85
	1976-1980	78	82
	After 1980	73	77
Buses as defined under ORS 481.030	Before 1976	86	90
	1976-1978	85	87
	After 1978	82	84

TABLE D

Off-Road Recreational Vehicle Standards

Allowable Noise Limits

~~Model Year~~	~~Maximum Noise Level, dBA~~	
	~~Stationary Test~~	~~Moving Test~~
	~~25 Feet (7.6 meters) Or Greater~~	~~50 Feet (15.2 meters) Or Greater~~
~~Before 1976~~	~~94~~	~~88~~
~~1976~~	~~91~~	~~85~~
~~1977-1982~~	~~89~~	~~83~~
~~1983-1987~~	~~86~~	~~80~~
~~After 1987~~	~~83~~	~~77~~

[Vehicle Type]	[Model Year]	[Maximum Noise Level (dBA) and Distance from Vehicle to Measurement Point]	
		[Stationary Test 20 Inches (1/2 Meter)]	[Moving Test at 50 Feet (15.2 Meters)]
[Motorcycles]	[1975 and Before]	[102]	
	[After 1975]	[99]	
[Snowmobiles]	[1971 and Before]		[86]
	[1972-1975]		[84]
	[1976-1978]		[80]
	[After 1978]		[77]
[Boats]			
[Underwater Exhaust]	[All]		[84]
[Atmosphere Exhaust]	[All]	[100]	[84]
[All Others]			
[Front Engine]	[All]	[95]	
[Mid and Rear Engines]	[All]	[97]	

TABLE E

[Ambient Standards for Vehicles Operated Near Noise Sensitive Property]

Allowable Noise Limits

Time	Maximum Noise Level, dBA
7 a.m. - 10 p.m.	60
10 p.m. - 7 a.m.	55

TABLE F

[Auxiliary Equipment Driven by Primary Engine Noise Standards]

Stationary Test At 50 Feet [(15.2 meters)] Or Greater

Model Year	Maximum Noise Level, dBA
Before 1976	88
1976-1978	85
After 1978	82

TABLE G

[Existing Industrial and Commercial Noise Source Standards]

Allowable Statistical Noise Levels in Any One Hour

Pre-1978		Post - 1977	
7 a.m. - 10 p.m.	10 p.m. - 7 a.m.	7 a.m. - 10 p.m.	10 p.m. - 7 a.m.
L_{50} - 60 dBA	L_{50} - 55 dBA	L_{50} - 55 dBA	L_{50} - 50 dBA
L_{10} - 65 dBA	L_{10} - 60 dBA	L_{10} - 60 dBA	L_{10} - 55 dBA
L_1 - 80 dBA	L_1 - 65 dBA	L_1 - 75 dBA	L_1 - 60 dBA

TABLE H

[New Industrial and Commercial Noise Source Standards]

Allowable Statistical Noise Levels in Any One Hour

7 a.m. - 10 p.m.	10 p.m. - 7 a.m.
L_{50} - 55 dBA	L_{50} - 50 dBA
L_{10} - 60 dBA	L_{10} - 55 dBA
L_1 - 75 dBA	L_1 - 60 dBA

TABLE I

[Industrial and Commercial Noise Source Standards for Quiet Areas]

Allowable Statistical Noise Levels in Any One Hour

7 a.m. - 10 p.m.	10 p.m. - 7 a.m.
L_{50} - 50 dBA	L_{50} - 45 dBA
L_{10} - 55 dBA	L_{10} - 50 dBA
L_1 - 60 dBA	L_1 - 55 dBA

TABLE J

[Median Octave Band Standards for Industrial and Commercial Noise Sources]

Allowable Octave Band Sound Pressure Levels

Octave Band Center Frequency, Hz	7 a.m. - 10 p.m.	10 p.m. - 7 a.m.
31.5	68	65
63	65	62
125	61	56
250	55	50
500	52	46
1000	49	43
2000	46	40
4000	43	37
8000	40	34

DEPARTMENT OF ENVIRONMENTAL QUALITY

Proposed Amendments
4/7/77

MOTOR VEHICLE SOUND MEASUREMENT PROCEDURES MANUAL

Procedure Manual NPCS-21 is hereby proposed to be amended as follows: material deleted is lined-out; material to be added is indicated by brackets.

NPCS-21

REVISION RECORD

INSTRUCTIONS FOR USE: All revisions of this manual will be numbered to assure each manual holder that he has received all revisions. The date and initials of the person inserting revisions to the manual should be entered on this revision record opposite the appropriate revision number. If the sequence is broken, copies of the missing revisions may be requested from the Noise Control Section.

Rev. No.	Date Inserted	Initials	
1.	7-8-74	JH	
2.	8-27-76	JH	EQC Amendments
3.			
4.			
5.			
6.			
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FOREWORD

The Motor Vehicle Sound Measurement Procedures Manual has been prepared to specify the equipment to be used and the procedures established in the manual when carefully followed, will ensure that the noise readings obtained are accurate, will support enforcement action, and aid in reducing motor vehicle noise.

The scope of this manual includes sound measurements for new motor vehicles, on-highway motor vehicles and stationary testing of off-highway and on-highway motor vehicles.

The objective of the manual is to establish procedures to implement the objectives of the Environmental Quality Commission. Further, if the practices and procedures herein are adhered to, the result will be a uniform enforcement program which will accomplish the intent of the Legislature and fulfill the Commission's responsibility under ORS Chapter 467.

Office of the Administrator
Air Quality Control Division
Department of Environmental Quality

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LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 Policy

1.1.1 The Department of Environmental Quality, through the Noise Pollution Control Section, shall establish a noise measurement program to implement the laws and regulations applying to motor vehicle noise.

1.1.2 The Noise Pollution Control Section and cooperating enforcement agencies shall be responsible for motor vehicle noise measurement.

1.1.3 This manual contains procedures for the Noise Pollution Control Section, Enforcement Division, and other persons taking motor vehicle sound measurements. Guidance is provided for in the comments.

1.2 Authority

1.2.1 Statutory and administrative law governing authority to the guidance and direction contained in this manual is found in the following sources:

a. Oregon Revised Statutes, Chapter 467, Sections 467.010, 467.020, 467.030, 467.050, 467.990.

b. Oregon Administrative Rules, Chapter 340, Department of Environmental Quality, Air Quality Control Division.

1.3. Instruments and Training

1.3.1 Specific requirements for instruments and personnel are defined under procedure manual, Noise Pollution Control Section - 2, Requirements for Sound Measuring Instruments and Personnel.

1.3.2 Allied departments, divisions or agencies who select sound measuring instruments for measuring noise emissions should secure the assistance of qualified engineers in the field of sound measurement in preparing specifications and making purchases of such instruments.

1.3.3 Personnel making noise measurements shall be carefully trained in the techniques of noise measurements, use of required instruments, instrument calibration and problems which may be encountered when performing such tasks.

CHAPTER 2

STATIONARY MOTOR VEHICLE

Sound Level Measurement At 25 Feet

2.1 Scope. This Chapter establishes procedures for setting up and calibrating sound measuring equipment and conducting tests to determine the sound level output of a stationary vehicle, as measured 25 feet from the vehicle. The near field test procedure at 20 inches (.5 meter) is presented in Chapter 6.

[Motor vehicles in excess of 10,000 pounds GVWR or GCWR engaged in interstate commerce shall conform to measurement procedures and methodologies specified in Compliance with Interstate Motor Carrier Noise Emission Standards of the Federal Highway Administration, Department of Transportation (49 CFR 325).]

2.2 Measurement Sites. Measurement sites shall be free of sound-reflecting objects within fifty feet of the microphone and fifty feet of the vehicle to be tested. (See Figure 2-1)

Comment: A "Sound-reflecting surface" is any object or landscape surface in the immediate vicinity of a measurement site which reflects sufficient sound to require the application of a correction factor to the sound level meter reading. Surfaces which are not sound-reflecting surfaces are:

a. Any surface that measures less than eight feet in length in a direction parallel to the portion of the microphone line on which the microphone is positioned, regardless of height (such as a telephone booth or a tree trunk) or less than one foot in height, regardless of length (such as a curb or guard rail).

b. Any vertical surface, regardless of size (such as a billboard) with the lower edge more than fifteen feet above the roadway.

c. Any uniformly smooth slanting surface with less than a forty-five degree slope above horizontal.

d. Any slanting surface with a forty-five to ninety degree slope above the horizontal where the line at which the slope begins to exceed forty-five degrees is more than fifteen feet above the roadway.

e. Any trees, bushes, shrubs, hedges, grass, or other vegetation.

All other surfaces are considered sound-reflecting surfaces.

2.2.1 Microphone Location. The microphone shall be located twenty-five feet + six inches from the rear or from either side of the vehicle to be tested. The locus of points thus defined is the microphone line. (See Figure 2-1) The microphone shall be located at the point on the microphone line at which the maximum sound level occurs.

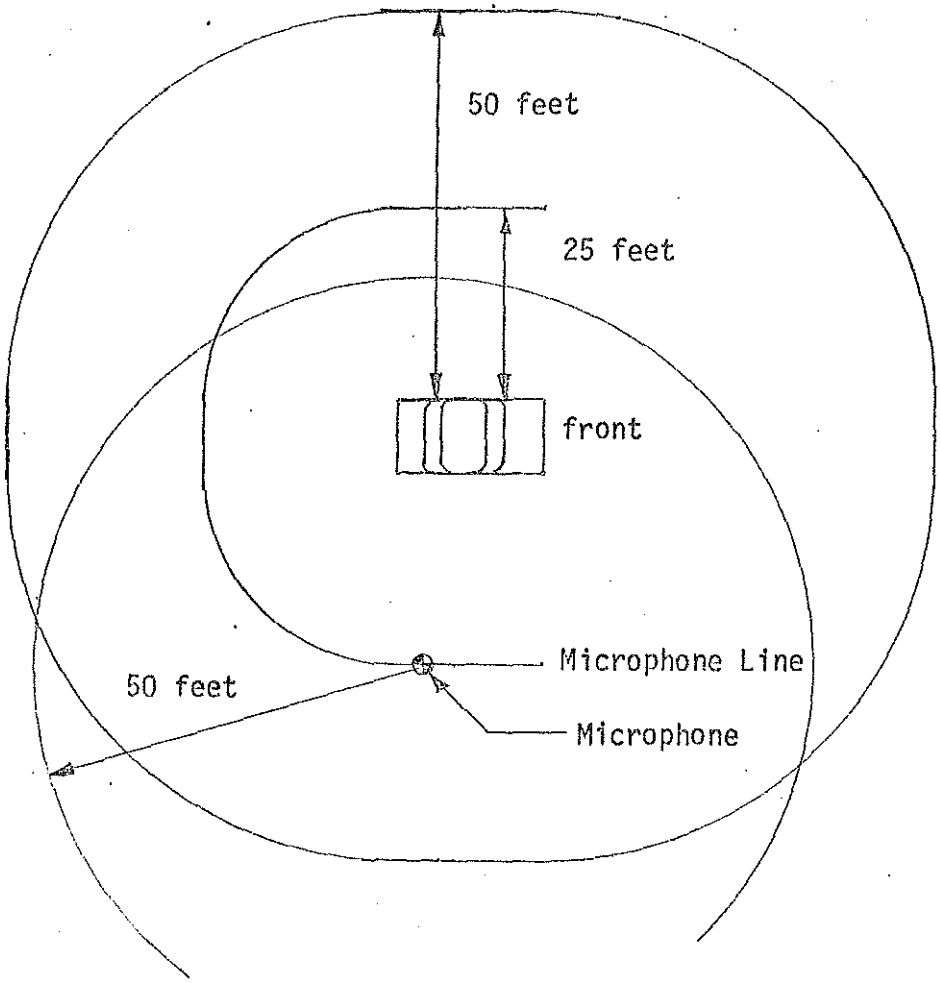


Fig. 2.1 Stationary Measurement Site

2.3 Sound Level Measuring Precaution

2.3.1 Wind. Do not conduct measurements when wind velocity at the test location exceeds ten miles per hour.

2.3.2 Precipitation. Do not conduct measurements when precipitation is falling. However, measurements may be taken when streets are wet.

2.3.3 Ambient Noise. The ambient sound level shall be at least 10 dBA below the sound level of the vehicle being measured.

2.3.4 Recording. The sound level recorded shall be the highest level obtained during each test, disregarding unrelated peaks due to extraneous ambient noises.

2.4 Equipment Setup and Use

2.4.1 General. All types of sound level meters shall be field calibrated immediately prior to use using the procedures described in the factory instruction manual.

2.4.2 Battery Check. Batteries in both the meter and calibrator shall be checked before calibration.

2.4.3 Instrument Calibration. The instrument shall be set to the correct level range, weighting scale and meter response. The calibrator shall be placed on the microphone of the meter. The output indicated on the meter shall then be adjusted to the correct calibration level.

2.4.4 Microphone Height. The sound level meter may be hand held or placed on a tripod. The microphone shall be positioned four and one-half feet above the ground.

2.4.5 Windscreens. Windscreens made of open cell polyurethane foam furnished by the instrument manufacturer shall be placed over the microphone after calibration.

COMMENT The windscreen reduces the effect of wind noise and protects the microphone diaphram from dust or other airborn matter.

2.4.6 Annual Calibration Within one year prior to use, each set of sound measuring instruments, sound level meter including octave band filter, and calibrator, shall receive a laboratory calibration in accordance to the manufacturer's specifications. This calibration shall be traceable to the National Bureau of Standards.

COMMENT An inspection label will be attached to each instrument set to determine when the calibration was performed.

2.5 Sound Level Measurement

2.5.1 Preliminary Steps. The following steps shall be followed before taking a measurement.

(a) Turn meter on

(b) Switch meter to "A" weighting scale

(c) Switch meter to "FAST" response

(d) Set the meter to the appropriate range to measure the anticipated sound level.

2.5.2 Mounting. The sound level meter shall be hand held or placed on a tripod according to the manufacturer's instructions.

2.5.3 Orientation. The orientation of the sound level meter microphone shall be according to the manufacturer's instructions to obtain random incidence.

2.5.4 Variations. Allowances are necessary due to unavoidable variations in measurement sites and test equipment. Vehicles are not considered in violation unless they exceed the regulated limit by 2 dBA or more.

2.6 Vehicle Test Procedure

2.6.1 Vehicle Sound Level. The sound levels for stationary motor vehicles shall be determined by tests performed according to the following procedures.

2.6.2 Location. The microphone shall be located on the microphone line at the position where the maximum sound level is expected to occupy. (see Figure 2-1).

2.6.3 Preliminary Tests. Sufficient preliminary tests shall be made to enable the driver to become thoroughly familiar with the test procedure.

2.6.4 Vehicle Operation. The vehicle shall be stationary, in a neutral gear, at its normal operating temperature.

a. Governed Engines. Engines with speed governors shall be run at low idle with the throttle closed. The throttle shall then be fully opened as fast as possible. As soon as the engine reaches and stabilizes at governed speed, the throttle shall be fully closed as quickly as possible.

b. Non-Governed Engines. Engines without speed governors shall be operated the same as governed engines except that the throttle shall be closed quickly enough to prevent excessive engine speed and possible damage to the engine. Drivers of vehicles supplied with tachometers should use the tachometer to monitor engine speed.

2.6.5 Visual Reading. The highest sound level observed, exclusive of peaks due to unrelated ambient noise, shall be reported for each test.

2.6.6 Reported Sound Level. The reported sound level for the vehicle shall be the highest reading which is no more than one dB higher than the next highest reading.

2.6.7 Stationary Motor Vehicle Test Form. A form to record all pertinent information and data is presented in Figure 2-2. This form, NPCS-24 or any other Department approved form for this use, shall be used for stationary tests.

STATIONARY VEHICLE NOISE TEST	NOISE POLLUTION DIVISION DEPARTMENT OF ENVIRONMENTAL QUALITY	DATE

YEAR	VEHICLE MAKE	VEHICLE TYPE	LICENSE NO.	MODEL

REGISTERED OWNER	ADDRESS

DRIVER	D.L. NO.	ADDRESS

ENGINE TYPE	HP	ENGINE DISPLACEMENT	LOCATION	VEHICLE MILEAGE

EXHAUST OUTLET	CHECK POSITION AND SIZE OF OUTLET	RESONATORS	MUFFLER TYPE	TIRE SIZE	GEAR RATIOS
☐ Single ☐ L. Side ☐ Rear ☐ Dual ☐ R. Side ☐ Vertical	☐ Straight ☐ 45° to rear ☐ 45° to Side ☐ ___ dia	☐ Single ☐ Dual		____x ____	Diff.____:____ Spkt.____:____ (No. of Teeth)

RECORDER MODEL AND DEQ NO.	METER MODEL AND DEQ NO.	CALIBRATOR AND DEQ NO.

TEST DRIVER	TEST ENGINEER	METER CHECK ☐ BAT. ☐ WINDSCREEN ☐ "A" SCALE ☐ FAST ☐ CALIB.

OPERATING CONDITIONS	Time	READINGS dBA	READINGS LOCATION NUMBER	MAX. RPM

TEST CONDITIONS

WEATHER CONDITION	TEMP.	%R.H.	WIND SPEED

Sketch in this space the measurement site peculiarities, and using the proper symbols indicate the direction of wind, vehicle orientation and reading locations.

Key: WIND DIRECTION - - - →
VEHICLE ←→
MICROPHONE LOCATION NO. ⇨

INSTRUMENTATION SET UP AT 25 FT FROM EDGE OF VEHICLE

NPCS-24

Figure 2.2

Stationary Vehicle Noise Test

CHAPTER 3

~~ON-HIGHWAY~~ [IN-USE VEHICLE MOVING] SOUND LEVEL MEASUREMENTS

3.1 Scope. This chapter describes the procedure for selecting sites and setting up equipment for measurement of noise from vehicles on the highway. [, off-road or on water.]

3.2 Measurement Sites.

3.2.1 Types of Sites. Two types are established for measuring vehicles in use on the highway. They are a standard measuring site requiring a large clear open area and a restricted measuring site in which sound-reflecting objects are permitted. When selecting measuring sites, care shall be taken to measure sites carefully and determine if a correction factor must be applied.

3.2.2 Standard Measuring Sites. Standard measuring sites are those where the microphone can be placed 50 feet from the center of the vehicle path and where there are no sound-reflecting objects within 100-foot radius of the microphone and a 100-foot radius of the microphone point (which is the point on the vehicle path that is closest to the microphone). (See Figure 3-1) When making measurements of vehicle sound levels in standard measuring sites, the instrument readings shall be recorded with no correction factor applied.

3.2.3 Restricted Measuring Sites. Restricted measuring sites are those where the distance from the center of the vehicle path to the microphone is other than 50 feet or where there are sound-reflecting surfaces closer than 100 feet from the microphone or the microphone point. Vehicle noise measurements may be made in such areas when the proper correction factors described in this chapter are applied to the recorded sound levels. (See Figure 3-2)

3.2.4 Measuring Distance. The actual distance from the microphone to the microphone point at the center of the vehicle path may range from 35 to 118 feet when the factor obtained from Figure 3-3 is added to the sound level meter readings to correct the reading to what it would be at the standard measuring distance of 50 feet.

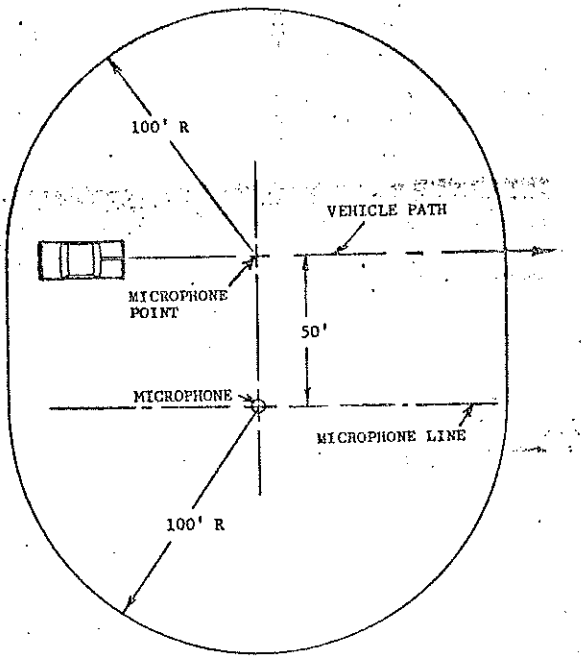


Fig. 3-1. Standard Highway-Measuring Site

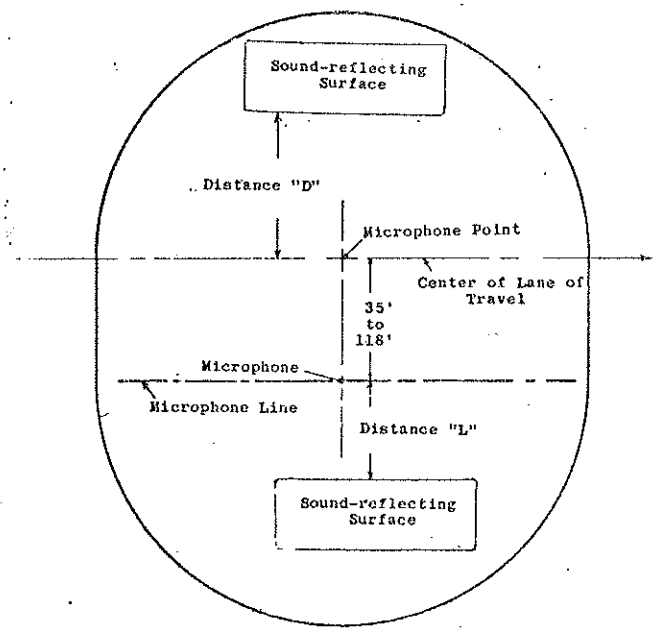


Fig. 3-2. Restricted Highway-Measuring Site

Distance from Microphone to Roadway [Pathway] Centerline	dBA Correction Factor
35 - 39 ft.	-3
39 - 43 ft.	-2
43 - 48 ft.	-1
48 - 58 ft.	0
58 - 70 ft.	+1
70 - 83 ft.	+2
83 - 99 ft.	+3
99 -118 ft.	+4

Fig. 3-3 Measuring Distance Correction Factors

Example: If the distance between the microphone and the roadway [pathway] centerline is 36 feet instead of 50 feet and a vehicle is measured at 90 dBA, the recorded reading will be as follows:

90	dBA	Uncorrected reading
-3	dBA	Correction factor
87	dBA	Corrected reading

3.2.5 Sound-reflecting Surfaces. A "sound-reflecting surface" is any object or landscape surface in the immediate vicinity of a measurement site which reflects sufficient sound to require the application of a correction factor to the sound level meter reading.

a. Correction factors determined from paragraph 3.2.7 may be applied only when sound-reflecting surfaces are basically parallel to the lane of travel.

b. A basically parallel surface may have irregularities or projections of not more than two feet measured perpendicular to the lane of travel, with the distance to the microphone line or vehicle path measured from the closest point of the projection.

3.2.6 Surfaces Not Requiring Correction Factors. Correction factors shall not be applied to the sound level reading when the following surfaces are within the measuring area defined by paragraph 3.2.2:

a. Any surface that measures less than eight feet in length in a direction parallel to the vehicle path, regardless of height (such as telephone booth or tree trunk) or less than one foot in height, regardless of length (such as a curb or guard rail).

b. Any vertical surface, regardless of size (such as billboard) with the lower edge more than fifteen feet above the ~~roadway.~~ [surface.]

c. Any uniformly smooth slanting surface with less than a forty-five degree slope above horizontal.

d. Any slanting surface with a forty-five to ninety degree slope above horizontal where the line at which the slope begins to exceed forty-five degrees is more than fifteen feet above the ~~roadway.~~ [surface.]

e. Any trees, brushes, shrubs, hedges, grass or other vegetation.

3.2.7 Correction Factors for Sound-reflecting Surfaces. Correction factors to be applied to sound level meter readings when there are sound-reflecting surfaces within 100 feet of either the microphone or microphone point are determined as follows:

a. Reflecting Surfaces. Sites where there are sound-reflecting surfaces basically parallel to the vehicle path within the clear area of the standard site may be used by measuring the distances shown in Figure 3.4 and 3.5, and applying the correction factor obtained from the nomogram in Figure 3-6.

b. Smooth Embankments. The point of measurement from smooth embankments shall be the place on the embankment where the slope begins to exceed forty-five degrees above horizontal. (See Figure 3-4) The point of measurement from irregular embankments shall be the place on the embankment where the vegetation, concrete, asphalt, dirt or other relatively smooth cover.

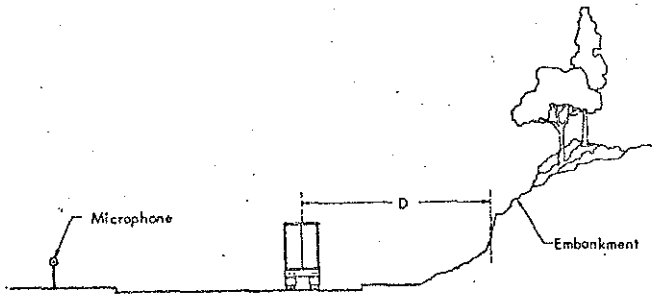


Fig. 3-4. Measurement of Distance to Embankment

c. Taking Measurements. To determine the correction factor for sound-reflecting surfaces within the measuring site, measure the distances shown in Figure 3-5. Measurement "D" is the shortest distance between the sound-reflecting surface and the centerline of the lane of travel. Measurement "L" is the shortest distance between the sound-reflecting surface and a line parallel to the lane of travel that passes through the microphone (microphone line).

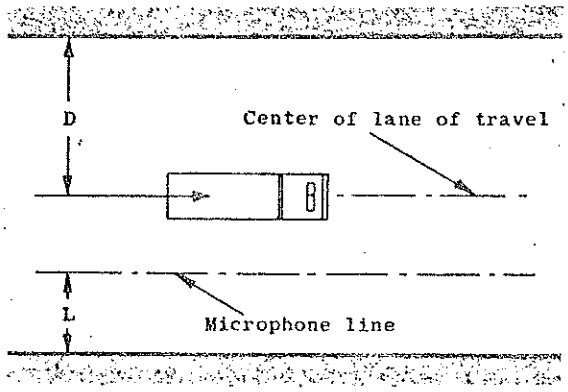
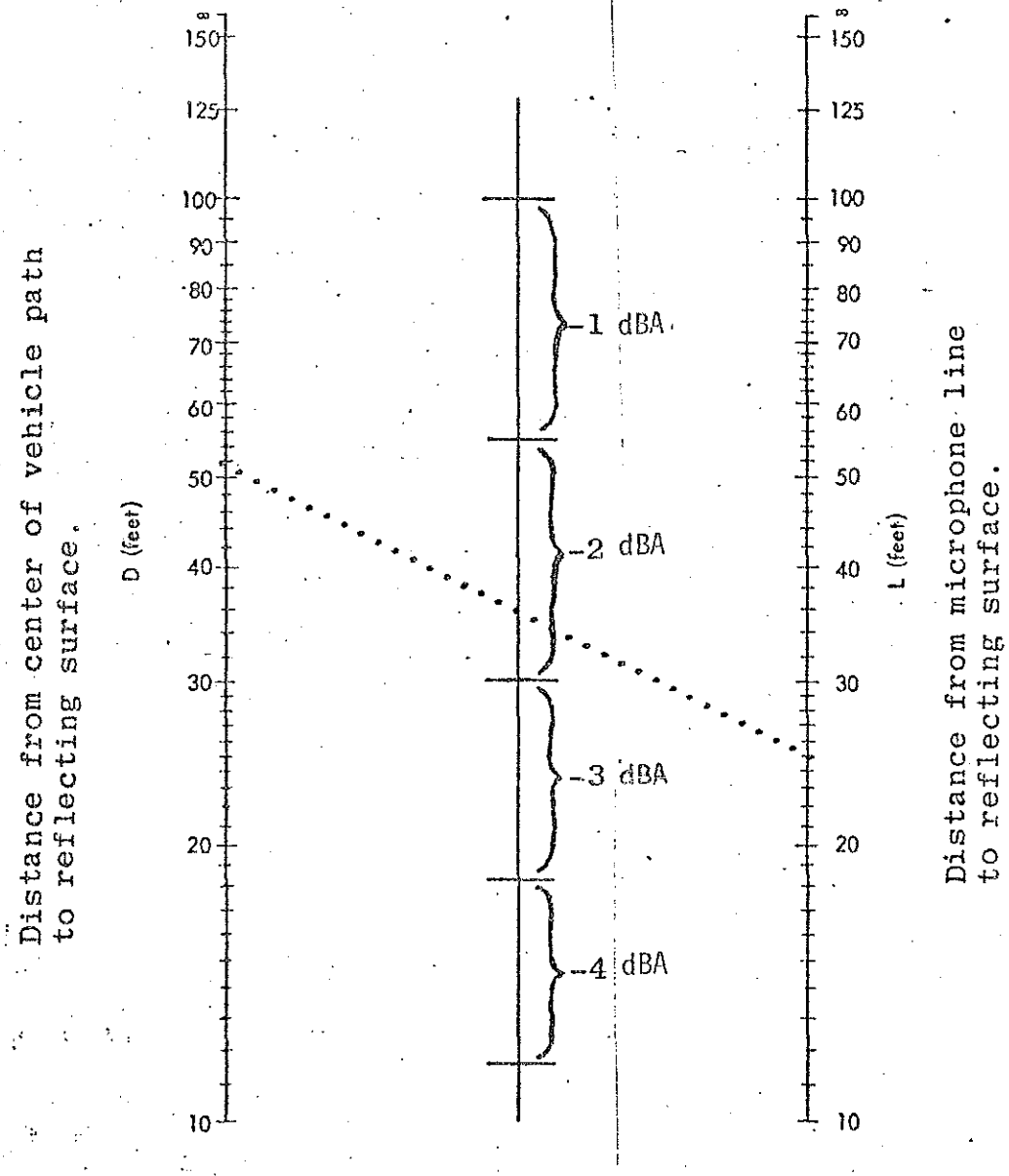


Fig. 3-5 Correction Factor Distances "D" and "L"

d. Determining Correction Factor. Locate the points on the left and right scales of the nomogram (Figure 3-6) corresponding to the distances "D" and "L." Place a straight edge across the nomogram so that it connects the two points. The point where the straight edge intersects the center axis indicates the correction factor to be applied to the sound level meter reading.



On centerline read dBA correction to be subtracted from meter reading.

Fig. 3-6. Nomogram for Reflecting Surfaces

e. Example. The dotted line in Figure 3-6 illustrates the use of the nomogram for a reflecting surface fifty-two feet from the center of the lane of travel (distance "D") and one twenty-five feet from the microphone line (distance "L"). These measurements plotted on the nomogram result in a correction factor of -2 dBA. With the microphone at the standard measuring distance of fifty feet and a vehicle measured at ninety dBA, the corrected reading would be recorded as follows.

90 dBA	Uncorrected reading
-2 dBA	Correction from Figure 2-6
88 dBA	Corrected reading

3.2.8 Combination of Reflecting Surfaces and Non-standard Measuring Distance. Example. If the distance between the microphone and microphone point is seventy-four feet instead of the standard distance of fifty feet and the sound-reflecting surfaces are the same distances as described in the example given above, two corrections are necessary.

90 dBA	Uncorrected reading
-2 dBA	Correction for sound-reflecting surfaces
88 dBA	
+2 dBA	Correction for measuring distance
90 dBA	Corrected reading

3.2.9 Selection of Sites. Selection of sites shall be subject to the following restrictions:

~~a. Roadways. Roadways selected for sound level measuring sites shall be paved with concrete or asphalt.~~

[a. Pathways

i) Road vehicle sites shall be paved with concrete or asphalt

ii) Snowmobile sites shall be covered with snow or live vegetation no more than four inches in height

iii) Boat sites shall be on water with waves less than ± twelve inches

iv) All other sites shall be on hard packed earth or live vegetation of less than four inches in height.]

b. Tunnels and Overpasses. Sound measurements shall not be made within 100 feet of a tunnel or overpass through which the roadway passes.

c. Overhangs. The vehicle path and microphone shall not be within fifty feet of overhangs on buildings which project more than two feet from the wall of the building.

d. Reflecting Surfaces Close to Microphone. Sound reflecting surfaces, other than the ground [or water], shall be no closer than ten feet from the microphone line.

e. Reflecting Surfaces Close to Lane of Travel. Sound reflecting surfaces shall be no closer than ten feet from the center of the lane of travel for a distance of 100 feet parallel to the vehicle path on either side of the microphone point.

f. Non-parallel Reflecting Surfaces. Large reflecting surfaces that are not basically parallel to the lane of travel shall be 100 feet or more from the microphone or microphone point. (See Figure 3-7).

3.3 Sound Level Measuring Precautions

3.3.1 Identification. It is most important that the noise recorded is actually from the vehicle being measured. Care must be taken to ensure that noise from another vehicle does not add to that from the one being measured.

3.3.2 Intensity. The sound level of the vehicle under scrutiny must rise at least 6 dBA before and fall at least 6 dBA after the maximum sound level occurs.

3.3.3 Recording. The sound level recorded shall be the highest level obtained as the vehicle passes by, disregarding unrelated peaks due to extraneous ambient noises.

3.3.4 Wind. Always use the wind screen on the microphone when taking measurements. Do not conduct measurements when wind velocity at the test location exceeds ten miles per hour.

3.3.5 Precipitation. Do not conduct measurements when precipitation is falling ~~or when streets are wet.~~[. Streets shall be dry during road vehicle measurements.]

3.3.6 Ambient Noise. The ambient sound level shall be at least 10 dBA below the sound level of the vehicle being measured.

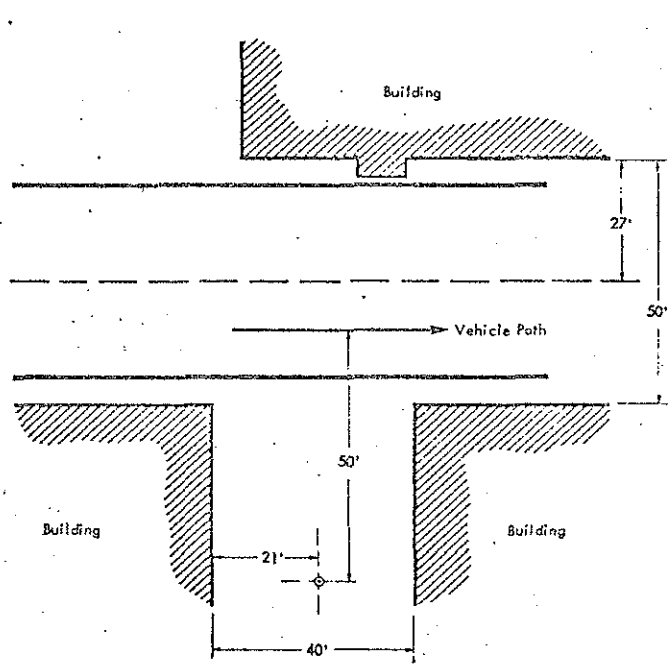


Fig. 3-7. Unacceptable Measuring Site

3.4 Equipment Setup and Use

3.4.1 General. All types of sound level meters shall be field calibrated immediately prior to use using the procedures described in the factory instruction manual.

2.4.2 Battery Check. Batteries in both the meter and calibrator shall be checked before calibration.

3.4.3 Instrument Calibration. The instrument shall be set to the correct level range, weighting scale and meter response. The calibrator shall be placed on the microphone of the meter. The output indicated on the meter shall then be adjusted to the correct calibration level.

3.4.4 Microphone Height. The microphone shall be placed on a tripod if an extension cable is used. If the cable is not used, the sound level meter with the microphone attached may be hand held or placed on a tripod. The microphone shall be positioned at height of 4 ± 1/2 ft as shown in Figure 3.8.

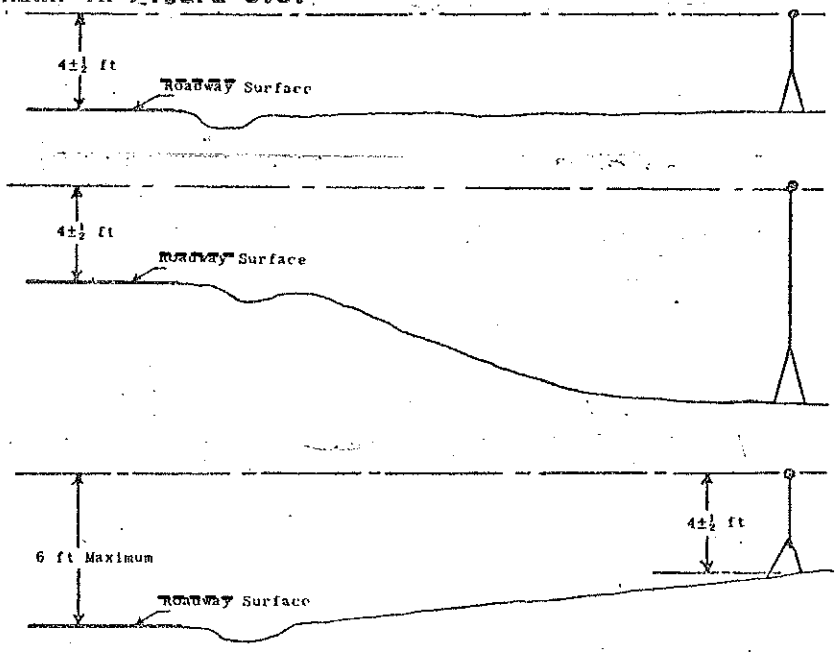


Fig. 3-8. Microphone Height

3.4.5 Windscreens. Windscreens made of open cell polyurethane foam furnished by the instrument manufacturer shall be placed over the microphone after calibration.

COMMENT The windscreen reduces the effect of wind noise and protects the microphone diaphram from dust or other airborn matter.

3.4.6 Annual Calibration. Within one year prior to use, each set of sound measuring instruments, sound level meter including octave band filter, and calibrator, shall receive a laboratory calibration in accordance to the manufacturer's specifications. This calibration shall be traceable to the National Bureau of Standards.

COMMENT An inspection label will be attached to each instrument set to determine when the calibration was performed.

3.5 Sound Level measurement

3.5.1 Preliminary Steps. The following steps shall be followed before taking a measurement.

a) Turn meter on

b) Switch meter to "A" weighting scale

c) Switch meter to "FAST" response

d) Set the meter to the appropriate range to measure the anticipated sound level.

3.5.2 Mounting. The sound level meter shall be hand held or placed on a tripod according to the manufacturer's instructions.

3.5.3 Orientation. The orientation of the sound level meter microphone shall be according to the manufacturer's instructions to obtain random incidence.

3.5.4 Variatons. Allowances are necessary due to unavoidable variations in measurement sites and test equipment. Vehicles are not considered in violation unless they exceed the regulated limit by 2 dBA or more.

3.6 Vehicle Test Procedures

The moving vehicle test can be made after the following steps are accomplished.

a) The test site is selected and correction factors are determined as defined in Section 3.2.

b) The necessary measuring precautions are taken as described in Section 3.3.

c) The test equipment is setup as described in Section 3.4.

A form to record all pertinent information and data is presented in Figure 3-9. This form, NPCS-25, or any other Department approved form for this use shall be used for the moving vehicle noise tests.

MOVING VEHICLE NOISE TEST

NOISE POLLUTION DIVISION
DEPARTMENT OF ENVIRONMENTAL QUALITY

DATE

YEAR	VEHICLE MAKE	VEHICLE TYPE	LICENSE NO.	MODEL

REGISTERED OWNER | ADDRESS

DRIVER | D.L. NO. | ADDRESS

ENGINE TYPE	HP	ENGINE DISPLACEMENT	LOCATION	VEHICLE MILEAGE

EXHAUST OUTLET
☐ Single ☐ L. Side ☐ Rear
☐ Dual ☐ R. Side ☐ Vertical

CHECK POSITION AND SIZE OF OUTLET
☐ Straight ☐ 45° to rear
☐ 45° to side ☐ ___ dia.

RESONATORS
☐ Single
☐ Dual

MUFFLER TYPE	TIRE SIZE	GEAR RATIOS
	____ x ____	Diff. ____ : ____ Spkt. ____ : ____ (No. of Teeth)

RECORDER MODEL AND DEQ NO. | METER MODEL AND DEQ NO. | CALIBRATOR AND DEQ NO.

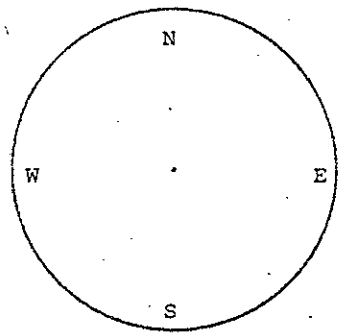
TEST DRIVER | TEST ENGINEER | METER CHECK ☐ BAT. ☐ WINDSCREEN ☐ "A" SCALE ☐ FAST ☐ CALIB.

OPERATING CONDITIONS	TIME	dBA	CORRECTIONS Distance +	CORRECTIONS −	CORRECTIONS Reflect −	Correct dBA	EST. MPH

TEST CONDITIONS

WEATHER CONDITION	TEMP.	%RH	WIND VEL.

Indicate by proper symbols the direction of the wind, vehicle path, and microphone location.



Key:
Wind Direction ——→
Vehicle Path ←——→
Microphone Location ⊃

INSTRUMENTATION SET UP AT 50 FT. FROM CENTERLINE OF TRAVEL.

NPCS-25

Figure 3-9

Moving Motor Vehicle Test

CHAPTER 4

NEW VEHICLE SOUND LEVEL MEASUREMENT

4.1 Scope. This Chapter establishes procedures for setting up and calibrating sound measuring equipment and conducting tests to determine vehicle sound level output.

4.2 Test Area and Personnel

4.2.1 Test Area. The test area shall be a flat open space free of large upright sound-reflecting surfaces, such as parked vehicles, signboards, building, or hillsides, located within 100 feet radius of the microphone and of the following unmarked points on the vehicle path as shown in Figure 4-1.

a. The microphone point, which is the location on the vehicle path closest to the microphone.

b. A point fifty feet before the microphone point.

c. A point fifty feet beyond the microphone point.

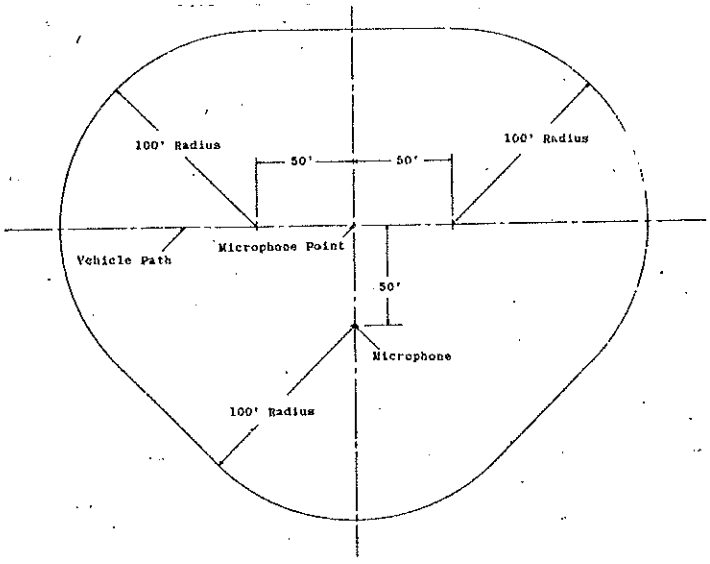


Fig. 4-1. New Vehicle Test Area Layout

4.2.2 Ground Condition. The surface of the ground within the measuring site for road vehicles shall be smooth asphalt or concrete free of snow, soil or ashes in at least the triangular area formed by the microphone location and points on the vehicle path 50 feet before and beyond the microphone point. The ground surface in the above area for snowmobiles shall be live vegetation (grass) no more than four inches in height.

4.2.3 Roadway Surface. The surface of the vehicle path shall be dry, smooth asphalt or concrete pavement free of extraneous material, except that the pathway for snowmobiles shall be covered with live vegetation (grass) no more than four inches in height [or a maximum of 3 inches of loose snow over a base of at least 2 inches of compacted snow.]

4.2.4 Wind. Do not conduct sound measurements when wind velocity at the test area exceeds ten miles per hour.

4.2.5 Personnel Location. Exercise care to prevent interference with sound level measurements caused by personnel in the measuring area.

a. Bystander Location. Bystanders shall remain at least fifty feet from the microphone and the vehicle being measured during sound level measurements.

b. Technician Location. The technician making direct readings from the sound level meter with microphone attached shall stand with the instrument positioned in accordance with the manufacturer's instructions.

4.3 Equipment Setup and Use

4.3.1 General. All types of sound level meters shall be field calibrated immediately prior to use using the procedures described in the factory instruction manual.

4.3.2 Battery Check. Batteries in both the meter and calibrator shall be checked before calibration.

4.3.3 Instrument Calibration. The instrument shall be set to the correct level range, weighting scale, and meter response. The calibrator shall be placed on the microphone of the meter. The output indicated on the meter shall then be adjusted to the correct calibration level.

4.3.4 Microphone Location. Attach the microphone or sound level meter to the tripod, extending the tripod legs so that the microphone, when aimed at the microphone point, will be at a height of 4 $\pm$ ½ ft. above the plane of the roadway surface. Postion the tripod so the microphone is at a distance of 50 $\pm$ 1 ft. from the center of the lane of travel.

COMMENT Connect extension cable between the instruments. Secure the cable to the foot of the tripod leg nearest the recorder location. This will help prevent the tripod from being pulled over by an accidental tug on the cable.

4.3.5 Windscreens. Windscreens made of open cell polyurethane foam furnished by the instrument manufacturer shall be placed over the microphone after calibration.

COMMENT The windscreen reduces the effect of wind noise and protects the microphone diaphram from dust or other airborn matter.

4.3.6 Annual Calibration. Within one year prior to use, each set of sound measuring instruments, sound level meter including octave band filter, and calibrator, shall receive a laboratory calibration in accordance to the manufacturer's specifications. This calibration shall be traceable to the National Bureau of Standards.

COMMENT An inspection label will be attached to each instrument set to determine when the calibration was performed.

4.4 Sound Level Measurement

4.4.1 Preliminary Steps. The following steps shall be followed before taking a measurement.

a) Turn meter on

b) Switch meter to "A" weighting scale

c) Switch meter to "FAST" response

d) Set the meter to the appropriate range to measure the anticipated sound level.

4.4.2 Mounting. The sound level meter shall be placed on a tripod according to the manufacturer's instructions.

4.4.3 Orientation. The orientation of the sound level meter microphone shall be according to the manufacturer's instructions to obtain random incidence.

4.4.4 Variations. Allowances are necessary due to unavoidable variations in measurement sites and test equipment. Vehicles are not considered in violation unless they exceed the regulated limit by 2 dBA or more.

4.4.5 Weather Measurement. Record wind velicty and direction with a wind gauge and temperature and relative humidity with a sling psychrometer or other Department approved instruments.

4.4.6 Data Recording. Record all required vehicle data, type of test equipment, and weather information on the New Vehicle Test Form, (NPCS-26), as shown in Figure 4-2 or any other form approved in writing by the Department.

NEW VEHICLE NOISE TEST

DEPARTMENT OF ENVIRONMENTAL QUALITY

DATE

YEAR	VEHICLE MAKE	VEHICLE TYPE	LICENSE NO.	MODEL

REGISTERED OWNER	ADDRESS

DRIVER	D.L. NO.	ADDRESS

ENGINE TYPE	HP	ENGINE DISPLACEMENT	LOCATION	VEHICLE MILEAGE

EXHAUST OUTLET	CHECK POSITION AND SIZE OF OUTLET	RESONATORS	MUFFLER TYPE	TIRE SIZE	GEAR RATIOS
☐ Single ☐ L. Side ☐ Rear ☐ Dual ☐ R. Side ☐ Vertical	☐ Straight ☐ 45° to rear ☐ 45° to side ☐ ___ dia.	☐ Single ☐ Dual		____x ____	Diff.___:___ Spkt.___:___ (No. of Teeth)

RECORDER MODEL AND DEQ NO.	METER MODEL AND DEQ NO.	VEHICLE SUPPLIED BY	CALIBRATOR AND DEQ NO.

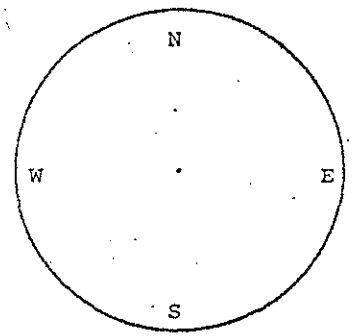
TEST DRIVER	TEST ENGINEER	METER CHECK
		☐ BAT. ☐ WINDSCREEN ☐ "A" SCALE ☐ FAST ☐ CALIB.

OPERATING CONDITIONS	TIME		dBA READINGS L.S.	dBA READINGS R.S.	MAXIMUM RPM	MAXIMUM MPH	

TEST CONDITIONS

WEATHER CONDITION	TEMP.	%RH	WIND VEL.

Indicate by proper symbols the direction of the wind, vehicle path, and microphone location.



Key:
Wind Direction
Vehicle Path
Microphone Location

INSTRUMENTATION SET UP AT 50 FT. FROM CENTERLINE OF TRAVEL.

NPCS-26

Figure 4-2
New Vehicle Test

4.5 New Vehicle Test Procedure

4.5.1 Vehicle Sound Level. The sound levels for new motor vehicles shall be determined by tests performed according to procedures established for each particular class of vehicle.

4.5.2 Definitions. For the purpose of these procedures, the following terms have the meanings indicated:

a. Maximum RPM. "Maximum rpm" means the maximum governed engine speed, or if ungoverned, the rpm at maximum engine horsepower as determined by the engine manufacturer in accordance with the procedures in Society of Automotive Engineers Standard, Engine Rating Code - Spark Ignition - SAE J245, April 1971, or Engine Rating Code Diesel - SAE J270, September 1971.

b. Microphone Point. "Microphone point" means the unmarked location on the center of the lane of travel that is closest to the microphone.

c. Vehicle Reference Point. "Vehicle reference point" means the location of the vehicle used to determine when the vehicle is at any of the points on the vehicle path. The primary vehicle reference point is the front of the vehicle.

4.5.3 Operation.

a. Preliminary Runs. Sufficient preliminary runs shall be made to enable the test driver to become familiar with the operation of the vehicle and to stabilize engine operating conditions.

b. Test Runs. At least four test runs shall be made for each side of the vehicle.

c. Reported Noise Level. The reported sound level for each side of the vehicle shall be on the average of the two highest readings on that side which are within 2 dBA of each other. The sound level reported for the vehicle shall be the sound level of the loudest side.

d. Visual Reading and Recording. Visual readings shall be taken from the sound level meter during preliminary test runs and recorded. The readings from the sound level meter shall be compared with those of the recorder and there shall be no more than $\pm$ 0.5 dBA variation between the readings. When the variation is greater, the equipment shall be checked and recalibrated. If the variation still exists, the test shall be conducted using only direct readings from the sound level meter.

4.5.4 Motorcycles. Motorcycles shall be tested as follows:

a. Vehicle Path. The test area shall include a vehicle path of sufficient length for safe acceleration, deceleration, and stopping of the vehicle.

b. Test Area Layout. The following points and zones shown in Figure 4-3 where only one directional approach is illustrated for purposes of clarity, shall be established on the vehicle path so that measurements can be made on both sides of the vehicle:

1. Microphone point.

2. Acceleration point - a location 25 feet before the microphone point.

3. End point - a location 100 feet beyond the microphone point.

4. End zone - the last 75-feet distance between the microphone point and the end point.

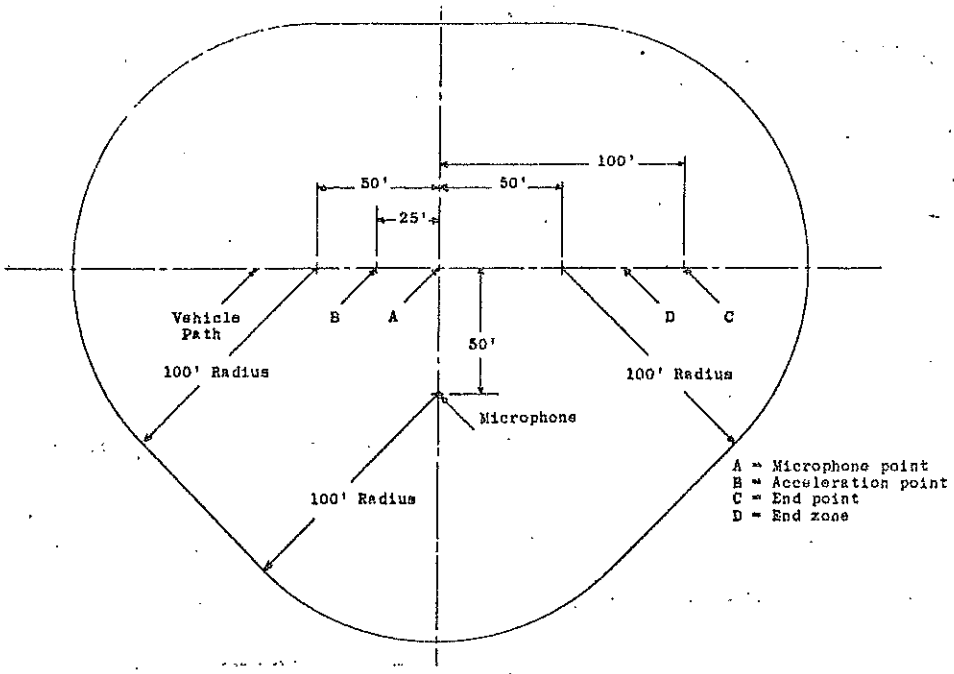


Fig. 4- 3. Test Area Layout for Motorcycles

c. Test Procedures. Vehicles shall be tested according to the following procedures:

1. Gear Selection. Motorcycles shall be operated in second gear. Vehicles which reach maximum rpm at less than 30 mph or before a point of 25 feet beyond the microphone point shall be operated in the next higher gear.

[If the motorcycle has an automatic transmission or torque converter, then gear selection shall follow the following procedure:

If the gear range is selectable, employ the lowest range. If the vehicle reaches maximum rpm at less than 30 mph or before a point 25 feet beyond the microphone point (see Figure 4-3), use the next higher range. If maximum rpm is reached before a point 25 feet beyond the microphone point when the vehicle is in the highest gear range, then the throttle shall be opened less rapidly, but in such a manner that full throttle and maximum rpm are attained while within the end zone.

If the gear range is not selectable, then the throttle shall be opened less rapidly, but in such a manner that full throttle and maximum rpm are attained while within the end zone.]

2. Acceleration. The vehicle shall proceed along the test path at a constant approach speed which corresponds either to an engine speed of 60 percent of maximum rpm or to 30 mph, whichever is lower. When the vehicle reference point reaches the acceleration point, the throttle shall be rapidly and fully opened. The throttle shall be held open until the vehicle reference point reaches the end point or until the maximum rpm is reached within the end zone, at which point the throttle shall be closed. Wheel slip shall be avoided.

3. Deceleration. Tests during deceleration shall be conducted when deceleration noise appears excessive. The vehicle shall proceed along the vehicle path at maximum rpm in the same gear selected for the tests during acceleration. When the reference point on the vehicle reaches the acceleration point, the throttle shall be rapidly closed and the vehicle shall be allowed to decelerate to less than 1/2 of maximum rpm.

4. Engine Temperature. The engine temperature shall be within normal operating range before each test run.

5. Test Weight. The total weight of test driver and test instrumentation shall be 165 lbs. For small drivers, additional weights shall be used to bring the total to 165 lbs.

4.5.5 Snowmobiles. Snowmobiles shall be tested as follows:

a. Vehicle Path. The test area shall include a vehicle path of sufficient length for safe acceleration, deceleration, and stopping of the vehicle.

b. Test Area Layout. The following points and zones shown in Figure 4-3, where only one directional approach is illustrated for the purposes of clarity, shall be established on the vehicle path so that measurements can be made on both sides of the vehicle.

1. Microphone point.

2. End point - a location 50 feet beyond the microphone point.

3. Acceleration point - a location on the vehicle path established as follows: Position the vehicle headed away from the microphone point with the vehicle reference point at 25 feet from the microphone point. From a standing start with transmission in low gear, rapidly apply wide-open throttle, accelerating until maximum rpm is attained. The location on the vehicle path where maximum rpm was attained is the acceleration point for test run in the opposite direction.

4. Maximum rpm zone.

c. Test Procedures. From a standing start, with transmission in low gear and the vehicle reference point positioned at the acceleration point, the throttle shall be rapidly and fully opened and held through the maximum rpm zone until the reference point on the vehicle reaches the end point after which the throttle shall be closed.

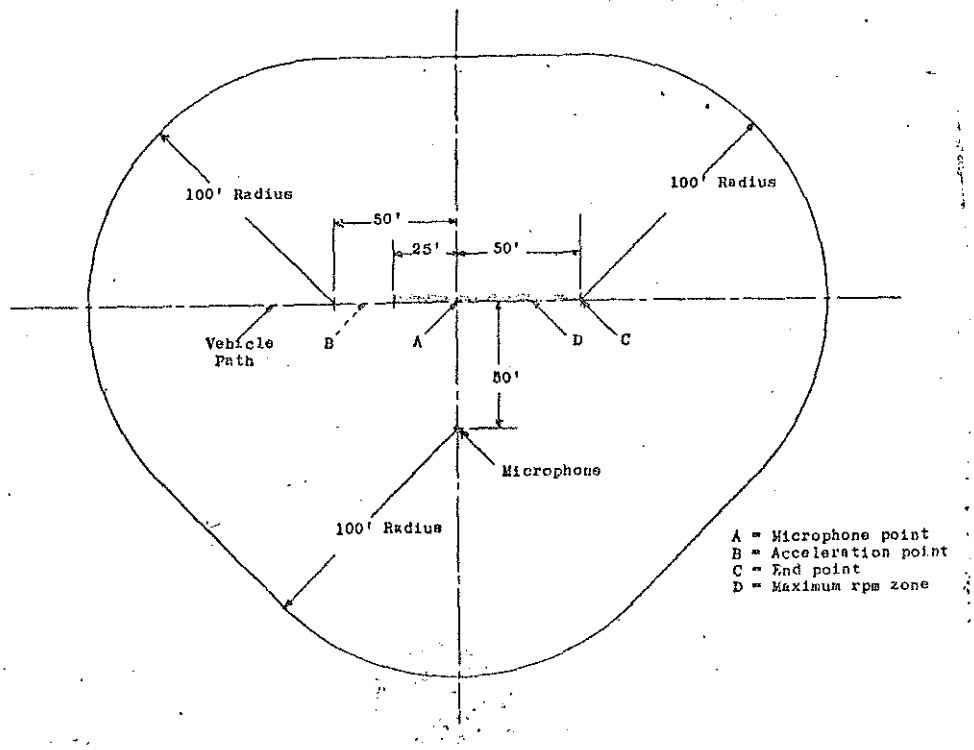


Fig. 4-4. Test Area Layout for Snowmobiles

4.5.6 Heavy Trucks, Truck Tractors, and Buses. The test procedure for vehicles with a manufacturer's gross vehicle weight rating of ~~6,000~~ **[10,000] lbs or more shall be as follows:**

(1) Test Area Layout. The test area shall include a vehicle path of sufficient length for safe acceleration, deceleration, and stopping of the vehicle. The following points and zones shall be established on the vehicle path as shown in Figure 4, where only one directional approach is illustrated for purposes of clarity.

(A) Microphone point

(B) Acceleration point - a location 50 ft before the microphone point

(C) End point - a location 50 ft beyond the microphone point.

(D) End zone - the last 40-ft distance between the microphone point and the end point.

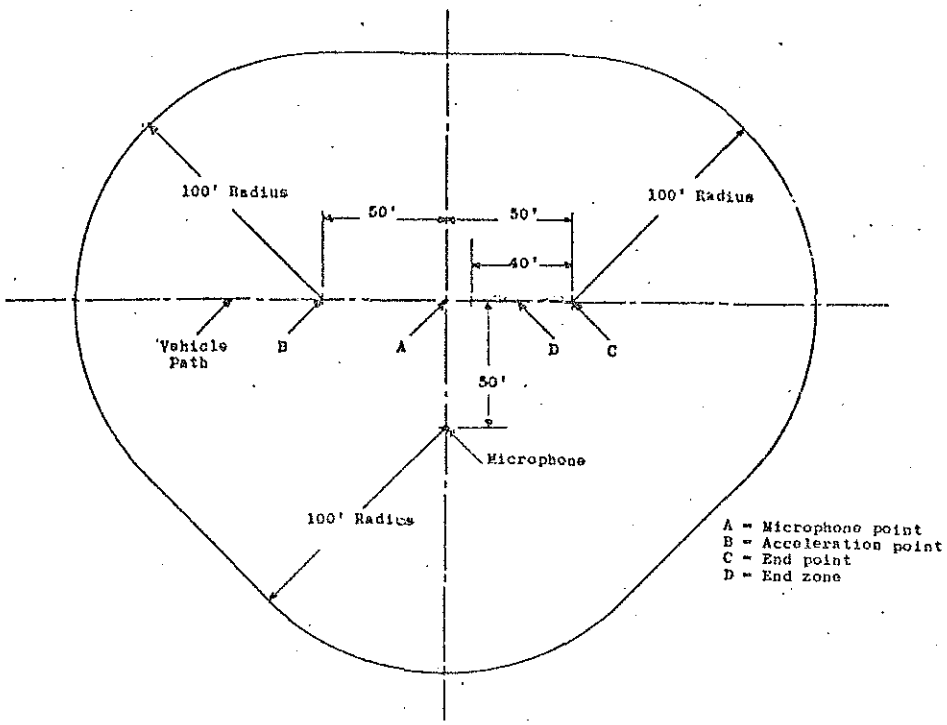


Figure 4-5 Test Area Layout for Trucks

(2) Gear Selection. A gear shall be selected (manual or automatic transmission) which will result in the vehicle beginning at an approach rpm of no more than 2/3 maximum rpm at the acceleration point and reaching maximum rpm within the end zone without exceeding 35 mph.

(A) When maximum rpm is attained before reaching the end zone, the next higher gear shall be selected, up to the gear where maximum rpm produces over 35 mph.

(B) When maximum rpm still occurs before reaching the end zone, the approach rpm shall be decreased in 100 rpm increments until maximum rpm is attained within the end zone.

(C) When maximum rpm is not attained until beyond the end zone, the next lower gear shall be selected until maximum rpm is attained within the end zone.

(D) When the lowest gear still results in reaching maximum rpm beyond the end zone, the approach rpm shall be increased in 100 rpm increments above 2/3 maximum rpm until the maximum rpm is reached within the end zone.

(3) Acceleration. The vehicle shall proceed along the vehicle path maintaining the approach engine rpm in the gear selected for at least 50 ft before reaching the acceleration point. When the vehicle reference point reaches the acceleration point, the throttle shall be rapidly and fully opened and held open until maximum rpm is attained within the end zone, at which point the throttle shall be closed.

(4) Deceleration. Tests during deceleration shall be conducted when deceleration noise appears excessive. The vehicle shall proceed along the vehicle path at maximum rpm in the same gear selected for the tests during acceleration. When the vehicle reference point reaches the microphone point, the throttle shall be rapidly closed and the vehicle allowed to decelerate to less than 1/2 maximum rpm. Vehicles equipped with exhaust brakes shall also be tested with the brake full on immediately following closing of the throttle.

(5) Engine Temperature. The engine temperature shall be within normal operating range throughout each test run.

[(6) Demand-Activated Fans. If the test vehicle contains a demand-activated fan, the fan may be in the "off" position during the test.]

4.5.7 Light Trucks, Truck Tractors, Buses, Cars and All Other Vehicles. The test procedure for trucks, truck tractors, and buses with a manufacturer's gross vehicle weight rating of less than 6,000 [10,000] lbs, and all passenger cars shall be as follows:

(1) Test Area Layout. The test area shall include a vehicle path of sufficient length for safe acceleration, deceleration, and stopping of the vehicle. The following points and zones shall be established on the vehicle path as shown in Figure 5, where only one directional approach is illustrated for purposes of clarity:

(A) Microphone point

(B) Acceleration point - a location 25 ft before the microphone point

(C) End point - a location 100 ft beyond the microphone point

(D) End zone - the last 75-ft distance between the microphone point and the end point.

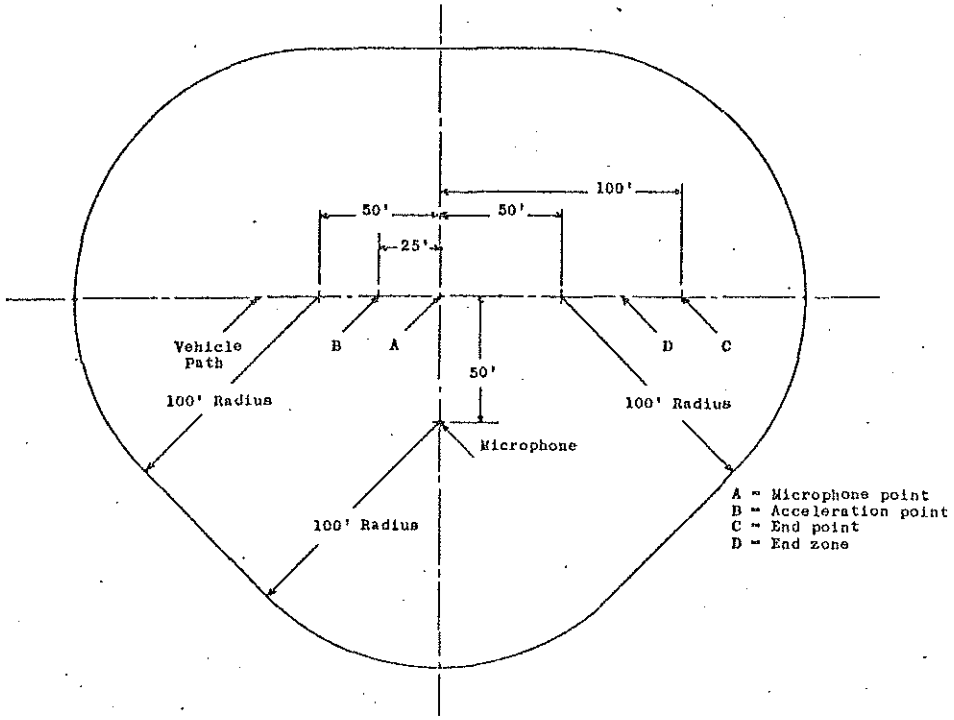


Figure 4-6 Test Area Layout for Passenger Cars

(2) Gear Selection. Motor vehicles equipped with three-speed manual transmissions and with automatic transmissions shall be operated in first gear. Vehicles equipped with manual transmissions of four or more speeds shall be operated in first gear and in second gear. Vehicles which reach maximum rpm at less than 30 mph or before reaching the end zone shall be operated in the next higher gear. Auxiliary step-up ratios (overdrive) shall not be engaged on vehicles so equipped.

(3) Acceleration. The vehicle shall proceed along the vehicle path at a constant speed of 30 mph in the selected gear for at least 50 ft before reaching the acceleration point. When the vehicle reference point reaches the acceleration point, the throttle shall be rapidly and fully opened. The throttle shall be held open until the vehicle reference point reaches the end point or until maximum rpm is reached within the end zone. At maximum rpm, the throttle shall be closed sufficiently to keep the engine just under maximum rpm until the end point, at which time the throttle shall be closed.

(4) Deceleration. Tests during deceleration shall be conducted when deceleration noise appears excessive. The vehicle shall proceed along the vehicle path at maximum rpm in the same gear selected for the tests during acceleration. When the vehicle reference point reaches the acceleration point, the throttle shall rapidly be closed and the vehicle allowed to decelerate to less than 1/2 of maximum rpm.

(5) Engine Temperature. The engine temperature shall be within normal operating range throughout each test run. The engine shall be idled in neutral for at least one minute between runs.

CHAPTER 5

AUXILIARY EQUIPMENT SOUND LEVEL MEASUREMENT

5.1 Scope. This Chapter establishes procedures for setting up and calibrating sound measuring equipment and conducting tests to determine the sound level output of auxiliary motor vehicle equipment.

5.2 Measurement Sites. Measurement sites shall be free of sound-reflecting objects within one-hundred feet of the microphone and one-hundred feet of the vehicle to be tested.

5.2.1 Microphone Location. The microphone shall be located fifty feet ± six inches from the rear or from either side of the equipment to be tested. The locus of points thus defined is the microphone line. (See Figure 5-1) The microphone should be located at the point on the microphone line at which the maximum sound level occurs.

5.2.2 Sound-reflecting Surfaces. A "sound-reflecting surface" is any object or landscape surface in the immediate vicinity of a measurement site which reflects sufficient sound to require the application of a correction factor to the sound level meter reading. Surfaces which are not sound-reflecting surfaces are defined in paragraph 5.2.3, and all other surfaces are considered sound-reflecting surfaces.

5.2.3 Surfaces Which are not Sound-reflecting. The following surfaces may be present in the test area:

a. Any surface that measures less than eight feet in length in a direction parallel to the portion of the microphone line on which the microphone is positioned, regardless of height (such as a telephone booth or a tree trunk) or less than one foot in height, regardless of lengh (such as a curb or guard rail).

b. Any vertical surface, regardless of size (such as a billboard with the lower edge more than fifteen feet above the roadway.

c. Any uniformly smooth slanting surface with less than a forty-five degree slope above horizontal.

d. Any slanting surface with a forty-five to ninety degree slope above the horizontal where the line at which the slope begins to exceed forty-five degrees is more than fifteen feet above the roadway.

e. Any trees, bushes, shrubs, hedges, grass or other vegetation.

5.3 Sound Level Measuring Precaution

5.3.1 Wind. Do not conduct measurements when wind velocity at the test location exceeds ten miles per hour.

5.3.2 Precipitation. Do not conduct measurements when precipitation is falling. However, measurements may be taken when streets are wet.

5.3.3 Ambient Noise. The ambient sound level shall be at least 10 dBA below the sound level of the equipment being measured.

5.3.4 Recording. The sound level recorded shall be the highest level obtained during each test, disregarding unrelated peaks due to extraneous ambient noises.

5.4 Equipment Setup and Use

5.4.1 Microphone Height. The sound level meter may be hand held or placed on a tripod. The microphone shall be positioned four and one-half feet above the ground.

5.4.2 Windscreens. Windscreens made of open cell polyurethane foam furnished by the instrument manufacturer may be placed over the microphone after calibration. The windscreen reduces the effect of wind noise and protects the microphone diaphram from dust or other airborn matter.

5.4.3 Sound Level Meter Setup and Use. Procedures for setup, calibration and use of the sound level meter is contained in this section.

a) General

All types of sound level meters shall be calibrated using the procedures described in the factory instruction manual. All instruments shall be calibrated prior to use. A general discussion of calibration procedures follows.

b) Battery Check

The state of the battery shall be checked before the calibration of the instrument. Batteries in both the meter and the calibrator shall be checked.

c) Instrument Calibration

The instrument shall be set to the correct level range, weighting scale and meter response. The calibrator shall be placed on the microphone of the meter. The output indicated on the meter is then adjusted to the correct calibration level using a screwdriver on the adjustment screw.

d) Annual Calibration

Annually, or when determined to be necessary, each set of sound measuring instruments, sound level meter and calibrator, shall be returned for calibration to the manufacturer's specifications. An inspection label will be attached to each instrument set to determine when the calibration was performed.

e) Sound Level Measurement

1. The following steps should be followed before taking a measurement:

   (a) Turn the meter on
   (b) Switch on the "A" weighting scale
   (c) Switch on the "FAST" meter response
   (d) Set the meter to the appropriate number to measure the anticipated sound level

2. The sound level meter should be hand-held or placed on a tripod according to the manufacturer's instructions.

3. The orientation of the microphone should be according to the manufacturer's instructions.

4. Allowances are necessary due to unavoidable variations in measurement sites and test equipment. Equipment is not considered in violation unless it exceeds the regulated limit by 2 dBA or more.

5.5 Equipment Test Procedure

5.5.1 Vehicle Sound Level. The sound levels for auxiliary equipment shall be determined by tests performed according to the following procedures.

5.5.2 Location The microphone shall be located on the microphone line at the position where the maximim sound level is expected to occupy (See Figure 5-1)

5.5.3 Preliminary Tests. Sufficient preliminary tests shall be made to enable the operator to become thoroughly familiar with the equipment.

5.5.4 Equipment Operation. The equipment shall be operated at the combination of load and speed which produces the maximim sound level without violating the manufacturer's operation specifications.

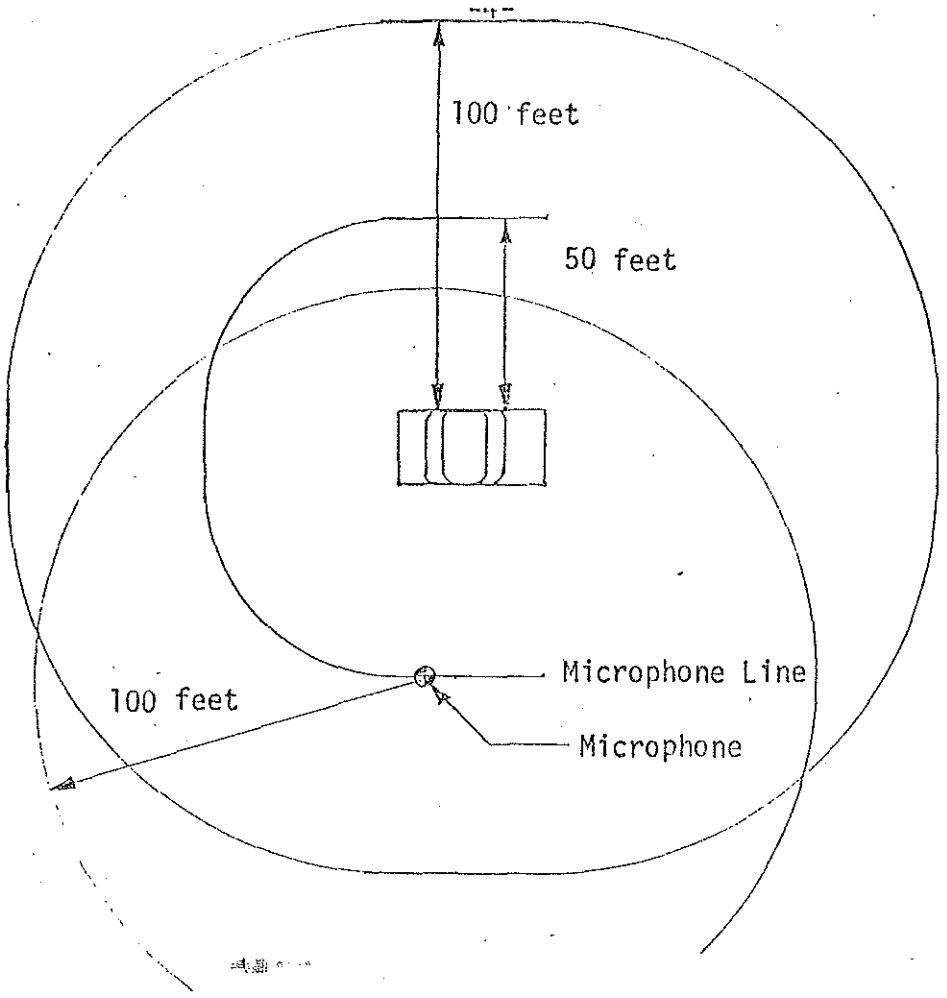


Figure 5-1. Auxiliary Equipment Measurement Site

5.5.5 Visual Reading. The highest sound level observed, exclusive of and peaks due to unrelated ambient noise, shall be reported for each test.

5.5.6 Reported Sound Level. The reported sound level for the vehicle shall be the highest reading which is no more than one dB higher than the next highest reading.

5.5.7 Auxiliary Equipment Test Form. A form to record all pertinent information and data is presented in Figure 5-2. This form, or any other Department approved form for this use, shall be used for auxiliary equipment tests.

AUXILIARY EQUIPMENT NOISE TEST	NOISE POLLUTION DIVISION DEPARTMENT OF ENVIRONMENTAL QUALITY	DATE

YEAR	EQUIPMENT MAKE	EQUIPMENT TYPE	LICENSE NO.	MODEL

REGISTERED OWNER	ADDRESS

DRIVER	D.L. NO.	ADDRESS

ENGINE TYPE - Primary / Secondary	HP	ENGINE DISPLACEMENT	LOCATION	EQUIP. MILEAGE/HRS.

EXHAUST OUTLET	CHECK POSITION AND SIZE OF OUTLET	RESONATORS	MUFFLER TYPE		
☐ Single ☐ L. Side ☐ Rear	☐ Straight ☐ 45° to rear	☐ Single			
☐ Dual ☐ R. Side ☐ Vertical	☐ 45° to Side ☐ ___ dia	☐ Dual			

RECORDER MODEL AND DEQ NO.	METER MODEL AND DEQ NO.	CALIBRATOR AND DEQ NO.

TEST DRIVER	TEST ENGINEER	METER CHECK
		☐ BAT. ☐ WINDSCREEN ☐ "A" SCALE ☐ FAST ☐ CALIB.

OPERATING CONDITIONS	Time	READINGS dBA	READINGS LOCATION NUMBER	MAX. RPM

TEST CONDITIONS

WEATHER CONDITION	TEMP.	%R.H.	WIND SPEED

Sketch in this space the measurement site peculiarities, and using the proper symbols indicate the direction of wind, vehicle orientation and reading locations.

Key: WIND DIRECTION - - - →
VEHICLE ←→
MICROPHONE LOCATION NO. ⇨

INSTRUMENTATION SET UP AT 50 FT FROM EDGE OF VEHICLE

NPCS-27

Figure 5-2

Auxiliary Equipment Noise Test

CHAPTER 6

NEAR FIELD STATIONARY MOTOR VEHICLE SOUND LEVEL MEASUREMENTS 20 Inches (1/2 Meter)

6.1 Scope. This chapter establishes procedures for setting up and calibrating sound measuring equipment and conducting tests to determine the sound level output of a stationary vehicle as measured 20 inches (.5 meter) from the exhaust exit. This procedure allows testing indoors and at sites limited in open space.

6.2 Initial Inspection.

6.2.1 Subjective Evaluation. Before a vehicle is tested to the near field procedures, a subjective evaluation of the vehicle noise shall be made by experienced personnel to determine if an objective test is necessary. The subjective test, using the human ear as a sensing device, shall be conducted at engine idle and during rapid partial throttle opening in neutral gear. The inspector shall stand on the exhaust exit side and near the rear of the vehicle during this evaluation. The exhaust noise shall not be discernably louder than the engine noise and they shall blend together to be acceptable.

6.2.2 Visual Inspection. If a vehicle is found to be subjectively loud, a visual inspection of the exhaust system shall be conducted. This inspection should include the entire system from the engine to the outlet pipe.

Comment: Under Oregon Administrative Rules Chapter 340 Section 35-035 the following defects are a violation.

a) No muffler

b) Leaks in the exhaust system

c) A pinched outlet pipe

6.2.3 Near Field Test. If the subjective evaluation warrants further inspection and the visual check does not disclose a violation, then the vehicle shall be subjected to the near field noise test as described in Section 6.5. This test uses a sound level meter to measure the noise level of the vehicle under controlled test conditions.

6.3 Measurement Sites.

6.3.1 Vehicle Location. The vehicle must rest on the open **[water, ground or]** pavement, **the shop floor, or on a dynamometer. It should not be on a hoist, rack, or over a pit. Shop doors should be open to avoid excessively high readings and reflective surfaces should be as far as possible from the sound level meter.**

6.3.2 Bystanders. Bystanders should not stand within 10 feet [3 meters] of the microphone or vehicle during noise tests, except for operating personnel.

6.3.3 Wind. Do not conduct noise measurements when wind velocity at the test location exceeds ~~10~~ [20] miles per hour [(32 km/hr)].

6.3.4 Precipitation. Do not conduct noise measurements if precipitation is falling, unless the microphone and instruments are protected from moisture.

Warning: Do not let any moisture on microphone. This will cause damage. Do not attempt to clean microphone.

6.3.5 Ambient Noise. The ambient noise levels shall be at least 10 dBA below the sound level of the vehicle being tested.

[Comment: For rear engine automobiles and light trucks, close the engine hood as much as possible to minimize engine noise.]

6.4 Equipment Setup and Use.

6.4.1 Meter Specifications. The specifications for sound level meters are defined in Noise Pollution Control Section manual NPCS-2 Requirements for Sound Measuring Instruments and Personnel. The minimum meter required is a Type II as defined by American National Standards Institute number S.I. 4-1971.

6.4.2 Battery. A battery check shall be conducted on the Meter and Calibrator before each calibration.

6.4.3 Calibration. The sound level meter shall be field calibrated immediately prior to use following procedures described by the manufacturer's instruction manual. Meters should be calibrated at least at the beginning and end of each business day and at intervals not exceeding 2 hours when the instrument is used for more than a 2-hour period.

Comment: If the instrument is damaged or in need of service, contact the Noise Pollution Control office or Motor Vehicles office.

6.4.4 Annual Calibration. Within one year prior to use, each set of sound level meters shall receive a laboratory calibration in accordance with the manufacturer's specifications. This calibration shall be traceable to the National Bureau of Standards.

Comment: An inspection label will be attached to each instrument to determine when the calibration was performed.

6.4.5 Windscreens. Windscreens of open cell polyurethene foam furnished by the manufacturer shall be placed over the microphone after calibration. This will protect it from dust or other airborn matter.

Warning: Do not let exhaust gases impinge on microphone.

6.4.6 Meter Setting. The meter shall be set on the "A" scale and used in the slow response mode.

6.4.7 Tachometer. A calibrated engine tachometer shall be used to determine when the test RPM is attained. Tachometers shall have the following characteristic:

Steady state accuracy of $\pm$ 2% of full scale.

The tachometer shall be calibrated at least once a year in accordance with manufacturer's calibration procedures.

6.5 Sound Level Measurements.

6.5.1 Preliminary Steps:

a) Field calibration.

b) Windscreen on.

c) Set meter to the appropriate range to measure the anticipated sound level.

d) Switch to "A" weighting scale and slow response mode.

e) Turn meter on.

6.5.2 Mounting. The sound level meter shall be hand-held or placed on a tripod according to the manufacturer's instructions.

6.5.3 Orientation. The orientation of the sound level meter microphone shall be according to factory instructions.

Comment: Generally, the operating personnel will be to one side. The

"General Radio" 1565B Sound Level Meter shall be oriented such that the microphone points aft and the sound path will "graze" the surface of the microphone. (See Figure ~~1~~) [6.1 and 6.2)]

6.5.4 Microphone Position. The microphone for the sound level meter shall be at the same height as the center of the exhaust outlet but no closer to the ~~pavement~~ [surface] than 8 in. (203 mm). The microphone shall be positioned with its longitudinal axis parallel to the ground, 20 in. (508 mm) from the edge of the exhaust outlet, and 45 ± 10 deg from the axis of the outlet (Figure 6.1 [& 6.2)]. For exhaust outlets located inboard from the vehicle body, the microphone shall be located at the specified angle and at least 8 in. (203 mm) from the nearest part of the vehicle.

[For motorcycles with more than one outlet per side, the measurement shall be made at the rearmost outlet.]

[Note: If a measuring device is attached to the exhaust outlet and the meter to maintain proper distance, ensure no vibrations from the vehicle are transmitted to the instrument.]

6.5.5 Vehicle Operation. Vehicles tested to determine exhaust system sound levels shall be operated as follows:

a) Automobiles and Light Trucks [and other Automotive Powered Vehicles]. The engine shall be operated at normal operating temperatures with transmission in park or neutral. Sound level measurements shall be made at 3/4 (75%) of the RPM for rated horsepower ± ~~50~~ [100] RPM of meter reading.

Comment: Tables of the 75% RPM (test RPM) versus the engines are given in the Near Field Motor Vehicle Test RPM Tables, NPCS-31.

b) Motorcycles. [The rider shall sit astride the motorcycle in a normal riding position with both feet on the ground. The engine shall be operated at normal operating temperatures with

the transmission in neutral. If no neutral is provided, the motorcycle shall be operated either with the rear wheel 5-10 cm (2-4 in) clear of the ground, or with the drive chain or belt removed. The sound level measurement shall be made with the engine speed stabilized at one of the following values:]

[(A) If the motorcycle engine data is available, test the motorcycle at 1/2 (50%) of the RPM for maximum rated horsepower ± 100 RPM.]

[(B) If the engine data is not available and if the motorcycle has a tachometer indicating the manufacturer's recommended maximum engine speed ("Red Line"), test the motorcycle at 45% of the "Red Line" RPM ± 100 RPM.]

[Note: Motorcycle tachometers generally show a red area at the upper part of the scale. The "Red Line RPM" is the lowest value within the red area.]

[(C) If the engine data and red line RPM are not available, test the motorcycle at:]

[(i) 3500 RPM ± 100 RPM for motorcycles with total cylinder displacement between 0-950 cc (0-58 in^3)]

[(ii) 2800 RPM ± 100 RPM for motorcycles with total cylinder displacement greater than 950 cc (58 in^3)]

c) Trucks and Buses. To be determined.

6.5.6 Reported Sound Levels. The reported exhaust system sound level reading shall be the highest reading obtained during the test, exclusive of peaks due to unrelated ambient noise or extraneous impulsive type noise obtained during

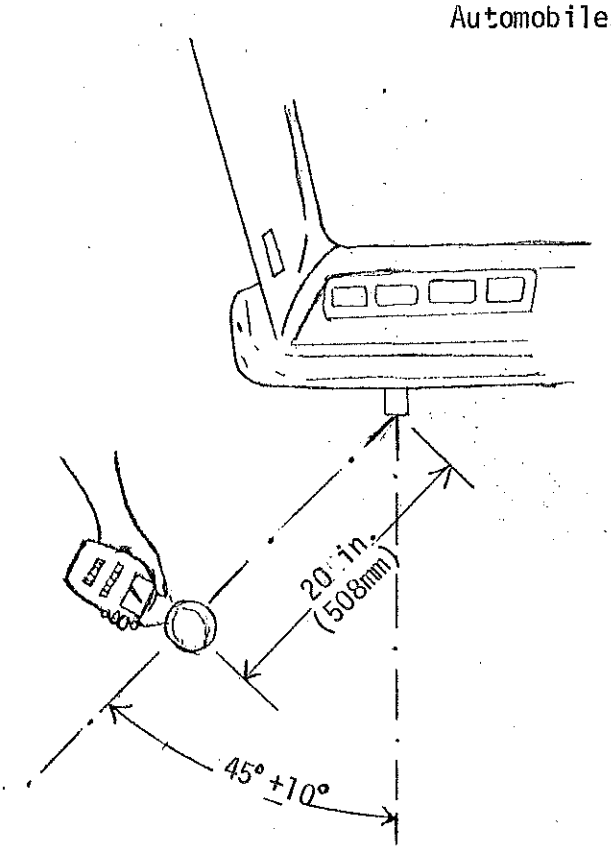
the acceleration or deceleration portion of the test. When there is more than one exhaust outlet, the reported sound level shall be for the loudest outlet.

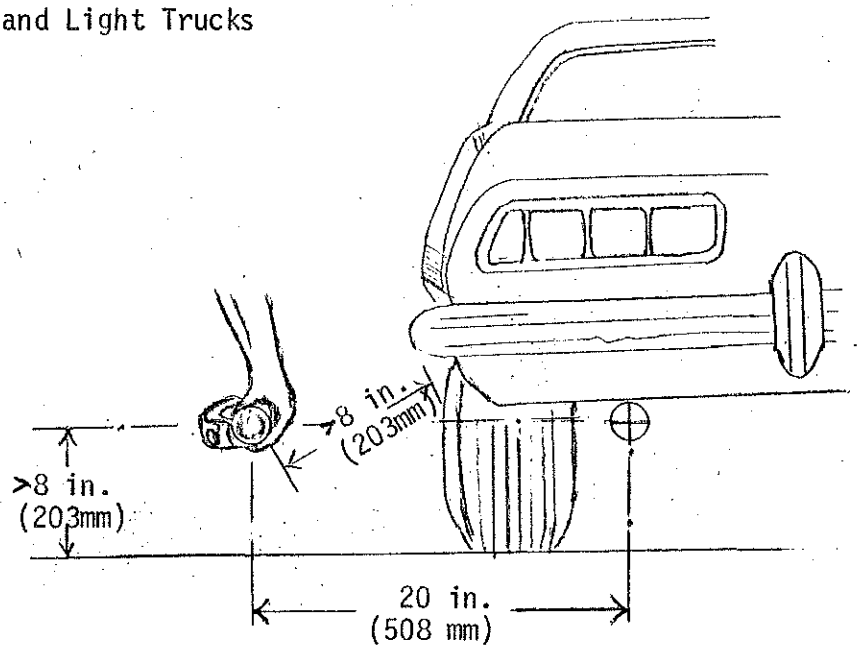
Comment: The purpose of this test is to measure exhaust noise, so there should not be any other noises within 10 dBA below the exhaust noise. (See Ambient Noise)

6.5.7 Variations. Allowances are necessary due to unavoidable variations in measurement sites and test equipment. Vehicles are not considered in violation unless they exceed the regulated limit by the value shown in the following table or more.

Sound Level Meter Type	Allowable Exceedance
ANSI Type I	1 dBA
ANSI Type II	2 dBA

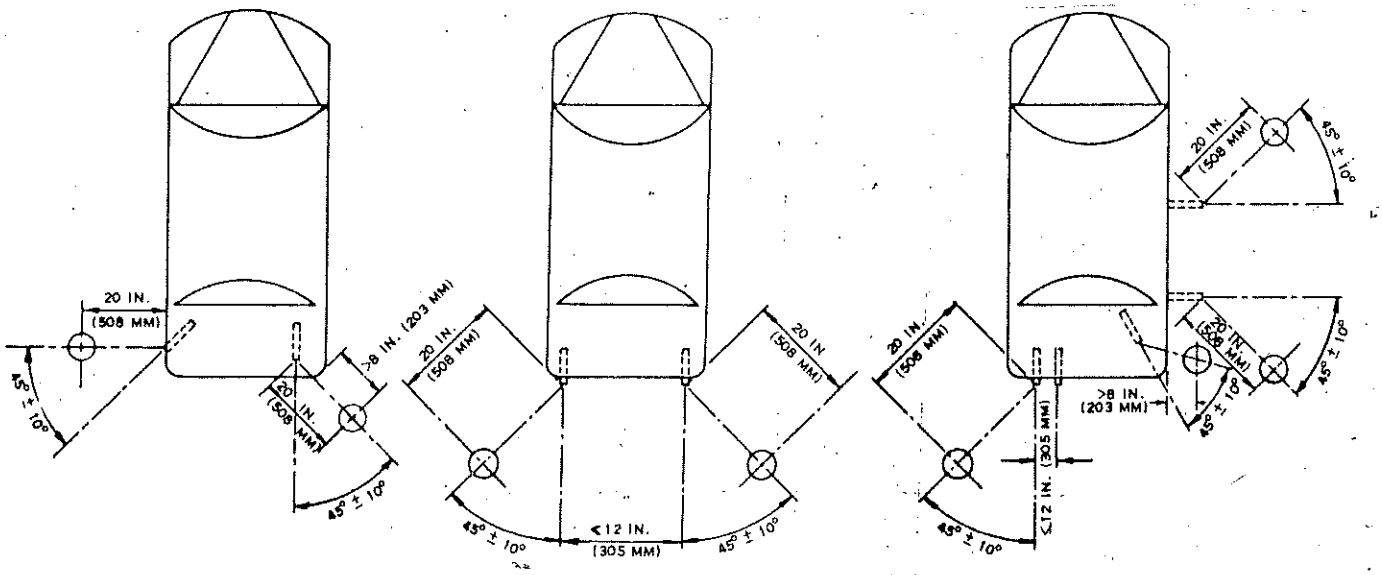
Figure 1 [6.1]
Microphone Placement for
Automobiles and Light Trucks





Do not allow the exhaust to impinge on the microphone. Use the wind screen to protect the microphone.

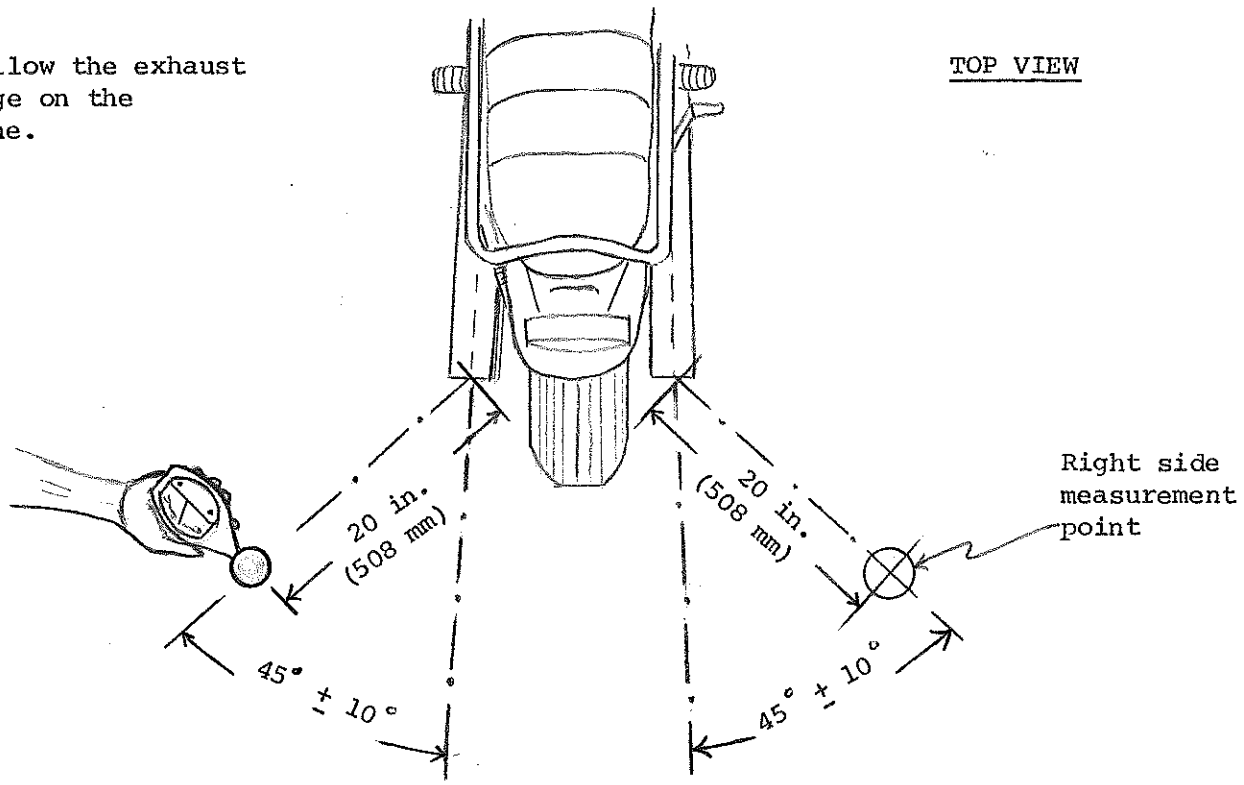
For dual exhausts, measure both and record the higher of the two readings.



[Figure 6.2]
Microphone Placement for
Motorcycles

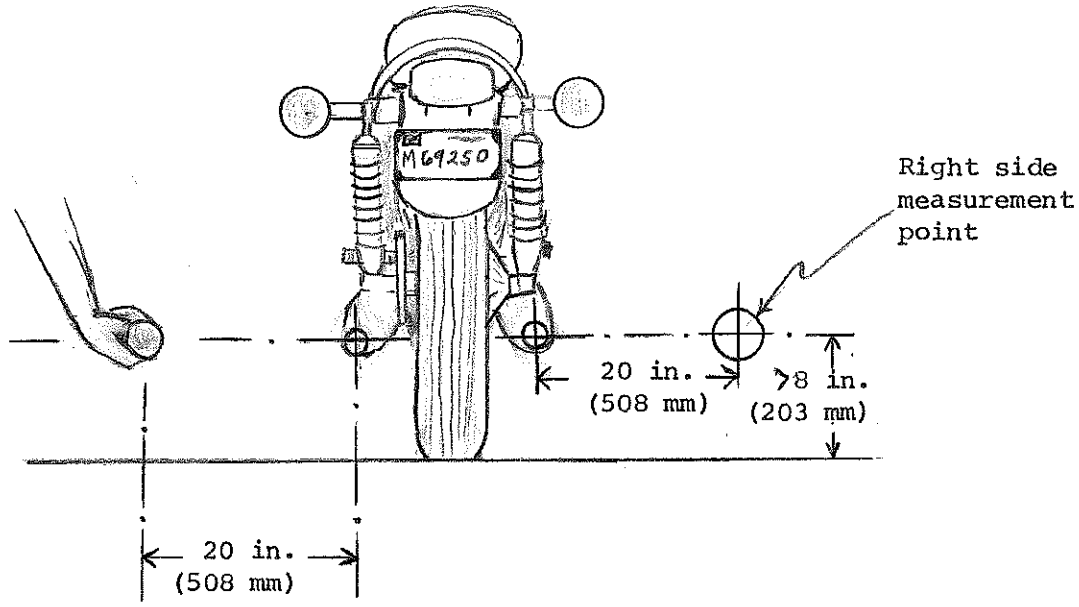
Do not allow the exhaust to impinge on the microphone.

TOP VIEW



For exhaust outlets on both sides, measure both and report the highest of the two readings.

Rear View



ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

To: Environmental Quality Commission

From: Hearing Officer

Subject: Hearing Report - March 23, 1977 hearing regarding proposed amendments to Noise Regulations

SUMMARY

The hearing commenced on March 23, 1977 in room 602 of the Multnomah County Courthouse. Approximately 25 persons attended. Some testimony was offered at the hearing and some was submitted by mail shortly after the hearing.

SUMMARY OF TESTIMONY

Mr. Russell Jura representing Yamaha Motor Corporation, U.S.A.

Mr. Jura supported the near-field test for motorcycles and applauded it as an efficient step toward gaining compliance with the noise requirements for in-use motorcycles.

With regard to snowmobiles which Yamaha manufactures, Mr. Jura supported the testimony of Mr. Muth.

Dr. Kenneth Haevernick, Oregon State Snowmobile Association (OSSA)

Dr. Haevernick reported his organization to be a non-profit one comprised of 2700 snowmobiles and a forum for all organized snowmobile interests in Oregon, including 25 snowmobile clubs.

It was his testimony that the Department was ill advised in thinking that there is a need for reducing the test distance to 25 feet. There was contended to be ample room for setting up a 50-foot test which could be done as quickly and accurately as a 25-foot test.

It was also contended to be unwise to set for in-use snowmobiles a more stringent standard than was required of them when built. The contention was based on the probability that many owners would have difficulty getting machines into compliance where the manufacturers may have left the industry, parts may not be available, and the standard is more stringent than that for which the machine was designed.

Also, it was noted that most individual users do not have the money to get equipment to determine if their vehicles are in compliance.

Finally, Dr. Haevernick advised that his association was deeply concerned with the manufacturer's specifications for snowmobiles made after 1978. He stated his association's intention to file a petition addressing the matter.

Mr. Roy W. Muth representing the Snowmobile Safety and Certification Committee. (SSCC) Mr. Muth testified essentially as follows:

Beginning about 9 years ago the industry set out to reduce noise and has reduced the noise (as of February 1, 1975 manufacturing dates) by about 94%.

Many snowbelt states have taken the simpler approach of requiring an adequate muffler. The remaining states regulate snowmobiles with "A" scale limitations as follows:

12 states and Canada:	78 dBA at 50 feet
6 states	82 dBA at 50 feet
1 state	82 dBA at 100 feet
1 state	84 dBA at 50 feet

A two-year study for the EPA is underway to determine if EPA should regulate snowmobile sound levels.

Seven states have regulations calling for snowmobile sound levels of 73 dBA in future.

Based on the claims of one manufacturer, New York required 73 dBA by May of 1974 (a 1970 law).

Connecticut, Massachusetts, Minnesota, and Rhode Island followed suit.

The boasted machine was quiet. It was also heavy, large, expensive and unpopular. In 1975 its manufacturer withdrew from the snowmobile market.

Prior to the effective date of the 73 dBA requirements, four states withdrew from it, relaxing to 78 dBA.

With the dBA levels adjusted to reflect the 6 dBA difference between a 50-foot test and a 25-foot test, the proposed rule would set the following limits (at 50 feet):

Snowmobiles produced in 1975 or before	84 dBA
in 1976 through 1978	80 dBA
after 1978	77 dBA

The above would require that snowmobiles on the trails be from 3 to 6 dBA's quieter than current regulations provide.

The proposals would mean as follows:

Pre-1973 snowmobiles (manufactured before the industry imposed its own 82 dBA standard) will be required to perform more quietly than they were designed to perform.

Those owning snowmobiles built from 1973 to 1978 would have to maintain every noise-related component in peak condition so as not to exceed the 2 dBA allowed for normal wear and tear of equipment. For some makes no longer on the market, parts might be difficult to buy.

If the snowmobile industry does not change its present 78 dBA manufacturing design, those who buy new vehicles after 1978 will be required to make them operate more quietly than they were designed to operate.

There is no need to be more stringent than the industry's 78 dBA standard. Complaints are few and, as old models are replaced by new, complaints will be fewer.

Therefore it is proposed that the sound level limits for snowmobiles proposed for Table D of OAR 340-35-035 not be adopted.

Snowmobiles were removed from the EPA list of major sources after the industry refuted erroneous estimates of their sound energy.

Presently four research organizations are engaged in a $220,000 study of the regulations affecting snowmobiles, the feasibility of meeting them, and the economic and environmental impacts pertaining.

The noise made by today's machines is 93-3/4 percent reduced from that of the early, unmuffed snowmobiles. Formidable obstacles were overcome in doing this, including the requirements of weight control, and operating capabilities at extremes of outdoor temperature and elevation.

The process of noise reduction is a "real world" process being undertaken by thousands in the industry. Abstract theory and speculation is inappropriate.

There is little possibility that today's snowmobiles present a threat of speech interference, sleep interference or hearing damage to the operator.

Tests were cited which tended to disprove theories that even louder snowmobiles are unusually disruptive to wildlife habits.

There were cited some statistics regarding average noise sources from the noise universe which were taken as support for the proposition that the modern snowmobile is not offensive.

It was noted too that snowmobiles are often routed into areas which have natural sound barriers, such as trees or hills.

The impact on snowmobile users is dealt with at length in the report and it is concluded the levels of noise present, when consideration is given to average use patterns, present no problem by OSHA standards.

Regarding the proposal to reduce the test distance from 50 to 25 feet, it was contended that this would be contrary to the testing procedures specified in SAE J192a which is widely embraced. The result would be confusion in comparing the Department's test data with historical data from other jurisdictions or agencies. It was also argued that there is more than ample space in which to conduct a 50-foot test. It was urged that the proposal not be adopted.

It was reported that a large segment of the industry labels their new vehicles with the SSCC label, indicating the machines will pass the 78 dBA, 50-foot test. The result to date was said to be 375,000 safer, quieter snowmobiles in the hands of consumers. To snowmobile purchasers the "cost of quiet" was 26 million at retail over this past season alone. This added cost, combined with other cost increases, has already dampened the market. The number of active manufacturers was reported to have dropped from 129 to 8 in the last 6 years.

The industry and the nine million North Americans who enjoy snowmobiling need to know that only reasonable requirements will be imposed. The industry's survival is threatened by uncertainty such as that engendered by those jurisdictions which imposed a 73 dBA standard only to have to withdraw it upon discovery of its deficiency.

The importance of recreation to the physical and psychological well-being of people was reported to be reason for very careful scrutiny of regulations tending to inhibit mechanically-intensive recreational pursuits.

It was stressed that snowmobiling provides new horizons and alternatives to many citizens who are snowbound during much of the year.

It was noted that, in addition to 78 dBA maximum at wide open throttle, the SSCC had adopted a maximum of 73 dBA at 15 mph. This was said to address itself to the normal-use mode as well as extremes. It was suggested both these standards should be incorporated in independent verification of compliance, such as the SSCC label. Four eastern states were reported to have required independent certification, a measure said to insure adherence to the standards and to prevent unfair competition in the industry.

The 1978 manufacturers' standard of 75 dBA was singled out as a provision of the current rules in dire need of review.

Mr. Robert Jolin

Mr. Jolin is a motorcycle dealer. As such, he feels that the majority of those who make, sell, and ride motorcycles are damaged by the few who ride unlawfully noisy vehicles. It was his feeling that peer group pressure from fellow enthusiasts would be the most effective way to convince the noisy minority to change behavior. A public relations campaign through a joint agency-industry effort was suggested. (Mr. John's suggestion is under review by the Department's public affairs office).

Mr. James J. Ray, representing the Bonneville Power Administration.

Other than as specified in the staff report, BPA's testimony addresses the entire scheme of the regulations as they relate to utility-used sources. His comments are attached in full. They raise potentially grave issues whose resolution can hopefully be the subject of prompt, informal discussion between the two agencies.

Mr. John B. Walsh, representing U.S. Suzukie Motor Corporation.

Suzuki supports the proposal of a new 1/2 meter stationary noise test to aid in enforcement of noise standards for in-use vehicles.

Active use of the test to stop users of excessively noisy vehicles was urged.

It was suggested that the "rapid throttle opening" test be modified to provide against too much exuberance by the tester which could overly strain the engine. 50 to 60% of maximum rpm was suggested as the highest throttling necessary.

Since some "leaks" were said to be a result of vehicle design, a proscription against only those leaks in the exhaust system which result in a noise increase was recommended.

A pilot testing program was recommended to resolve discrepancies to be expected from the wide range of tachometers and ignition systems on motorcycles. Inconsistent readings might fail a vehicle which is not really malfunctioning.

It was urged that the minimum distance to the ground from the test microphone was superfluous and would cause undue labor for testers.

Suzuki suggested that rpm data on various engines be added to the testing manuals with a note in the rules indicating such availability.

Also, $\pm$ 100 rpm was suggested as a more realistic rpm testing tolerance than the proposed $\pm$ 50 rpm.

The title "In-Use Road Vehicle Standards" was suggested for Tables B and C.

Finally, Suzuki found the proposed levels for new off-road motorcycles to be within 2 to 4 decibels of the level Suzuki finds appropriate. Suzuki offered to cooperate with the agency in finding the proper levels.

Mr. James Hadley, representing the Oregon State Marine Board.

It was suggested that boats exhausting under water be required to meet the Marine Board's 84 dBA at 50 feet while those exhausting above water can be required to meet a reasonable DEQ standard.

Mr. and Mrs. Arthur Fuqua, Beaverton.

Mr. and Mrs. Fuqua own two 1968 vintage snowmobiles from which they get considerable recreational joy. They are unable to afford newer vehicles and are extremely dismayed that proposed regulations might forfeit the snowmobiles they now have and leave them unable to enjoy this form of winter recreation. They are 55 years of age.

W.P. Walker, Milwaukie.

Mr. Harrison asks who will enforce the standards.

Mr. Dean Hill, Milwaukie.

Mr. Hill does not object to motorcycles but he finds there are far too many excessively loud ones, especially at night and in the summer. Also, he finds there are too many loud snowmobiles disturbing people and nature.

Mr. Carl Anderson, Troutdale.

Mr. Anderson reports that the cost to industry of producing quieter vehicles is outweighed by the long range cost in health effects to society from noise pollution.

He discounts the claim that technology is not available to meet the standards.

Mr. and Mrs. A.J. Fraser, Portland.

Mr. and Mrs. Fraser contend that voluntary programs won't work and that the agency is duty-bound to invoke mandatory noise controls. It is reported that, where they live, the couple can set their clocks by overly loud motorcycles when the bars close.

Mr. Arnildo J. Uppiano, Lostine.

Mr. Uppiano is a rancher and he has had several occasions of trespass on his property by off-road enthusiasts using no mufflers on their machines. The noise itself is, he believes, a form of trespass.

Mr. Uppiano dismisses the theory that no regulation is needed because of a lack of complaints. He calls for a tough regulation.

Finally, Mr. Uppiano posits a novel law of psychometrics, an inverse correlation between intelligence and noise tolerance. "The louder the machine, the dumber the person who is driving it."

COMMENTS

The rules, as proposed, have been filed with the Energy Facility Siting Council pursuant to ORS 469.520.

A copy of the comments of BPA has been sent to the Council also.

The above was in addition to the other, routine matters of public notice and filing which normally precede rule-adoption.

RECOMMENDATION

Your hearing officer makes no recommendation on the proposed rules.

Respectfully submitted,

Peter W. McSwain
Hearing Officer

United States Department of the Interior

BONNEVILLE POWER ADMINISTRATION
P.O. BOX 3621, PORTLAND, OREGON 97208

OFFICE OF
THE ADMINISTRATOR

In reply refer to: AJ

MAR 30 1977

Mr. Joe B. Richards
Chairman, Environmental
Quality Commission
State of Oregon
1234 S.W. Morrison
Portland, Oregon 97205

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
MAR 31 1977
OFFICE OF THE DIRECTOR

Dear Mr. Richards:

We welcome the opportunity to review and propose amendments, for your consideration, to the Oregon State Noise Regulations. In the spirit of the developing relationship between the State of Oregon and Bonneville Power Administration, we view this as an opportunity to further our cooperative relationships. Our review has not been limited to the revisions proposed by the Department of Environmental Quality, but encompasses the totality of the regulation in its application to electric power transmission facilities in the Northwest environment. Our purpose is to assist the Commission and the Department in the preparation of noise regulations which consider the unique aspects of electric transmission facilities and are practical for all parties concerned, including the public, and that can be logically interpreted and applied in a technical and legal sense to design, operation and enforcement.

Background and Present Status

Long before the enactment of regulations regarding audible noise, the Bonneville Power Administration was responsive to environmental considerations, including the audible noise of its operating and proposed transmission lines. Our current 500-kV designs are the result of continuing investigations and design changes to minimize the corona and audible noise while delivering reliable power to our customers at economical rates.

The electric utility industry and the Federal government are presently involved in intensive studies of audible noise from transmission facilities, with the end purpose being guidelines for establishing appropriate psychoacoustical annoyance levels, and measurement methods and procedures. Also, the U.S. Environmental Protection Agency is circulating, for review, a draft document for a "Proposed National

Strategy for Noise Abatement and Control." The results of these efforts will provide considerable information for the development of State noise regulations for transmission facilities.

Transmission and distribution line audible noise from hardware and conductors is essentially a foul weather phenomenon. At typical operating gradients, the hardware and conductors operate below the corona onset voltage in dry weather. During wet weather, water droplets forming on the conductors and hardware cause the electric field surface gradient to exceed the corona onset level, resulting in streamer discharges and bursts of acoustic pressure waves. This audible noise is characterized primarily by a broad band crackling or hiss type of noise. Occasionally, pure tone components consisting of a 120-Hz pure tone and its harmonics are also present.

Technical Inadequacies of Proposed Revised Regulations

1. In general, the regulations do not recognize the statistical differences and relative significance between electric transmission facilities and other noise sources. For instance, audible noise from overhead electrical conductors and hardware has a considerably different statistical occurrence than motor vehicle noise, and is not as statistically significant as noise caused by wind, rain and thunder.

2. "Any one hour" allows selecting either worst or best hours for both ambient and noise source. The selected hour would be arbitrary and subjective. As such, it does not permit logical interpretation or application in a technical or legal sense. On new facilities the 10dBA above ambient levels, on an "any one hour" basis, is not well defined for the design and operation of transmission lines and power substations. Absolute levels are preferable. On a quiet, still day, say 25dBA ambient noise level, a light breeze could raise the noise level by more than 10dBA. Even though a 10dBA increase can be detected by the human ear, it is not necessarily annoying.

3. The octave band requirements listed in table J are not based on annoyance levels from electric transmission facilities. Research work is currently being performed by the National Bureau of Standards and by the Electric Power Research Institute on annoyance levels from these sources. These results will directly relate noises from these facilities with psychoacoustic effects. Without these findings, the octave band requirements for utility operation are premature and arbitrary.

4. Considering the number of people directly affected, the audible noise from existing electric transmission facilities in the Northwest is acceptable to the general public, with very few exceptions, based on our record of complaints. The revision of the regulations should include consideration of this statistical record.

5. Additional specific comments are as follows:

35-035(1)(a)

Requiring certain existing equipment to comply with the same requirement as that for new equipment should be discretely evaluated in terms of the effects on the industry. Our studies and experience have shown that noise reduction of new equipment can generally be accomplished at relatively lower cost compared to that required for quieting existing equipment.

What procedure was used by the Department to evaluate the statistical noise levels defined in table G before January 1, 1977? Did this evaluation include comparison with the U.S. Environmental Protection Agency's latest suggested levels? How will the difference between these levels and the Oregon State regulations on noise levels be rectified or justified? (These same questions apply to regulations of neighboring states where interstate operations are involved).

It is not clear that this paragraph applies only to noise sensitive property. The term "an appropriate measurement point" is described in 35-035(3)(b) but this is the only clue as to the application. The same comment applies to 35-035(1)(b)(A) and 35-035(1)(b)(B).

35-035(1)(a) and (b)

Can the Department require that a noise source be shut down? If so, under what procedures? Who will accept the responsibility for the economic impact from such a shut down? Ref. "No person. . . shall cause or permit the operation of that noise source if the noise levels. . .exceed the levels specified . . ."

35-035(1)(b)(B)(i)

The allowable absolute levels specified in table H are stringent. The additional requirement that the L10 and L50 ambient statistical levels be held to differential increases of less than 10dBA for

each hour of the year is impractical and unnecessarily stringent. Some locations experience occasional hours of extremely low noise levels. The regular operation of nearly any type of device would raise an ambient level of 25 dBA by more than 10 dBA. The 10 dBA requirement, although not applicable, could not be met in a normal library.

35-035(1)(b)(B)(ii)

This paragraph is confusing as written. Is it speaking to the ambient level without the new noise source or is it speaking to the noise level (not ambient) of the new noise source?

35-035(1)(d) Quiet Areas

The intent of quiet area requirements is not clear. The regulations require that sources within a quiet area comply with levels specified in table I at a distance of 400 feet from the source, whereas sources located outside the quiet area must comply with table I at the boundary of the quiet area. From this, it would appear that more stringent requirements are placed on sources located outside the quiet area (but within 400 feet of the quiet area) than for sources within the quiet area itself. This would not appear to be the intention of the regulations. It is necessary that designated quiet areas be identified as soon as possible so the impacts of future projects and land use can be evaluated in the planning stages.

35-035(1)(f) Octave Bands and Audible Discrete Tones

Numerous revisions have been made to clarify this section. Our experience shows that designing future installations to meet the specified "A," octave, and one-third octave band requirements is practically an insurmountable task for a broad band corona type noise source. Furthermore, the inherent noise characteristics of some broad band noises may comply with all requirements except for some of the higher frequency octave band requirements. This brings up the question as to what basis was used in establishing the octave band requirements? In effect, is 43 dB in the 8 kHz octave band more detrimental to the health, safety, or welfare of the public than is 43 dB in the 1 kHz band? What studies or information are the octave band requirements based upon?

Letter to Mr. Joe Richards, Chairman, Environmental Quality Commission, Portland, Oregon; Subj: Oregon State Noise Regulations

35-035(1)(f)(A)

The meaning of "median octave band sound pressure level . . . for . . . periods equal to or greater than six (6) total minutes" is unclear.

35-035(1)(f)(B)

This is unclear. Does this mean that the L10 level for any one-third octave can exceed one but not both of the L50 levels of adjacent one-third octave by more than the specified amounts?

35-035(3)(b)

The term, appropriate measurement point, is essentially defined here. Move this part to the definition section.

35-035(5) Exemptions

Would a temporary transformer unit installed at a substation for a period of 1 to 1½ years (during repair of a faulty unit) be exempt under "(a) Emergency . . ." This time interval is considered to be common practice for the electric utility industry.

Based on the comments contained in this written testimony, BPA feels that power substations and transmission lines should be specifically exempt from these regulations until such time as practical regulations can be developed.

35-035(4) Monitoring and Reporting

Statistical noise level measurement techniques and terminology are described in the "Sound Measurement Procedures Manual" published by the Oregon Department of Environmental Quality. Regarding noise measurement, this document states that "measurements shall not be taken when precipitation is falling." Does this include ambient as well as noise source measurements? It might appear that noise generated by precipitation, such as heavy rainfall on a metal roof, is not of concern.

35-105(2) Definitions

"Any one hour" is not consistent with the philosophy of basing regulations on statistical noise levels, since it allows selection

of the worst hour, which could occur only once a year for example. On a statistical basis it would be more appropriate to use a mean hour for a 1-year interval. In addition, the statistical noise level limits should not be more severe than the actual statistical levels for weather-caused noise.

35-015(8) and (16) Definitions

Is an industrial or commercial site so designated by zoning laws alone?

Impact on Transmission Facilities

At the present time, we cannot assure that new transmission facilities can be economically designed to meet the regulation for new noise sources located on a previously unused site. Even if feasible, they may require an excessively large right-of-way. Based upon the most onerous interpretation of the regulation, including the proposed revisions, the estimated cost to ratepayers would be in excess of $350 million for modifications to existing BPA transmission facilities. A less desirable, but possibly more economic solution, would be to purchase a larger right-of-way. Modifications of this magnitude would require at least 20 years to accomplish and could not begin until after filing an Environmental Impact Statement. The impacts from the modifications to transmission lines, both physical and economic, could outweigh the benefits.

Recommendations

A definite need exists for the State to make a concerted effort to coordinate the establishment of noise regulations with adjacent states and with local governments. Transmission lines in numerous instances cross state lines. Coordination between states is essential to optimize standards for interstate lines. Also, since a transmission line may be several hundred miles in length, it is feasible it could be subject to several local noise regulations as communities set their individual regulations.

Land use planning agencies and the DEQ must insure coordination so that noise sensitive properties will not be developed within the influence of existing electric transmission facilities. Also, it is essential that land uses be established so that impacts of future electric transmission facilities can be considered during planning, location and design.

Letter to Mr. Joe Richards, Chairman, Environmental Quality Commission, Portland, Oregon; Subj: Oregon State Noise Regulations

We propose that the State of Oregon, in cooperation with the electrical utilities, enter into deliberations aimed at prescribing standards which are practical, technically sound, and economically feasible for electric transmission facilities.

These combined efforts would bring to bear on the problem not only the experts of the Department of Environmental Quality but also the combined engineering talent and experience of the utility industry. Such a cooperative program, perhaps a first in the nation, would address this difficult problem in a responsible and realistic manner.

BPA pledges its full support as a participant in such a program.

Sincerely yours,

E. Willard
Assistant to the Administrator -
Interagency Relations

cc:
John Hector
Dept. of Environmental Quality
1234 S.W. Morrison
Portland, Oregon 97205

ENVIRONMENTAL QUALITY COMMISSION

1234 S.W. MORRISON STREET • PORTLAND, ORE. 97205 • Telephone (503) 229-5696

ROBERT W. STRAUB
GOVERNOR

MEMORANDUM

TO: Environmental Quality Commission

FROM: Director

SUBJECT: Agenda Item L, May 27, 1977 EQC Meeting

Staff Report - Evaluation of Interim Noise Standards for Industry and Commerce - OAR Chapter 340, Section 35-035 Table G

Background

Oregon Revised Statute Chapter 467 directs the Environmental Quality Commission to establish maximum permissible levels of noise. In September 1974 the Commission adopted OAR 340-35-035, Noise Control Regulations for Industry and Commerce.

Maximum allowable statistical noise levels for existing industrial and commercial noise sources were set forth in Table G. This included an interim standard 5 dBA less stringent than the final standard and was to be effective for the period after rule adoption in September 1974 through December 1977. It was not until January 1, 1978 that the final standard was to become effective.

Maximum allowable statistical noise levels for new industrial and commercial noise sources were set forth in Table H. It specified that the final standard become effective immediately for all sources built after January 1, 1975.

With the transition on January 1, 1978 to the final standard for existing sources, standards for all industrial and commercial sources, both new and existing, were therefore to be identical. Prior to this transition, however, the regulations stated that the staff would evaluate the statistical noise levels set forth in Table G, and report to the Commission on that evaluation prior to July 1, 1977. This report presents that evaluation.

Evaluation of Statistical Noise Levels

The final (post 1977) statistical noise levels adopted by the Commission were deemed necessary to protect public health, safety and welfare. Criteria used to establish these levels were: 1) protection of speech communication during the day, and 2) protection

against sleep disturbance during the night. The interim statistical noise levels (pre-1978) relaxed this final standard by 5 dBA.

The EPA document entitled "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety", established an outdoor noise level of L_{dn} = 55 dBA as being protective of the public's health and welfare. This recommended level was for both residential areas and other areas with human activity. It was stated in terms of a day-night noise descriptor, L_{dn}. Using this descriptor, noise is measured over a 24 hour period, with a 10 dBA penalty imposed on the nighttime period (10:00 p.m. to 7:00 a.m.).

Oregon rules, by contrast, are based on individual daytime and nighttime standards, with a one hour sample period for enforcement purposes.

To compare the final Oregon standard (post 1977) with the EPA recommendation, the following examples are presented:

Example 1

In this example, assume that the noise source just meets the post 1977 standards of Table G for a given 24 hour period. Thus, during the daytime the source operates at the daytime standards, and at night decreases its noise 5 decibels to the nighttime standards. Converting this statistical noise pattern into the EPA day-night descriptor yields a level of L_{dn} = 59 dBA.

Example 2

In this example, assume that the noise source operates only during the daytime period (7:00 a.m. - 10:00 p.m.) and only just meets the post 1977 daytime standards. When the noise source is not operating, only the background ambient noise exists. (In this example, several assumed ambient conditions were analyzed, ranging from a level of 40 dBA for "quiet suburban residential" area, to a maximum of 55 dBA for a "noisy urban residential" area.)

Calculating the EPA day-night noise level from these assumptions results in levels ranging from L_{dn} = 55 dBA for the area with the quietest nighttime ambient levels, to a maximum of L_{dn} = 62 dBA for that area with a highest nighttime ambient level.

Example 3

In this example, assume again that the source operates 24 hours per day, but always at the same noise level. Assume further that it just meets the post 1977 nighttime standard in Table G. Converting this nighttime statistical noise pattern into the EPA day-night descriptor yields a level of L_{dn} = 58 dBA.

Each of these three different examples illustrates how a typical noise source might operate under the post 1977 standards, and shows how it would compare to the EPA recommendation of L_{dn} = 55 dBA. Although Oregon's standards, when converted to the EPA noise descriptor, do not consistently meet the L_{dn} = 55 recommendation, the examples do indicate that our standards are reasonably close to those recommended by EPA.

Enforcement Activity

The industrial and commercial noise standards are being enforced by DEQ regional and branch offices, with technical assistance coming from the program office staff. During fiscal year 1976, over 300 separate citizen complaints regarding industrial or commercial noise were received by DEQ. After a complaint is received, a noise survey is conducted to determine whether the source is in compliance with the standards.

Existing sources, defined as those constructed prior to January 1, 1975, are subject to the pre-1978 standards set forth in Table G. Sources built after January 1, 1975 must meet the levels in Table H, which are identical to the post 1977 standards of Table G. Therefore, new sources must meet the final, protective, standard immediately, while existing sources must only achieve the interim standard until January 1, 1978. After this date, however, they must also meet the final standard.

If a source is determined to be in violation of the pre-1978 standards, a mutually agreed upon compliance schedule is established. Very often these schedules include not only a plan to meet the pre-1978 standards, but a plan to achieve the final, post 1977 standards as well.

If a "new" source, defined as one built after January 1, 1975, is found to be in violation of the levels of Table H, again a mutually agreed compliance schedule is established. However, these sources, because they are classified as "new sources," must have the final standards as the ultimate goal.

A survey of various industrial and commercial noise sources found to be in violation of the levels in either Table G or Table H yields the following results:

a. All industrial and commercial noise sources (both existing and new) which were determined to be in violation of the appropriate standards have agreed to bring their operations into compliance. None has deemed it necessary to appeal to the Commission for a variance due to economic or technical problems, as provided in OAR 340-35-100.

b. Approximately 50 percent of the existing noise sources found to be in violation of the levels in Table G have been placed on compliance schedules to reduce noise levels to the post 1977 standards

by early 1978. (Because the drafting of these schedules is the duty of the respective field offices, not all sources were placed on such a schedule.)

c. Twenty-seven percent of the total number of sources found to be in violation were classified as "new source," as they had been built after January 1, 1975.

d. Seventy percent of the noise sources classified as "new" (constructed after January 1, 1975) were already in existance when found to be in violation. Thus, these sources did not receive the benefits of plan review for noise considerations prior to construction. Nevertheless, ninety percent of these sources have been brought into compliance with the post 1977 standards. The remaining sources are on compliance schedules for the post 1977 standards.

Summary

The statistical noise standards adopted by the Commission in 1974 are still deemed to be necessary to protect public health, safety and welfare.

The interim standards, 5 dBA less restrictive than the final standards, have served their purposes of giving both industry and the Department initial experience with noise control regulations.

The Department believes, based upon the experience gained since late 1974, that industry should have no major problems complying with the final, post 1977, standards of Table G.

Director's Recommendation

It is the Director's recommendation that the Commission accept this evaluation of the noise standards for industry and commerce, set forth in Table G, as being both protective of the public health, safety and welfare, and feasible, economically and technically, in terms of future compliance by industry and commerce.

Bill

WILLIAM H. YOUNG
Director

JH:dro
5/5/77

ENVIRONMENTAL QUALITY COMMISSION

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ROBERT W. STRAUB
GOVERNOR

MEMORANDUM

To: Environmental Quality Commission

From: Director

Subject: Agenda Item M, May 27, 1977 EQC Meeting

Sulfur Content of Fuels - Authorization for Public Hearing to Review Adequacy of OAR 340-22-010(3)

BACKGROUND

On January 24, 1975, the EQC modified the Department's regulation which limits the sulfur content of residual fuel oil to 1.75% such that "after January 1, 1979 no person shall use or make available for use in Multnomah County, Clackamas County, Washington County or Columbia County a residual fuel containing more than 0.5% sulfur by weight." At the same time, the regulation was modified to require a public hearing to be held by July 1, 1977 to review the adequacy of and need for the new clean fuels regulation.

RESIDUAL FUEL OIL RULE IN MULTNOMAH, CLACKAMAS AND WASHINGTON COUNTIES

The low sulfur residual oil (LSRO) regulation was adopted for the Tri-County area primarily as a means of obtaining an emission trade-off which would allow construction of the proposed Columbia Independent Refinery, Inc., (CIRI) oil refinery in Portland's Rivergate Industrial Park. A complementary requirement was placed in the CIRI permit requiring this company to make LSRO available to the Tri-County area.

Other secondary beneficial effects of the LSRO rule for the Portland airshed were noted as follows:

1. Long term compliance with SO_2 air quality standards would be assured.
2. Acidity of rain and visibility loss would be reduced.
3. Potential for adverse health effects from SO_2 and sulfate particulate would be reduced.

CIRI was issued an air permit in early 1975. CIRI cancelled their project in early 1976 for several reasons, notably the lack of a National energy policy economically favorable for construction of new oil refineries on American soil. The primary basis for adoption of an LSRO regulation for the Tri-County area has now been eliminated as has the assured supply of this oil. Present studies to accurately assess the air quality impact of residual fuel oil combustion ($600,000 Portland Data Base Improvement Program and 20 year air quality maintenance area analyses) are at least a year to two away from completion. Therefore, it appears there is no strong justification for maintaining the LSRO regulation at this time. Revoking the LSRO regulation in the Tri-County area would also have a benefit of making this emission trade-off available to other permit applicants who may need it to locate or expand in the very limited Portland airshed.

Past and present information, however, still gives a strong indication that an LSRO regulation will be needed for the Portland airshed and will be one of the most likely and effective elements of new control strategies which must be developed within the next few years. The basis for this conclusion is discussed later in this report.

RESIDUAL FUEL OIL RULE IN COLUMBIA COUNTY

The LSRO regulation was extended to Columbia County on the basis that:

1. A permit would be issued for at least one of the proposed oil refineries in this county (Charter Energy, St. Helens, and Cascade Energy, Rainier).

2. The cleaner fuel would partially off-set air emission increases from the proposed refineries in the county.

3. The Department's policy would be maintained of not committing to significant increases in air contaminant emissions in the critical Longview-Portland airshed corridor at least until acceptable air quality is assured in the Portland airshed and impacts of emissions in this corridor are defined on a technically sound basis.

The emission off-set for Columbia County was welcomed by State of Washington residents and officials who objected to adding oil refinery emissions to the existing air quality problems in the Longview-Kelso area. A summary of emission offsets is shown in Table 1.

An air permit was issued for the Charter Oil Refinery at St. Helens and the Cascade Energy Oil Refinery at Rainier, Oregon, in early 1975. These permits required the companies to make LSRO available to Columbia County. The Charter Oil project has since been cancelled. The Cascade Energy Refinery is still a viable project. A feasibility report completed early in 1977 for this facility was quite favorable to the project. Financing of the project is now being solicited and a final decision on construction is expected this fall.

Since the basis for application of the LSRO regulation to Columbia County is still in effect, it would appear that the rule should be continued for this county. Since the Cascade Oil Refinery would not be operational until 1981, a two-year extension of the effective date of the LSRO regulation would be necessary.

Table 1

LSRO Emission Offsets - Columbia County

	Air Emissions (Tons/Year)		
	Particulates	SO_2	NOx
Cascade Energy Emissions	150	715	1370
Potential Emission Reductions from LSRO use in County	98	1740	268

AIR QUALITY IMPACT OF THE RESIDUAL FUEL OIL

There is much evidence to indicate that residual fuel oil combustion is a significant source of the Portland airshed's air quality problems. Studies defining the present air quality impact of residual fuel oil emissions and the projected problems will be completed in about one to two years. Information to date on this subject is summarized below:

Particulates

Residual fuel oil combustion contributes about 4% to the Portland airshed's particulate emissions according to the Department's emission inventory. Microscopic analysis of actual air samples indicates oil soot and coked oil droplets are contributing up to 49% of the large particulate with an average of about 19 per cent. Thus, the inventory may not be truly reflecting the actual air quality impact of this source.

An extremely good correlation between total suspended particulate (TSP) levels and residual fuel oil use in the Portland airshed has also been found (see figure 1). While other factors could also have influenced the TSP levels; ventilation, the most significant, has been factored out of this analysis. A similar correlation of fine particles which affect visibility and residual fuel oil use was also discovered.

Completion of the Portland Data Base Improvement project will accurately define the impact of fuel oil combustion on actual air quality. This study includes:

1. a special cooperative program with fuel distributors to measure trace elements in fuel oil,

2. special tests of actual fuel burning device stack emissions to identify unique tracers for the particulate, and

3. comprehensive analysis of actual air samples to identify whether these tracers are actually present in the samples.

Sulfur Dioxide

Residual Fuel oil contributes about 55% of the Portland airshed's SO_2 emissions. Correlations of annual average sulfur dioxide in downtown Portland with residual fuel oil use between the years 1970 and 1975 yielded a high correlation coefficient of .95. While SO_2 air quality standards have not been exceeded in the air shed, a good correlation of residual fuel oil use and SO_2 air quality indicates the sensitivity of air quality levels to the use of this fuel.

Sulfates

Sulfates, which are primarily the atmospheric conversion product of SO_2 emissions, may in the near future justify lowering the allowable sulfur content of residual fuel oil in the Portland airshed. No Oregon or federal sulfate standards exist, but the EPA may promulgate such standards in the early 1980's. Sulfates are recognized as a serious health hazard and are believed to be responsible for much of the adverse health effects attributed to SO_2 and particulate concentration. Annual average sulfate concentrations in the Portland airshed range up to 9 micrograms per cubic meters and daily concentrations have exceeded 20 micrograms per cubic meter. Current health effects research indicates that annual concentrations above 13 micrograms per cubic meter are associated with increased acute respiratory diseases in children and that 24 hour concentrations of 6 to 10 micrograms per cubic meter aggravate asthma and heart and lung diseases in the elderly.

Residual Fuel Oil Supply and Demand

The entire West Coast Residual Fuel oil supply is dictated for the most part by California supply and demand as most of the refining capacity is located there. Oregon uses less than 5% of the West Coast supply of residual oil while California uses nearly 88% or roughly 114 million barrels per year. The Portland area uses less than 3% of the West Coast's supply. Nearly 70% of the residual fuel oil used in California is LSRO (less than 0.5% sulfur) which is required by air quality regulations primarily in the Los Angeles and San Francisco bay areas. Production of LSRO results in a by-product of high sulfur residual oil (HSRO) in the range of 1-3 percent sulfur content. This HSRO is the product now being sold in the Oregon-Washington area.

Estimates are that California's demand for LSRO increased 40% in the period 1975-1976. This was met by modifications to local refineries and contracts to foreign oil suppliers. (See table 2) California's LSRO demand is expected to increase another 60% in the next 5 years. If this demand is met, (and it appears efforts are underway to at least partially meet it) there will be a great surplus of HSRO byproduct. This can have a detrimental effect on Oregon's air quality by increased use of the HSRO. Higher sulfur content of HSRO may also increase the frequency of oil shipments exceeding the present 1.75% sulfur limit. Oregon has experienced such problems already with several variances given for periodic shipments of residual fuel exceeding the present 1.75% limit.

TABLE 2

West Coast Residual Oil Use - Estimate (10^6 Barrels)

	1975	1976
Oregon - High Sulfur (1)	4.4	6.2
Washington - High Sulfur (2)	8.6	Not available
California - High Sulfur	32	30
- Low Sulfur	82	117

(1) Oregon Standard 1.75% S.
(2) Washington State no standard - Puget Sound area 2% limit

There are many areas of the country other than California that have LSRO regulations. In fact 25% of the residual oil produced in this country is LSRO (<0.5% sulfur). In the 6 Western states this percentage is even greater (48% in 1976). These areas have received LSRO through long-term planning efforts of local suppliers, consumers and air quality agency regulations and enforcement. A good example of cooperative efforts of suppliers and customers in developing LSRO is a recent announcement of Southern California Edison to burn extremely low 0.25% sulfur content residual oil in its power plants in advance of proposed regulations in the Los Angeles air basin.

A local supply of LSRO is possible if the Cascade Oil Refinery is built. This facility is committed to supply up to 2,000 barrels per day of LSRO to meet the Columbia County emission trade-off requirement. An additional 4,000 barrels of LSRO could be produced if additional desulfurization capacity is added. The Company has stated a willingness to consider addition of such facilities but only if a market exists through air quality regulations. A 4,000 barrel per day supply could meet a large portion (>50%) of present Portland area demands.

FUTURE RESIDUAL FUEL OIL AIR QUALITY REGULATIONS

A future need for LSRO in the Portland area seems almost a virtual certainty considering:

1. The present evidence of air quality impact of residual fuel oil combustion.
2. Potential increases in use of HSRO because of projected West Coast oversupply.
3. The need to develop a new particulate control strategy for the airshed.
4. The likely adoption of sulfate air quality standards.
5. The need for emission trade-off to allow for significant industrial growth.

While an LSRO air quality regulation may not be implemented for several years, efforts of local suppliers and consumers should continue and, in fact, accelerate to seek supplies of such fuel.

Particulate Regulations

Particulate air quality standards have been exceeded in the Portland area until 1975. In 1976 levels again exceeded standards. The first round of particulate control strategies adopted in 1972 exhausted the most obvious emission control strategies. Cleaner fuel and modern burners are now one of the few candidates for obtaining future reduction in airshed particulate emissions.

It has been indicated that substitution of LSRO for HSRO can reduce particulate emissions from this source class by as much as 50%. It does now appear, however, a more positive way to insure obtaining a particulate emission reduction is to also specify carbon residue content of the fuel oil since in a few cases, lower sulfur oil have in fact increased particulate emissions.

There is also new evidence to indicate that replacement of old type rotary cup burners can reduce particulate emissions from residual oil fired devices from 50% to 70%. It is estimated that nearly 60% of the residual oil burners in the Portland area are of the rotary cup type. Some air quality regulatory agencies have banned use of that type of burner based on evidence that it can emit 2 to 3 times the particulate emissions of more modern burners. Replacement of a rotary cup burner with a modern burner can improve fuel efficiency, save oil, and in fact pay back its costs in just a few years.

Sulfur Dioxide Regulations

If long term projections of SO_2 air quality indicate a threat to violating air quality standards, LSRO regulations will be the most likely solution to the problem.

Sulfates Regulations

If a sulfate standard is adopted, LSRO regulations may be necessary to meet them. In addition it is likely that the Portland Data Base Project will indicate that sulfates are a major contributor to area wide visibility problems. If visibility improvements are to be made, LSRO regulations may be the most likely candidate to accomplish this.

NOx Regulations

The Portland area continues to exceed oxidant health standards and new control strategies will likely be needed. Past efforts have been directed to reducing hydrocarbons emissions to solve the oxidant problems. New strategies may need to include NOx control strategies. Use of LSRO can reduce NOx emissions; however, modification to burners is probably the first step to accomplish this reduction.

CONCLUSIONS

1. Since the proposed Columbia Independent Refinery, Inc., project in Multnomah County has been cancelled, the 0.5% sulfur requirement for residual fuel oil rule in Multnomah, Clackamas and Washington Counties should be revoked. This action would reinstate clean fuel as an available tradeoff for other facilities which may want to locate or expand in the very limited Portland airshed.

2. Since one of the two proposed oil refineries in Columbia County (Cascade Energy at Rainier) is still a viable project, the 0.5% sulfur requirement for residual fuel oil rule should be maintained in this county.

3. The effective date of a clean fuel rule in Columbia County should be delayed two years to January 1 1981 to coincide with the revised expected start up date of the Cascade project. A rule review date of July, 1979 should be adopted as a time to reconsider the need for the rule in Columbia County and to consider reinstating a similar rule in the Portland airshed if studies scheduled to be completed in the next 1 to 2 years indicate that such a requirement is necessary to achieve acceptable air quality.

4. There is considerable evidence which indicates residual fuel oil has a significant impact on Portland's air quality. This evidence indicates a great likelihood of a future need for low sulfur fuel in this airshed as a future control strategy to achieve and maintain acceptable air quality.

DIRECTOR'S RECOMMENDATION

It is the Director's recommendation to authorize a public hearing to consider amending OAR 22-010 parts (3) and (4) (see attachment 1) pertaining to sulfur content of residual fuel oil to:

1) delete Multnomah, Clackamas and Washington Counties from the requirement of using 0.5% sulfur content residual fuel.

2) change the date for implementation of the LSRO Rule in Columbia County to January 1, 1981.

3) require a hearing to be held prior to July 1, 1979 to review the need for the LSRO Rule in Columbia County and consider reinstating the rule in the Tri-County area of Portland.

Bill

Director

5/11/77 1b

ATTACHMENT 1

Proposed Rule Amendment

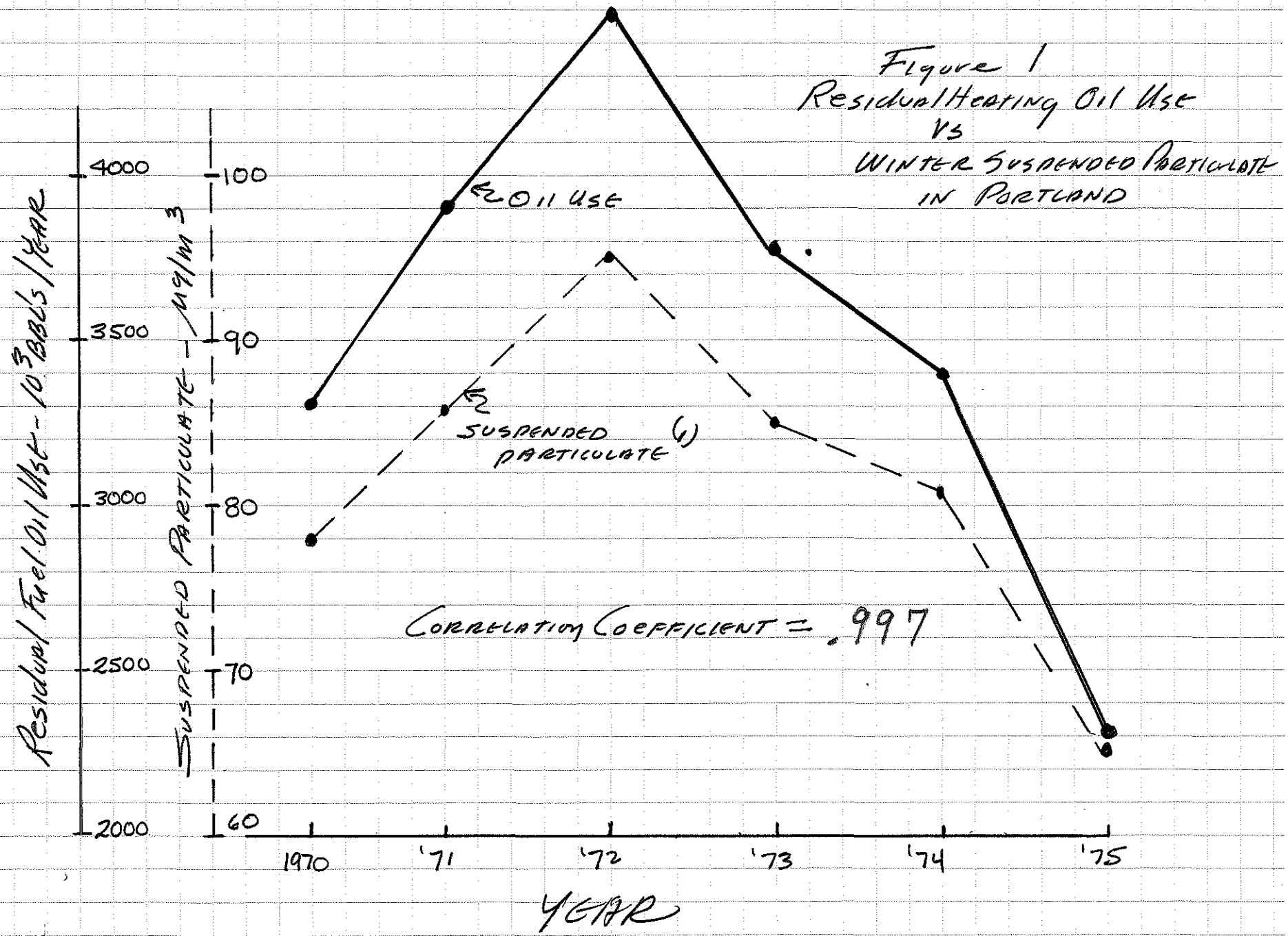
22-010 RESIDUAL FUEL OILS. (1) After July 1, 1972, no person shall sell, distribute, use, or make available for use, any residual fuel oil containing more than 2.5 percent sulfur by weight.

(2) After July 1, 1974, no person shall sell, distribute, use, or make available for use, any residual fuel oil containing more than 1.75 percent sulfur by weight.

(3) After January 1, [1979] 1981 no person shall use or make available for use in [Multnomah County, Clackamas County, Washington County, or] Columbia County any residual fuel oil containing more than 0.5 percent sulfur by weight.

(4) A public hearing shall be held by the Department no later than July 1, [1977] 1979 to review the adequacy of section 22-010(3) and to adopt any revisions that may be necessary.

Hist: Amended 3-25-75 by DEQ 87



(1) 5 station Average Normalized for wind speed

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

MEMORANDUM

TO: Environmental Quality Commission

FROM: William H. Young, Director

SUBJECT: Agenda Item No. N, May 27, 1977, EQC Meeting

Proposed Modifications to "Criteria for Priority Ranking of Sewerage Works Construction Needs" - Used in Grants Program

Background

When EPA Region X approved Oregon's FY 77 priority list on November 3, 1976, they recommended that our prioritization criteria be modified. These criteria were adopted by the EQC at its October 15, 1976 meeting along with the FY 77 priority list.

After staff evaluation of (1) priority systems used by 30 other states, (2) EPA recommendations, and (3) adopted river basin plans, several modifications to our prioritization criteria appear justified. The Department must soon develop the preliminary FY 78 priority list with criteria adopted by EQC.

Proposed Revisions - Priority Ranking Criteria

Most of the suggested changes to Oregon's prioritization criteria are restricted to the numerical point system identified in Part IV. Each revision is explained individually and need for change is emphasized.

1. Stream Segment Ranking. In the past, a maximum of 77 points could be given to a project because of its stream segment location. The number of points received by a project varied between 1 and 77, based on a stream segment ranking shown in the "Annual State Water Strategy -- FY 75" (i.e., prepared in 1974).

   A "Statewide Water Quality Management Plan" was subsequently developed and EQC adopted this plan in December, 1976. Volume II of the plan included ranking of stream segments within each river basin. This ranking scheme was based on water quality considerations; the most severe problem receiving the highest ranking. Since the management plan is more up-to-date than the FY 75 strategy, information in the plan should be used in the grants priority system.

In order to make use of stream segment rankings from the management plan, we first had to rank river basins on some basis. Water quality considerations are already reflected in the plan; therefore, we ranked basins by total population. Placing some degree of emphasis on population (in project ranking) is required by EPA.

The second concern we had was how many points could be possible within a basin. A simple mathematical formula was devised to enable differentiation between basins and to establish maximum possible points for each basin. Stream segment ranking within basin, which was approved in December 1976 by EQC, is used together with basin ranking.

The difference in number of maximum points between basins is dependent on basin ranking and number of stream segments within each respective basin. The new stream segment ranking table is attached to this memorandum, with supporting explanation.

2. Add Sixth Category - The Tie Breaker. For the last three federal fiscal years, projects having the same total number of priority points could not be objectively ranked within point group. For example, four projects having 999 points were given four sequential priority numbers with no explanation given for the difference between project priority number.

   In order to have a consistent way to rank projects with the same priority points, existing population to be served by the proposed project should be used. The project which would serve the largest existing population would be ranked first within point group.

   This "tie-breaker" procedure would recognize that the number of people affected has some correlation with the severity of a water quality problem. However, the major factors of project ranking are already reflected in priority points.

3. Collection Sewer Funding. In past years, we have interpreted that collection sewers can be considered for federal grant assistance in a mandatory health hazard annexation case, when annexation is the end result of legal proceedings. Annexation is not the only solution to a health hazard problem. The City involved should be allowed to provide sewer service by contract if that is the preferred solution.

4. Use of Questionnaire. A questionnaire has been developed and will be sent to each prospective grant applicant. The purposes of this questionnaire include:

   a. Notification that a project need has been identified by DEQ, and

   b. To get relevant information from the potential grant applicant, such as population to be served by the project and estimated project cost.

A summary of staff analysis is contained in Attachment No. 2 to this memorandum.

Director's Recommendation

It is recommended that the EQC:

1. Approve the proposed changes in priority criteria contained in Attachment No. 1.

2. Authorize DEQ to develop a draft priority list using the criteria contained in Attachment No. 1 and

   a. Send out this draft list in June 1977 to all concerned parties (i.e., including the EQC).

   b. Hold a public hearing before the Commission Hearings Officer on the proposed list in July 1977.

   c. Return to Commission for final adoption in August 1977.

Bill

WILLIAM H. YOUNG
Director

THB:ak

Attachments:
1. Revised priority criteria
2. Staff analysis

May 10, 1977

OREGON STATE DEPARTMENT OF ENVIRONMENTAL QUALITY

CRITERIA FOR PRIORITY RANKING OF SEWERAGE WORKS CONSTRUCTION NEEDS FOR FY[~~77~~] 78

I Purpose

The criteria and rules for application set forth herein shall be used to govern the priority ranking of identified sewerage works construction needs for construction grant funding pursuant to applicable state and federal law and regulations from October 1, [~~1976~~] 1977 through September 30, [~~1977~~] 1978. The criteria and rules for application shall be re-evaluated prior to September 30, [~~1977~~] 1978 to assess the necessity for changes. [~~based on availability of funds relative to needs.~~]

II Definition

Applicable definitions from ORS Chapters 468 and 454 shall apply.

III Development and adoption of Project Priority List

At least annually, and prior to the beginning of the federal fiscal year related to the available grant funds, the Department shall prepare a proposed project priority list pursuant to the criteria and rules for application set forth herein. As required by federal rules and after appropriate notice, a hearing shall be held on the proposed list. Following evaluation of testimony received and modification as necessary, the Commission shall adopt a project priority list which shall be the official Sewage Works Construction Grant Priority list of the State of Oregon. The adopted list may be revised at any time following appropriate notice and hearing.

IV Priority Criteria

Identified needs shall be ranked using a numerical point system.

Table A contains the schedule for points assignment within each of the five categories of:

a) Project Need

b) Regulatory Emphasis

c) Stream Segment Ranking

d) Project Type

e) Step Status

Except for projects receiving 999 total points under the Project Need category, each need or project will be assigned appropriate points in each of five categories. The points for each project will then be added and the sum therefrom will be the point total used for developing the project priority list. The project with the highest point total will be the highest priority project. In the event of ties, existing population to be served by each project will be compared. The project which would serve the largest existing population will rank first and the project serving the smallest population will rank last within their common priority point group.

V Rules for Application of Criteria

A. Assignment of Points

Points shall be assigned for each project based on best available data at the time of ranking for adoption of a list. In the event additional information justifies a change in point assignment, change in ranking shall be accomplished in accordance with B or C below.

B. Additions or Elevation in Ranking

Projects may be added to the list or elevated in ranking at the discretion of the Director subject to the following procedure:

1. Points shall be assigned in accordance with Table A and the point total will determine the ranking of the project with respect to projects already on the list.

2. Sponsors of those projects which have fewer total points than the new or re-ranked project shall be notified of the proposed list modifications and a public hearing shall be scheduled with appropriate notice given for the purpose of receiving testimony on the list modifications.

3. Following the evaluation of testimony received, the Commission may adopt the modified list as under Section III.

C. Deletion or Reduction in Ranking

Projects may be deleted from the list or reduced in ranking by the Director without public hearing either in the event of a project's receiving full funding, or by reassessment of point totals or basic project desirability. Sponsors of projects thus deleted or reduced in ranking shall be notified of the revised status of the project and may request a hearing before the Commission regarding the revised status. Such a hearing request must be made to the Director within 20 days following receipt of the notification of revised status and the Director shall schedule a hearing before the Commission within 60 days.

D. Carryover of Projects to Subsequent Year Lists

1. All projects which have been certified for a Step II or Step III grant in a given fiscal year and are not completed will automatically be placed at the top of the priority list for the next fiscal year in the same relative ranking as they appeared in the prior year in order to assure continuity and funding.

2. All projects which have not yet been certified for any grant or have been certified for only a Step I grant will be subject to reprioritization along with all new projects for the next year's list.

E. Project Scheduling

Funds shall be reserved for each project for those phases that are scheduled for certification prior to the end of the fiscal year. Phases which will not be initiated within that time frame will be scheduled for funding from subsequent year funds. In the event of unavoidable schedule slippage, and upon formal request and justification by the applicant, the Director may modify the schedule for the project and continue the reservation of funds provided that such modified schedule does not extend beyond the end of the fiscal year. If request and justification for schedule modification is not received within 30 days after the schedule date, the Director may reallocate the funds to other projects on the list. If the Director initiates a schedule modification without prior request by the applicant, the applicant will be notified and allowed the opportunity to negotiate the new schedule.

Note: If a grant schedule is directly related to an NPDES Waste Discharge Permit schedule, the Department has authority to enforce that permit schedule. Also, the Environmental Quality Commission may enforce a schedule by order when appropriate.

F. Contingency Reserve

A minimum of 15% of each fiscal year's allocation of grant funds shall be set aside as a contingency reserve for grant increases and cost adjustments. A portion of the contingency reserve may be allocated to initiate new projects three months prior to the end of the fiscal year if it appears that the total reserve will not need to be maintained. A portion of the contingency reserve not to exceed $500,000 shall be set aside for Step I and Step II projects pursuant to 40 CFR 35.915(i). The Director is authorized to allocate this portion of the reserve in accordance with state and federal regulations for Step I and Step II projects which may or may not be on the priority list. The Director may return any portion of this special reserve to the main reserve if it will not be used prior to the end of the fiscal year for Step I and II grants.

The 15% reserve shall consist of: 1) a 5% reserve specifically for increases after grant award, 2) a $500,000 reserve under CFR 35.915(i), 3) the remainder to be state undesignated at the time of priority list adoption.

VI Eligibility for Funding

A. Except as noted in B below, facilities eligible for grant assistance shall be limited to sewage treatment works, interceptor sewers, major pumping stations and pressure mains, and such public sewer system rehabilitation as can be shown to have an obvious cost effective benefit related directly to size, effective life or performance of the sewage treatment plant.

B. For FY [~~77~~] 78 collection systems shall be eligible for grant assistance where such systems are required to comply with a mandatory annexation order issued pursuant to ORS 222 or DEQ regulations requiring elimination of Waste Disposal Wells (OAR Chapter 340 Section 44-005 et seq.) This eligibility of collection systems will not be extended [~~beyond~~] [~~September 30, 1977~~] unless the Environmental Quality Commission finds that sufficient federal funds are available to permit extension without jeopardizing the construction program for essential treatment works and interceptor sewers. Collection sewer eligibility must be determined in accordance with 40 CFR 35.925-13. Collection sewer funding will also be possible in mandatory annexation cases (i.e., after health hazard is certified by Health Division) when the municipality involved is willing to provide service to the proposed annexation area on a contractual basis.

TABLE A

PROJECT PRIORITY RANKING CRITERIA FOR FY 77

Point Assignment	Point Categories
	Project Need
999 Total*	Project necessary to comply with mandatory annexation order under ORS 222 or Waste Disposal Well Schedule under OAR Chapter 340, Section 44-005 et seq. (includes sewage collection system, where determined eligible for grant participation after comparison with federal grant criteria). (*Points for regulatory emphasis, stream segment ranking, project type, and step status included in total.)
800	Project necessary to achieve compliance with in-stream Water Quality Standards contained in OAR Chapter 340 Division 4 Subdivision 1 or eliminate a contribution to standards violation.
700	Project necessary to comply with minimum waste treatment standards or effluent standards established by the Department of Environmental Quality or the Environmental Protection Agency.
600	Project needed to minimize or eliminate documented "non-point source" contamination of groundwater or surface waters relating to subsurface sewage disposal system malfunction in known urban or urbanizing areas.
400	Project desirable for prevention of potential water pollution problems.
	Regulatory Emphasis
100	Environmental Quality Commission Order or Regulation.
90	NPDES or State Waste Discharge Permit.
80	Letter directive, preliminary planning approval or project authorization from the Department of Environmental Quality.
50	Other written statement of project desirability by DEQ or the Commission.

Point Assignment	Point Categories
	Stream Segment Ranking
[~~77 maximum~~]	Refer to Table B
	Note: This was replaced in total.
	Project Type
10	Sewage treatment plant projects including cost-effective sewer rehabilitation.
8	Interceptor sewers, major pumping stations and pressure mains.
	Step Status
1	Step I - Facilities plan preparation.
2	Step II - Preparation of plans and specifications.
3	Step III - Project construction.

TABLE B

STREAM SEGMENT RANKING TABLE

Stream Segment Point Ranking Formula

$$\text{Segment Points} = 100 - 2(BR) - \frac{1}{n}(SR)(50)$$

where:

BR = Basin Rank (i.e. 1 to 19)
n = Number of Stream Segments in the particular basin
SR = Segment Rank (i.e. within basin)

Note:

1. Basin Rank is based on total population within each river basin. The basin with the most people is ranked #1 and the least, #19.

2. Segment Rank is shown in the Statewide Water Quality Management Plan.

Basin Rank

Basin	1975 Population	# of Stream Segments	Rank
Willamette	1,565,974	22	1
Rogue	149,575	4	2
Umpqua	78,500	3	3
South Coast	66,687	5	4
North Coast - Lower Columbia	62,551	18	5
Klamath	54,400	5	6
Deschutes	53,810	4	7
Umatilla	43,300	3	8
Mid Coast	35,686	10	9
Hood River	34,530	4	10
Grande Ronde	28,880	3	11
Malheur	21,000	1	12
Powder	16,700	4	13
Sandy	16,552	3	14
John Day	11,500	2	15
Walla Walla	9,210	2	16
Malheur Lake	7,350	3	17
Goose & Summer Lakes	6,560	2	18
Owyhee	3,285	2	19

Stream Segment Ranking Points

Segment	Points
Tualatin	95.73
Willamette (River Mile 0-84)	93.45
Willamette (River Mile 84-186)	91.18
South Yamhill River	88.91
North Yamhill River	86.64
Yamhill River	84.36
Pudding River	82.09
Molalla River	79.82
S. Santiam River	77.55
Santiam River	75.27
N. Santiam River	75.27
Coast Fork Willamette River	73.00
Middle Fork Willamette River	70.73
Clackamas River	68.45
McKenzie River	66.18
Rickreall Creek	63.91
Luckiamute River	61.64
Marys River	59.36
Calapooia River	57.09
Long Tom River	54.82
Columbia Slough	52.55
Thomas Creek	50.27
Remaining Willamette Basin Streams	48.00

- -

Bear Creek and Tributaries	83.50
Applegate River	71.00
Middle Rogue	58.50
Remaining Rogue Basin Streams	46.00

- -

South Umpqua River	77.33
Cow Creek	60.67
Remaining Umpqua Basin Streams	44.00

- -

Coos Bay	82.00
Coos River	72.00
Coquille River (River Mile 0-35)	62.00
Coquille (River Mile 35 - Source)	52.00
Remaining S. Coast Basin Streams	42.00

- -

Segment	Points
Lewis & Clark River	87.22
Klatskanine River	84.44
Wilson River (RM 0 - 7)	81.67
Trask River (RM 0 - 6)	78.89
Skipanon River	76.11
Nestucca River (RM 0 - 15)	73.33
Nehalem River	70.56
Wilson River (RM 7-)	67.78
Trask River (RM 6 -)	65.00
Nestucca River (RM 15 -)	62.22
Nehalem Bay	59.44
Tillamook Bay	56.67
Tillamook River (RM 0 - 15)	53.89
Nestucca Bay	51.11
Necanicum River	48.33
Tillamook River (RM 15 -)	45.56
Netarts Bay	42.78
Remaining N. Coast - Lower Columbia Streams	40.00

- -

Lost River	78.00
Klamath River (RM 210-250)	68.00
Williamson	58.00
Sprague	48.00
Remaining Klamath Basin Streams	38.00

- -

Crooked River	73.50
Deschutes River (RM 120-166)	61.00
Deschutes River (RM 0 - 120)	48.50
Remaining Deschutes Basin Streams	36.00

- -

Umatilla River	67.33
Columbia River (Umatilla Basin)	50.67
Remaining Umatilla Basin Streams	34.00

- -

Siuslaw Bay	77.00
Yaquina Bay	72.00
Siletz River	67.00
Yaquina River	62.00
Alsea River	57.00

Segment	Points
Siuslaw River	52.00
Alsea Bay	47.00
Salmon River	42.00
Siletz Bay	37.00
Remaining Mid Coast Basin Streams	32.00
Hood River Main Stem	67.50
Columbia River (Hood Basin)	55.00
Hood River East, Middle and West Forks	42.50
Remaining Hood Basin Streams	30.00
Grande Ronde River	61.33
Wallowa River	44.67
Remaining Grande Ronde Basin Streams	28.00
Malheur River	26.00
Snake River (Powder Basin)	61.50
Powder River	49.00
Burnt River	36.50
Remaining Powder Basin Streams	24.00
Columbia River (Sandy Basin)	55.33
Sandy River	38.67
Remaining Sandy Basin Streams	22.00
John Day River	45.00
Remaining John Day Basin Streams	20.00
Walla Walla River	43.00
Remaining Walla Walla Basin Streams	18.00

Segment	Points
Silvies River	49.33
Donner & Blitzen River	32.67
Remaining Malheur Lake Basin Streams	16.00
Chewaucan River	39.00
Remaining Goose and Summer Lakes Basin Streams	14.00
Owyhee River	37.00
Remaining Owyhee Basin Streams	12.00

REVIEW OF OREGON'S PRIORITIZATION CRITERIA

This year we made a comprehensive review of Oregon's grant prioritization criteria in order to determine what changes, if any, should be made. This review and our recommendations are now completed.

Procedures Followed

The Sewage Works Construction Section - Grants Unit initiated a survey of other states' priority systems. Out of 49 letters sent out, 30 states responded by sending copies of applicable criteria, rules and regulations.

Comparison of Oregon's system with others helped us to identify strengths and weaknesses of our criteria. Generally, our review led us to conclude that no two state priority systems are identical. In addition, the application of national grant program guidance is different from one EPA Region to another (e.g. Region I versus Region X), judging from approved state priority criteria in each region.

The following discussion highlights the positive and negative characteristics of Oregon's priority system.

Desirable Components of Existing DEQ Priority System

1. Emphasis on the elimination of health hazards and water quality standards violations.

2. Recognition that subsurface sewage disposal failures have a significant effect on ground and surface water quality.

3. Being able to keep a project going through design and construction by assuring high priority ranking once a Step 2 grant application has been certified.

4. Having the flexibility to take funds away from applicants who fail to utilize reserved monies within acceptable schedules. These funds can then be used to fund other projects.

5. Flexibility to reassess priority points and change project ranking during the fiscal year. In addition, new priority lists can be adopted at any time subsequent to adequate public notice and hearing procedures.

6. Limiting collection sewer funding.

Weaknesses of Oregon's Present Priority System

1. Population affected by the proposed project has no distinct effect on priority ranking. In theory, population has some effect on priority point assessment through "regulatory emphasis" and "stream segment ranking".

2. Lack of project specific notification procedures when a need is identified in a community.

3. No way to break a tie between two or more projects which have the same total priority points.

Analysis

Bob Mahoney from PSU's graduate program in public administration, provided "An Analysis of State Sewage Works Construction Grants Priority Systems ---" which is attached to this memorandum. Mr. Mahoney's paper dealt with the question of population and how it affects project ranking in several other states.

After review of both Mr. Mahoney's analysis and the priority systems utilized by other states, we concluded that:

1. There is no obvious similarity between states in how population effects project ranking, and

2. A ranking option that is connected with drainage basins appeared to be the most plausible one for our use, particularly since stream segment point assignment is a weak feature of our present priority system.

The following table displays population data by river basin in Oregon. These data are meaningful since approximately one million Oregonians live outside incorporated communities. Many of these people already have urban services, such as public sewers. Comparison of this table, which reflects ranking by total population, with basin rank by summing incorporated city population (i.e. as presented in Mr. Mahoney's paper) shows some very real differences.

River Basin	Basin Rank	1975 Population
Willamette	1	1,565,974
Rogue	2	149,575
Umpqua	3	78,500
South Coast	4	66,687
North Coast-Lower Columbia	5	62,551
Klamath	6	54,400
Deschutes	7	53,810
Umatilla	8	43,300
Mid Coast	9	35,686
Hood	10	34,530
Grande Ronde	11	28,880
Malheur	12	21,000
Powder	13	16,700
Sandy	14	16,552
John Day	15	11,500
Walla Walla	16	9,210
Malheur Lake	17	7,350
Goose & Summer Lakes	18	6,560
Owyhee	19	3,285

Over 67% of the state's population has existing sewer service. Fifty percent of Oregon's population is within incorporated communities. Therefore, we decided to use the above assignment of "basin rank" rather than that presented in Mr. Mahoney's report.

The attached questionnaire form was developed to assist both the potential grant applicant and our grants program staff. In the past several cities have asked us why a project need was identified in their community. This questionnaire will explain why a project was recommended for inclusion on the grants priority list. It will also request information from the applicant that could play a part in project ranking. For example, identification of the number of people to be served by a proposed project can be used in a "tie-breaker" procedure.

The tie-breaker procedure would be used whenever two or more projects have the same number of priority points. Number of people to be served is a meaningful way to differentiate between projects. Also, the concept of higher ranking for a "bigger" problem is an equitable way to rank projects <u>within equal point group</u>.

Attachments:
1. Questionnaire
2. "An Analysis of State Sewage Works Construction Grants Priority Systems----"

THB:em
May 10, 1977

ROBERT W. STRAUB
GOVERNOR

Department of Environmental Quality

1234 S.W. MORRISON STREET, PORTLAND. OREGON 97205 Telephone (503) 229-

NOTICE OF PLACEMENT ON OREGON'S
SEWAGE WORKS CONSTRUCTION GRANT PRIORITY LIST

Project No._____

In accordance with the state's approved priority system, this is official notification that the following project has been identified on the FY 1978 priority list. All potential grant applicants for federal construction grants under PL 92-500 must be identified on the state's priority list.

Project Description_____

_____

_____

Project Step_____
(1, 2, or 3)

Those applicants who anticipate submitting a complete grant application should complete this form within 30 days. The following information must be submitted to the Water Quality Division at the above address.

1. Applicant_____ Date Prepared_____

   Address _____

   _____

   Contact Person _____ Telephone _____

2. Consulting Engineer _____

   Address _____

   Contact Person _____ Telephone _____

3. Population to be served by project _____
   (If the project was operational today)

4. a. Estimated total project cost _____
   b. Estimated EPA eligible project cost _____
   c. Estimated date of complete application submittal to DEQ _____
   d. Estimated project completion date _____

5. Will state construction loan funds be requested? _____

THB:em
May 10, 1977

Contains Recycled Materials

DEQ-1

An Analysis of State Sewage Works Construction Grants Priority Systems Which Are Required by Section 201 of P. L. 92-500

by

Robert H. Mahoney
MPA Graduate Student
Portland State University

for

Oregon Department of Environmental Quality
Water Quality Division
Sewage Works Construction Section

TABLE OF CONTENTS

Introduction

The purposes of this paper are: (1) to analyze sewage works construction grants priority systems used in several states, (2) to evaluate and critique how population is used in project priority ranking, (3) to compile population data for the State of Oregon, and (4) to summarize available options for changing Oregon's prioritization system. This report will serve as an information source to Oregon's Department of Environmental Quality (DEQ).

Methodology

This report was developed using several sources of information. Population figures were obtained from the 1977 Oregon Blue Book as published by the Secretary of State's Office. Data pertaining to Oregon's drainage basin system was acquired through the Oregon State Water Resources Commission, which included individual maps of each of the state's drainage basins. Basin maps were used because they graphically illustrate urban growth and concentration, thus allowing for a more accurate assimilation of urban population data by drainage basin. Total basin population data were available from DEQ's Water Quality Management Plan which was prepared in 1976.

Population figures were arranged by computer in the descending order of each community's most recent census, beginning with the City of Portland (382,000) and ending with Greenhorn, Oregon (population 3). By arranging Oregon's population (incorporated cities only) in descending order, it was possible to arrive at alternative levels of population values, which might be used in devising a point system to be awarded to communities on the basis of urbanization.

In addition to the above-mentioned techniques, DEQ evaluated priority ranking methods utilized by thirty other states, which, at the request of the Water Quality Division's Grant Administrator, Mr. Tom Blankenship, furnished their respective regulations and prioritization criteria for analysis.

It should be noted that my analysis is restricted to twenty-four states, reflects only a cursory review of the various approaches to the administration of PL 92-500's grant program, and deals primarily with values given to population and how points are awarded on the basis of population figures.

Both population and areal extent for each state were identified to allow for very simple comparison between states. A state's priority system might be compared with the scope of population to be served and its size.

State of Alaska

Population: 302,173 Area: 586,412 sq. mi.; Rank: 1

Alaska allows for a maximum of 1195 points to be awarded for a specific project, with 50 points the maximum number of points that can be granted on the basis of population (12,000 and over). Population weighting is, therefore very slight and accounts for only 4% of the total points allowable per project. According to Alaska's priority list, the highest total points awarded for FY 77 is 855 for Fairbanks. It would seem that Alaska's lack of concentrated population centers has resulted in a system which puts more emphasis on other aspects of their ranking procedures: Type of Project, Primary Uses of Receiving Waters Affected by Project, Public Health or Environmental Cosiderations, Violation or Threatened Violation of State and Federal Water Quality Standards, Project Continuity, and Project Step. Conclusion: While population does not appear to play a significant role in Alaska's ranking system, the format is simple and easily applied; thus it might have some merit in terms of administration, although values assigned to categories are the result of a formula based on costs, which all bear against total eligible project costs.

Population Spread-Point System: a) Over 12,000.....50 points
b) 3,000 to 12,000.....25 "
c) Under 3,000.....10 "

State of Arizona

Population: 1,772,482 Area: 113,909 sq. mi.; Rank: 9

Arizona allocates one point for every 1,000 population and is included within a formula process as an additive factor - all other aspects of the system being multiplied:

> Priority Value (PV) = Percentage Factor x Violation Factor x Basin Priority + Population Affected x Classification of Waters x Abatement Orders.

It is interesting to note that Arizona includes its basin system into the formula, thus refining its basis for awarding points in its

priority classifcation program. Should DEQ adopt a one point per every thousand of population, the range of points would be as follows: Dunes City, with a population of 1,000 (1 point) to Portland, population 382,000 (382 points). This system, however, eliminates ninety-four cities from gaining points as a result of populations of less than one thousand. If, however, the point system were expanded to include fractions of a point for populations below a thousand, or throughout the system, for that matter, all communities could be included within the system and it would eliminate ties in the event of near exact populations. For example, while Dunes City and Bay City would both receive one point for populations of one thousand, Athena, with a population of 970, would receive .97 points. Such a point system would allow for a reasonable administration of points, since the population of each community would provide a straight forward, built in point value, without any manipulation of breaks in the size of communities. Population weighting: With population included within a series of nine categories and ranked seventh, it appears that its impact on the final project score is not critical, although Arizona lists 43 projects for communities of ten thousand or less, as compared to only six projects for communities between 10,000 to 50,000. This can most likely be attributed to the pattern of urbanization in the state, however, just as the same might be said for the State of Oregon, with three distinct urban areas and an abundance of medium sized communities spread throughout the state. Arizona also scores their basins, giving each basin a value of nine, which is then divided by its priority; thus a third place basin would have its value of nine divided by three, resulting in a 3 point score. Basin rankings are based on total population, potential for growth, type and severity of water problems, with emphasis on population affected.

State of Arkansas

Population: 1,923295 Area: 53,104 sq. mi.; Rank: 27

Arkansas ranks population affected second in their list of four categories for determining priorities. The maximum score for population is determined by a simple formula, contingent upon Population Densities per Square Mile of the Segment divided by Population/Square Mile of most densely populated Segment X 30. Arkansas, therefore, applies a factor of 30 for this category, while Severity of Pollution Problems is awarded a value of 40, Preservation of Clean Waters 10 points. Population weighting is, therefore, achieved based on population densities per square mile of the Segment in question, which seems to require a rather current knowledge of the communities development characteristcs and building activity.

South Dakota

Population: 666,257 Area: 77,047 sq. mi.; Rank: 16

The weighting of population as a contributing factor towards the final point total in South Dakota's ranking system is bases on density of population per square mile, with a maximum of six points achievable in this category. Basin segments, for nondegradation and preservation of water quality standards, may achieve up to 14 points maximum; Intensity of pollution, up to four points, depending on circumstances; Flow conditions, up to six points awarded; Primary Pollution Souces, up to six points; for municipalities, up to ten points if population exceeds sixty thousand.

Population values:

0 points	less than 100
1 point	100 to 200
2 points	200 to 400
3 points	400 to 800
4 points	800 to 1500
5 points	1500 to 3000
6 points	3000 to 5000
7 points	5000 to 10,000
8 points	10,000 to 30,000
9 points	30,000 to 60,000
10 points	60,000 and up

State of Delaware

Population: 548,104 Area: 2,057 sq. mi.; Rank 49

Delaware's point system for population is quite simple and based on the total population of the State and the population to be served by the project:

> Points will be awarded based on the percentage of the State's population that is to be served by the project. One point will be awarded for each 1 % of the State's population to be served with a maximum of 10 points permitted, i.e., if a project serves 10 % or more of the State's population, it will be awarded 10 points. The latest estimate of the Delaware State Planning Office for population will be used for the basis for calculating percentages.

Population weighting is, however, significantly lower than the 60 points awarded to Water Pollution Control Needs, Priority Basin (20 points), compare favorably with Planning Integration (10 points).

State of Florida

Population: 6,789,443 Area: 58,560 sq. mi.; Rank: 22

The Florida point system includes population as third in its list of seven factors used to develop a range of priorities. A maximum of 50 points are possible, with the largest population centers - 150,000 and above, given the greatest considereation. Population weighting is as follows: Pollution severity = Max. 100 points; Population affected = Max. 50 points; Need to Preserve Pure Waters = Max. 60 points; National priorities = Max. 40 points. As expressed by Florida officials, the system is designed to treat everyone equal, thus larger cities are not recipients of points accumulated by virtue of their greater population densities.

State of Idaho

Population: 713,008 Area: 83,557 sq. mi.; Rank: 13

As of this date, Idaho does not have a ranking system which includes a "Population Affected" factor; although, the format and other ranking classification categories appears extremely objective.

State of Illinois

Population: 11,113,976 Area: 56,400 sq. mi.; Rank: 24

While the State of Illinois has succeeded in devising an extremely comprehensive evaluative system of calculating its priority system, its application in the State of Oregon appears limited by virtue of Agency resources. No simple approach to population affected seems available using the system, as the state's format for developing a consistent means of evaluation is complex and formula oriented. Population weighting, therefore, was not subject to an in depth analysis, given the formulas included within the correspondence received.

State of Maryland

Population: 3,933,399 Area: 10,577 sq. mi.; Rank: 42

Maryland establishes its point system for "Population Affected" on a dwelling unit per acre formula, which applies to the segment score. However, a population spread from 0 - 49,000 and above has also been included within Maryland's system, which is adjusted by multiplying the score by .75 to reduce the maximum achievable points for population to 150. Maryland's system is too complex to effectively incorporate its treatment of population into Oregon's system, which, because of agency resources should not be completely revamped to duplicate another state's methods for ranking its projects. Population weighting (150 points max.) compares with other of Maryland's criteria as follows: Purpose of Project (150 points max.); Pollution reduction (150 points max.); Basin Rating (150 points max.); Bonus points (50 points max.). The bonus point factor is the first such category used by a state to account for circumstances beyond the control of the administration of the program. This might be worth some consideration as a tie-breaker, should the occasion arise. In any event, the Administrator should be given the opportunity to exercise discretion in the event of a "special" project.

State of Nebraska

Population: 1,483,791 Area: 77,227 sq. mi.; Rank: 15

Nebraska's system is extremely simple in terms of format, with population presented on an incremental basis:

10,000 and over	20 pts.
5,000 and over	18 pts.
1,500 and over	15 pts.
800 and over	10 pts.
250 and over	8 pts.
under 250	5 pts.

Population weighting compares with the point system as per the following categories: Present Treatment (Max. points - 20); Water Pollution Control Facility (Max. points - 15); Receiving Stream (Max. points - 30); National Priorities (Max. points - 15). Population, thus, carries a fairly equitable strength when measured against other factors.

State of Nevada

Population: 488,738 Area: 110,540 sq. mi.; Rank: 7

Nevada uses a formula based on population and assesses valuation to determine points for its population factor. The unavailability of specific data makes it impossible to determine the weighting of population; in any event, the population distribution of the state makes it so unlike Oregon that it is reasonable to assume that population is weigted significantly in favor of its three major urban centers: Reno, Lake Tahoe and the Las Vegas region.

State of New Hampshire

Population: 737,681 Area: 9,304 sq. mi.; Rank: 44

New Hampshire separates its population through "predominately rural" and "predominately urban" classifications, with a maximum of 3 and 5 points awarded for the respective categories. Population weighting, while difficult to assess against such general terms ranks along with other categories on near equal terms - with only priority basins given 6 pts.

State of Indiana

Population: 5,193,669 Area: 36,291 sq. mi.; Rank: 38

The State of Indiana uses a complex arithmetic measurement to determine the population affected: Log $_{10}$ of the ratio of population of municipal dischargers on systems discharging to the segment to the area of the segment as measured in square miles. The weight given to to population would be difficult to determine without the population of the given city and its area. The system appears beyond the simplicity which should be sought in achieving points for population; however, local conditions and urban policies might contribute to the complexity of the system, which would require a far greater analysis than time permits before a totally objective evaluation might be developed. In any event, Indiana's method does not seem suited for Oregon's program.

State of New Mexico

Population: 1,016,000 Area: 121,666 sq. mi.; Rank: 5

New Mexico places great importance on the population factor and ranks its basin system on the basis of population as one of the most contibuting influences towards water pollution. As for municipalities, 1 point is awared for each 1,000 of population - applied on a 0.1 incremental basis, i.e., 8,700 population would be awarded 8.7 points, 9,900 population - 9.9 points, etc. A maximum of 10 points is achievable, however, weighting the system in favor of the communities with smaller population. This system appears effective as a result of its simple application and apparent efficient administrative characteristics. Its application, in principle, in Oregon's program appears more feasible than most of the programs listed to this point. Population weighting seems near equal to other categories listed, with only cold-water fisheries ranked as high as 15 points. All other categories average a 10 point value.

State of North Carolina

Population: 5,082,059 Area: 52,586 sq. mi.; Rank: 28

North Carolina allows a maximum of 5 points for populations over 50,000, breaking their system into three classifications for populations:

Less than 10,000.....1 pt.
10,000 to 50,000.....3 pts.
More than 50,000.....5 pts.

Population is, however, included within a "regional system", which allows for a maximum of 20 points and includes such items in scoring procedures as: regional management agency has been established; area by per centage served; number of cities to be served. Population is included within Section IV, item (d), thus will a total point value for population specifically (out of a total of 20 points for the section), the weighting for population is low, when compared with the other sections, which allow up to 10 points for "shellfish waters", for example. This system does not appear to be compatible with Oregon's present program, since the spread of population values does not allow for a comprehensive application of points for Oregon's settlement pattern.

State of North Dakota

Population: 617,761 Area: 70,665 sq. mi.; Rank: 17

North Dakota allows a maximum point allotment of 10 points for population affected. This state's category system is broken down into the following subject areas:

Segment Ranking.....30 pts. max.
Population.....10 pts. max.
1. Less than 1000....8
2. 1000-5000.....9
3. 5000 and over....10
Enforement Priorities.....30 pts. max.
Preservation of Waters.....25 pts. max.
Discharge effect..... 5 pys. max.

North Dakota also awards up to 5 points for areas to be served with more than 50 people per square mile, which is part of the Segment ranking.

State of Ohio

Population: 10,652,017 Area: 41,222 sq. mi.; Rank: 35

Ohio breaks their scoring system into four categories: Severity of pollution; Population affected; Preservation of water quality, and National priorities. However, for their Segment ranking, population recieves a very high maximum score i.e., a maximum of 41 points allowed. Population scoring is based on the following system:

10,000 or less..... 5 pts.
+1 pt. per 1,000 up to 100,000.....14 pts.
+3 pts. for each add. 100,000
up to 1,000,000.....41 pts. max.

Of all of the states reviewed, only Ohio emphasizes the population factor as critically. Its total state population of 10,652,000 most likely accounts for the population being weighted over the other categories. The system for applying points seems to have merit, especially the + 1 point per thousand principle; however, in Oregon's case it might have to be stated as " + 1 point per thousand people, or fraction thereof" to be applicable.

State of Rhode Island

Population: 949,723 Area: 1,214 sq. mi.; Rank: 50

Rhode Island's priority ranking system favors benefits over population, allowing for a total maximum of 3 points for populations of over 50,000. Shellfishing and drinking water supply may accumulate a score as high as 10 points, with recreation and protection of marine life allotted 8 points, along with projects to prevent nuisances where no sewers are available. Population is extremely simple, with no formula involved, thus making the total scoring of projects administratively managable from the agency resources standpoint.

0-10,000 persons.....1 pt.
10,001-50,000 persons.....2 pts.
50,001- and above.....3 pts.

State of South Carolina

Population: 2,509,516 Area: 31,055 sq. mi.; Rank: 40

Correspondence received from South Carolina indicates that their priority ranking system emphasizes discharge rates, without documentation as to the value placed on population. Therefore, any analysis of their rating system, which is accomplished by formula, is difficult to achieve in the absence of declared methods for applying a scoring method towards the affect of population.

State of Tennessee

Population: 3,924,164 Area: 42,244 sq. mi.; Rank: 34

Tennessee uses population in two ways: actual population per square mile (density) and as a growth factor. Both methods for applying population affected is included within their system for ranking all projects and do so with the formula format. In the event of a tie between jurisdictions, the staff of the Division of Water Quality is authorized to apply whatever available information is considered relevant to determine the project with the greatest compliance standards, etc. The state does award points as per established population counts, but applies a factor, which acts as the score. The factor is then used within the equation for the category in question, i.e., Treatment Plant Projects, Interceptor Projects, Collection System Projects, etc. Although population appears to play a significant role in Tennessee's program, it would appear that a similiar system would be difficult to achieve due to interagency resonsibility: LCDC's responsibility to regulate regional and state-wide planning which has implications for determining population densities, land uses and other factors that influence the points that are awarded to projects.

State of Texas

Population: 11,196,730 Area: 267,338 sq. mi.; Rank: 2

The State of Texas applies priority points by means of a complex

formula, which includes a population curve, awarding points for population on a density per square mile basis. The maximum attainable points under the system is approximately 9, requiring 1,500 people per square mile in order to achieve the highest score. Population appears to play a fairly significant role in the Texas plan, but with the method of arriving at a final score depending on the outcome of so many variables in a formula system, it is difficult to determine exactly the weight given to population. In the final anaysis, however, this system does not represent an approach that Oregon should take in applying a population factor in ranking projects. The methodology is too complex and involved to warrant serious consideration. This is not to suggest that the system for establishing the role of population in any of their projects is inefficient, since it most likely works very well for Texas. But it appears that the administrative resources required to implement the system are extensive and would require modifications to Oregon's program that are not warranted.

Commonwealth of Virginia

Population: 4,648,494 Area: 40,817 sq. mi.; Rank: 36

Virginia's ranking system represents a very orderly presentation of the factors which go to determining the score for a given project. Their population point allocation is based on a straight forward incremental approach, with values ranging from 2.00 points to 5.9 points:

100 - 499...2.0 pts.	15,000 - 19.999...4.18 pts.
500 - 999...2.69 pts.	20,000 - 49,999...4.30 pts.
1,000 -1,000..3.0 pts.	50,000 - 74,999...4.69 pts.
2,000 -2,999..3.30 pts.	75,000 - 99,999...4.88 pts.
3,000 -3,999..3.48 pts.	100,000 - 199,999...5.00 pts.
4,000 -4,999..3.60 pts.	200,000 - 399,999...5.30 pts.
5,000 -9,999..3.69 pts.	400,000 - 799,999...5.60 pts.
10,000-14,999..4.00 pts.	800,000 - Over.....5.90 pts.

The weighting of population for the Segment Priority Ranking places population second in a list of five categories which are used to determine

the final score. Population appears to play a role in almost every category when it come to applying a numerical value to the category; but, since each project differs in scale and scope, it is difficult to apply a consistent weight to the population factor. Virginia's system, however, is systematic, yet simple in its application, suggesting that Oregon might profit from some of the methods utilized for project evaluation, especially the point spread for population densities.

State of Washington

Population: 3,409169 Area: 68,192 sq. mi.; Rank: 20

The State of Washington expresses from the outset of their priority rating instructions that 70% of the state's grant funds will be allocated to projects which will serve populations of over 25,000, with the remaining 30% devoted towards projects serving populations of less than 25,000. Of the various states surveyed in this report, this policy statement is by far the most direct and specific. It represents a departure from the complex formula oriented programs, which seem to prevail in the various systems used; and, it has the advantage of identiying population as the most significant factor in serving to solve the state's pollution problem: go where the people are, declare your intentions to do so, and zero in on the urban centers where the need is the greatest and cost effective projects are most likely to result. Other factors, however, do come into play in rating projects, but in terms of coming to grips with the issue of population, the State of Washington has apparently done so through a political process as compared to a numerical technique. This method should be considered by Oregon as a viable option, thereby identifying its primary goals from a more political base. The final ranking of projects would, like Washington's system, depend on factors related specifically to areas such as public health hazards, discharge rates, compliance, protection of recreation areas and shellfish growing areas, water supplies, etc.

State of Wyoming

Population: 332,416 Area: 97,914 sq. mi.; Rank: 9

Wyoming ranks its population in the following manner (50 max. pts.):

50,000 population and Above.....50 pts.
49,000 population.....49 pts.
48,000 population.....48 pts.
. . .
. . .
. . .
2,000 population..... 2 pts.
1,999 population and below..... 1 pt.

It appears obvious, although there is no mention of it in the text, that Wyoming bases their population scale on one point for every 1,000 population, with the exception of those municipalities under 2,000. This is a simple manner in which to award points, but does result in the tie score problem. As a result the agency administrator, unless armed with a tie breaker system, must evaluate similiar projects and either negotiate with competing groups to arrive at a decision, or make an in-house decision using the latest infomation possible to award points. Other factors are incorporated into the scoring system to prevent the tie situation, but they are variables which have to do with discharge volumes, water quality standards and the like. Obviously, this system, if applied in Oregon, would favor the larger cities, i.e., Portland, Salem, Eugene, Springfield, etc.

STATE OF OREGON

POPULATION SUMMARY SHEET

Basin Name	Cities	Incorporated City Population	Average Population per City/Basin
1. Willamette	91	979,724	10,766
2. Rogue	14	82,967	5,926
3. South Coast	10	41,127	4,112
4. Umpqua	12	38,720	3,227
5. Umatilla	15	31,680	2,171
6. Deschutes	11	31,250	2,841
7. North Coast	18	29,060	1,614
8. Mid Coast (A & B)	9	20,005	2,223
9. Klamath	5	19,240	3,848
10. Grande Ronde	10	18,820	1,882
11. Hood River	11	17,235	1,567
12. Malheur	4	12,645	3,161
13. Powder	9	11,678	1,298
14. John Day	19	8,610	453
15. Walla Walla	2	5,225	2,613
16. Lake Malheur	2	5,170	2,585
17. Goose & Summer Lakes	2	3,165	1,582
18. Sandy	1	2,730	2,730
19. Owyhee	1	210	210
	246	1,359,261	5,525

Population figures acquired from State of Oregon 1977 Blue Book; published by Secretary of State Office, Salem, Oregon

Conclusion

Several things stand out following the review of the twenty-four states whose standards for population are mentioned as the subject of this report:

1) No two states approach the subject of population affected in quite the same manner;

2) All methods appear to reflect the agency's administrative resources, i.e., number of personnel, personnel background and training, etc;

3) The political implications for determining the affect that population will play in the ranking system should be considered as playing a legitimate part, thus eliminating an absolute numerical solution to devising a system, i.e., the State of Washington's policy for determining the allocation of funds. Political considerations, used in this sense, are not meant to include partisan politics;

4) The local development pattern of the specific state seems to be a contributing factor in influencing the role that population plays in the point system;

5) In the final analysis, the success of the water quality program will relate not only to agency resources, but to the scope of the problems confronting the agency and the funding that the agency has to meet the demand for project applications.

It should be noted that Oregon's development pattern is diverse, with some of the most unique geographical characteristics in the nation. With the combination of diversity in urban settlement (Portland representing the extreme) and the unique enviromental characteristics of the state, pollution problems take on a wide spectrum of identities. The one problem that cannot be ignored when building a point system for "population affected"is the tremendous influence that Portland, Salem and Eugene play in such a category. However, if Oregon is to effectively deal with the point sources of water pollution, the larger urban areas cannot be ignored

if they are indeed the cause of the problem. Weighting of population would, therefore, favor the larger cities. Once the problem was resolved and a policy of water preservation was enacted for the area once defined as a violator, the smaller communities would concievably receive greater priority. Such a system would seem logical, although the smaller cities might be critical of so much attention to the highly populated areas.

Some of the other categories for achieving the final segment ranking score might be designed as a compensating factor, however, which could lead to greater flexibility in the system.

Options

1) As per the State of Washington's system, Oregon could declare the per centage of funds to be utilized in the urban areas, i.e., 65% , with 25% set aside for rural areas. The remaining 10% would be held in a contingency fund for emergency purposes. Urban areas would be established with populations above 25,000 with rural areas defined as being less than 25,000;

2. A point system for population affected with 1 point for each 1,000 population, with a fraction thereof for communities below 1,000;

3. A combination of population affected by both cities and drainage basins, thus emphasizing population served throughout the entire point sytem;

4. Rank population near the top of the ranking system, weighting the score for population below at least one of the categories currently in effect. This method would possibly be seen as an equalizer, since the agency has experience in administering existing standards. Population could be intensified in the system in the ensuing fiscal years as the program progresses;

5. Weight the population scoring system towards the mean average population of the state (5,525), emphasizing an area wide program as opposed to centers of high population density;

6. Allow for a "bonus system" in order that the Agency Administrator might either break ties or award points for applications considered essential for the protection of public health, etc.

7. Award points similiar to Alaska's point system, with a modification to more adequately reflect Oregon's settlement pattern:

   Over 50,000.....100 points
   25,000 to 50,000.. 50 points
   Less than 25,000.. 25 points

8. Broaden the range of the system for points, similiar to that of South Dakota...see page 3;

9. Award points on the basis of percentage of the state's population served, i.e., Delaware; see page 4;

10. Emphasize population similiar to that degree of weight given by the State of Ohio; see page 10;

11. Rate benefits derived from projects over population, thereby lowering the the wight given population; see Rhode Island on page 10;

12. Consider an extensive range of population ranges affected; see page 12, Commonwealth of Virginia.

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

MEMORANDUM

TO: Environmental Quality Commission

FROM: William H. Young, Director

SUBJECT: Agenda Item No. O, May 27, 1977, EQC Meeting

Sewage Works Construction Grants - Staff Recommendations for Use of Remaining Federal Grant Funds Through End of Federal Fiscal Year 1977.

Background

The Environmental Quality Commission approved the FY 77 grants priority list on October 15, 1976. Attachment No. 1 is a copy of that list.

The FY 77 priority list was separated into two parts. Part I was adopted as the operational priority list until such time that Oregon received a FY 77 grant allocation from the Environmental Protection Agency. To date, we have not received any FY 77 monies and, therefore, Part II projects have not been funded.

Part I projects ranked 1 through 95 are being funded from FY 76 monies that were carried over into FY 77. Primarily because of schedule slippage, there is approximately $9,866,000 remaining to be obligated by state certification before September 30, 1977.

We must have all general allotment funds committed before October 1, 1977 or they will be returned to the U. S. Treasury. Other account balances include approximately $851,000 in the grant increase reserve.

Status Report on FY 77

As of April 30, 1977, DEQ has committed approximately 74% of available FY 76 carryover monies by state priority certification. A summary of projects certified after September 30, 1976 is provided to illustrate program activities during Federal FY 77:

	Planned	Actual
Step I Grants		
# Certified	10	8
$ Certified	$ 166,000	$ 161,000
Step II Grants		
# Certified	37	15
$ Certified	$6,571,000	$2,216,000
Step III Grants		
# Certified	17	12
$ Certified	$25,844,000	$20,905,000
Grant Increases	-	20
	-	$1,214,000

Other Grant Program Data

The following projects were deleted from Part I of the priority list because of either (1) failure to meet required schedules, (2) because of reassessment of priority ranking, or (3) deleted because the project is no longer needed.

Project	Step	Priority #	Priority List Grant $	Comment
Cave Junction	III	13	$213,000	Rescheduled to FY 78
Aurora	II	33	72,000	Priority reassessed
Prineville (Laughlin)	III	37	220,000	Rescheduled to FY 78
L. Oswego (Glenmorrie)	II	43	80,000	Rescheduled to FY 78
Madras	II	44	35,000	"
Newberg-Dundee	II	62	108,000	"
Jacksonville	II	73	81,000	"
St. Helens	II	76	165,000	"
Prairie City	II	77	40,000	"
Elgin	II	81	31,000	"
Ione	II	83	35,000	"
Bay City	I	85	12,000	No longer needed
Siletz	I	86	10,000	"
Pt. Tillamook Bay	I	87	13,000	"
Sheridan-Willamina	II	91	48,000	"One Regional Plant" Concept Dropped
SUBTOTAL	$1,163,000			
	(Unreserved Funds)			

Recent grant decreases to the Redmond Step II and Step III grants have been returned to our general allotment ($307,280 and $1,212,560 respectively).

Therefore, prior grant adjustments plus the reverted funds identified herein leave $3,665,000 available for reallocation.

Proposed Use of Remaining Funds

1. General Allotment

(Part I Projects that can Utilize Funds Prior to Funding Cutoff)

Project	Step	Grant Funds Reserved on Priority List	Actual Updated Grant Funding Need
Glendale	III	$ 867,000	$1,228,895
Molalla	III	293,000	1,420,000
Pacific City SD	III	355,000	1,300,000
Canyonville	II	69,000	57,000
Hillsboro (Irrig.)	II	8,000	50,000
Junction City	II	32,000	3,000
Monmouth	II		22,500
Independence	II	72,000	60,000
Eugene/Springfield	II	697,000)	2,355,000
Eugene Eastside	II	900,000)	
Portland Sludge	II	277,000	175,000
Seaside	I	49,000	33,750
Aumsville	II	36,000	32,000
Jefferson	II	31,000	31,000
Amity	II	21,000	13,000
Gervais	II	66,000	20,000
Lincoln City (Ph.I)	III	500,000	615,000
L. Oswego(Terrace)	III	110,000	108,127
Roseburg Metro	II	1,300,000	532,500
Roseburg (Rehab.)	II	300,000	600,975
Mt. Vernon	II	50,000	34,500
Hammond	II	36,000	120,000
Woodburn	II	132,000	363,750

Priority List Reserved $6,201,000

Total Required (Actual Need) $9,175,997

Net funds available for allocation.

$9,866,000 - $9,175,997=$690,003

2. Expected Grant Increases - from Reserve

Project	Step	Grant Funding Need
USA (Rock Creek STP)	III	$ 400,000
Portland Tryon	III	1,189,770
USA L. Tualatin	II	112,422
Corvallis (Wet Weather)	II	410,475
Eugene (SSES)	I	300,000
Springfield (SSES)	I	315,000
Corvallis (Sludge)	II	45,000
La Grande	II	19,920
Rainier (SSES)	I	45,000
Sheridan (SSES)	I	30,000
Carlton (SSES)	I	20,000
Total Required		$2,775,165

("Available Reserve"$851,000 - $2,775,165=$1,924,165 "Shortage")
(i.e., Demand for increases is greater than available reserve)

The available increase reserve is not large enough to fund all expected requests for grant increases. Some $690,000 in uncommitted funds can be transferred from the general account into the increase reserve now to make up part of the expected funding shortage. However, it is not necessary to fund all requested increases this fiscal year. Some grant increases can be delayed until additional federal funding is available. Some larger communities have a dedicated sewer reserve fund that is sufficiently large to permit continuing a project. Under these circumstances, increases could be awarded on a reimbursable basis.

Recommendations

It is recommended that the EQC:

1. Reaffirm funding of remaining projects on Part I (with updated costs) that can be awarded grants prior to September 30, 1977.

2. Authorize the transfer of approximately $690,000 from the General Account into the Reserve for Grant Increases where it can be utilized as necessary.

3. Authorize the Director to request transfer of any funds in the General Account that have not been committed by state priority certification by July 31, 1977, into the Reserve for Grant Increases. This action could take effect on August 1, 1977.

Bill

WILLIAM H. YOUNG
Director

THB:ak
Enclosures - 1977 Priority List
May 10, 1977

PART I

DEPARTMENT OF ENVIRONMENTAL QUALITY
FY 1977 PRIORITY LIST AND SCHEDULE

PROJECT NO.	PROJECT	NPDES NO.	ENGR CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,000)	TARGET CERT. (MM/YY)		COMMENT	PRIOR NO.
355	CORVALLIS - AMENDED PROJECT			STP IMP	2	00600	1076		INCR	1
323	NETARTS-OCEANSIDE S D	002988	43	STP, INT	3	1400	1076			2
411	REDWOOD S D	002994	14	STP, INT	3	2185	0876	0976		3
347	REDMOND	NA	43	SYSTEM	3	11000	0976			4
432	FOSTER-MIDWAY	NA	14	SYSTEM	3	1866	1076			5
410	WINSTON-GREEN	002879	56	STP	2	412	0376	0676	RECERTIF	6
438	JOHN DAY-CANYON CITY	002722	01	STP, INT	2	22	0776	0976		7
600	CANYON CITY	NA		INT	2	20	0776	0876		8
421	USA - LOWER TUALATIN	NA	16	INT	2	150	0776	0776		9
421	USA - LOWER TUALATIN	NA	16	INT	3	2200	0976			9
434	GLENDALE	002273	33	STP IMP	3	867	1276			10
429	EAGLE POINT	002229	87	STP IMP	2	21	1275	0176		12
423	CAVE JUNCTION	002833	30	STP IMP	2	28	0676	0676		13
423	CAVE JUNCTION	002833	30	STP IMP	3	213	0177			13
424	BOARDMAN	002070	80	STP IMP	3	1247	0876	0976		14
226	WHEELER - NTCSA INCR	002068	50	INT	3	612	0776	0776		15
404	YAMHILL	002280	84	STP IMP	2	11	1275	0576	RECERTIF	16
505	TILLAMOOK CITY	002066	16	STP IMP	2	189	0976	0976		17
444	MOLALLA	002238	84	STP EXP	3	293	1176			18
446	LEBANON	002081	14	STP IMP	3	1800	1076			19
510	JEFFERSON	002045	84	STP, INT	2	31	0876	0976		20
450	LINCOLN CITY-PHASE 1	NA	56	INT	3	500	0177			21
385	VENETA	002053	52	PS -STP	3	80	1076		INCR	23
373-	CHILOQUIN		32	PS & INT	3	25	1076		INCR	24
453	BONANZA		78	STP IMP	3	425	1076			25
524	LAKE OSWEGO -HARVEY	NA	16	INT	3	142	0976			26
525	LAKE OSWEGO -TERRACE	NA	88	INT	3	110	1176			27

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PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJ. COST (1,000)	TARGET CERT. (MM/YY)	ACTUAL CERT. (MM/YY)	COMMENT	PRIOR NO.
463	LAKE OSWEGO -EVERGRN	NA	91	INT	2	23	0276	0276		28
313	WEST LINN-LOWER TUAL	NA	20	INT	3	112	0976	0976		29
528	COVE	NA	50	STP IMP	3	568	1276			30
417	PACIFIC CITY S D		26	STP, INT	2	45	0576	0576		32
417	PACIFIC CITY S D		26	STP, INT	3	355	0177			32
448	AURORA		26	STP, INT	2	72	0576	0576		33
451	TWIN ROCKS S D	002349	50	INT, STP	3	150	0776	0776		34
538	ROADS END S D	NA	33	INT	3	212	1176			35
544	ADRIAN		12	STP, INT	3	238	1076			36
545	PRINEVILLE -LAUGHLIN	NA	43	INT	3	220	0177			37
547	UKIAH	NA	01	STP, INT	3	267	1076			38
566	PORT OF PORTLAND	NA		INT	3	141	1076			39
581	NORTH ROSEBURG S D	002359	14	INT & PS	2	50	0876	0776		40
486-01	BEND PHASE 1A	NA	56	SYSTEM	2	700	1076			41
585	LAKE OSWEGO -GLENMOR	NA		COLL SYS	2	80	1076			43
579	MADRAS	NA	14	INT	2	35	1176			44
382-02	USA - FANNO PHASE 5	NA	56	INT	3	139	0976			45
619	ASTORIA - WILLIAMSPORT	INT		INT	1	00019	1276			46
487-02	ROSEBURG METRO	002258	14	STP, INT	2	1300	0177			47
616	ROSEBURG SEWER REHAB	002258	14	STP, INT	2	300	1076		PHASED	48
488	CANYONVILLE	002072	33	STP IMP	2	69	0976			49
439	MT VERNON		45	STP, INT	2	50	1176			51
489	HILLSBORO-IRRIGATION	002334		STP	2	8	0976			52
575	USA - GASTON	002015		STP IMP	1	9	0976			53
576	USA - BANKS	002012		STP IMP	1	9	1176			54
496	JUNCTION CITY	002656	09	STP IMP	2	32	0976			55
497	EUGENE AIRPORT	002648	14	STP IMP	2	19	0976			56

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESC.	STEP	ESTIMATED PROJ. COST(1,000)	TARGET CERT. (MM/YY)	ACTUAL CERT. (MM/YY)	COMMENT	PRIOR NO.
490	HARRISBURG	002075	52	STP	2	34	1076			57
452	MONMOUTH-INDEPENDENCE	002061	09	STP	2	72	0976			58
454-02	EUGENE-SPRINGFIELD	002620	14	STP	2	697	1176			59
494	NEWBERG-DUNDEE	002025	84	REG STP	2	108	1176			62
570	SPRINGFIELD	002632		STP IMP	2	200	1276			63
492	USA - UPPER TUALATIN	NA	16	INT	2	153	1176			64
603	USA - BRONSON CK	NA		INT	2	60	1176			66
611	USA - ROCK CK TRUNK	NA		INT	2	200	1176			67
374	MAUPIN	002260	67	STP IMP	2	31	0976			68
474	EUGENE - EASTSIDE	NA	14	INT	2	900	1276			69
413	GOLD HILL	002259	33	STP IMP	2	34	1276			70
617	OAKLAND	002049		STP IMP	1	15	0177			71
556	REEDSPORT	NA	33	INT	2	45	1176			72
498	JACKSONVILLE	002079	30	INT	2	81	1276			73
557	PORTLAND - SLUDGE	NA		STP IMP	2	277	0976			74
539	ST HELENS	NA	86	INT	2	165	1176			76
499	PRAIRIE CITY			STP, INT	2	00040	1176			77
342	PORTLAND - SE RELIEV	NA		INT	3	2888	1276			78
586	RAINIER	002038		STP IMP	1	10	1076			79
475	LA GRANDE-ISLAND CITY	002046	12	STP, INT	2	181	1176			80
472	ELGIN	002243	01	STP IMP	2	31	1276			81
501	CORVALLIS-CRESCENT V	NA		INT	2	111	0976			82
583	IONE		63	STP, INT	2	35	0177			83
502	HAMMOND	002274	43	INT	2	36	0177			84
590	BAY CITY	002257		STP IMP	1	12	1276			85
584	SILETZ	002041		STP IMP	1	10	1276			86
466	PORT OF TILLAMOOK BAY	002291	04	STP IMP	1	13	0976			87

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PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESC.	STEP	ESTIMATED PROJECT COST (1,000)	TARGET CERT. (MM/YY)	ACTUAL CERT. (MM/YY)	COMMENT	PRIOR NO.
503	SEASIDE	002040	56	STP IMP	1	49	1076			88
427	AUMSVILLE	002272	36	STP IMP	2	36	0976			89
506	SHERIDAN-WILLAMINA	002064	47	STP IMP	2	48	1076			91
508	AMITY	002621	20	STP IMP	2	21	1276			92
476	GERVAIS	002739	09	STP/ INT	2	66	1176			93
509	WOODBURN	002000	16	STP, INT	2	132	1176			93
615	CARLTON	002054		STP IMP	1	20	1076			94
273	ROCKAWAY	002330	33	STP IMP	2	184	1176			95
559	LINCOLN CITY PHASE 2	002047	56	STP, INT	2	337	0976			97
512	COTTAGE GROVE	002055	47	STP IMP	2	105	0976			98
513	CRESWELL	002754	40	STP IMP	2	36	1076			99
518	NEWPORT			STP IMP	1	00015	1076			100
514	OAKRIDGE	002231	47	STP IMP	2	28	0177			101
573	LOWELL	002004		STP IMP	2	50	0177			102
594	ESTACADA	002057		STP IMP	1	20	1276			103
515	SCIO	002930	36	STP IMP	2	14	1176			105
620	PHILOMATH			STP IMP	1	00012	1176			107
517	HERMISTON	002076	56	STP, INT	2	263	1276			111
589	MILTON-FREEWATER	002278		STP IMP	1	50	0976			114
564	NORTH POWDER	002240	47	STP IMP	2	35	0976			115
519	JOSEPH	002060	01	STP IMP	2	50	1076			116
554	ENTERPRISE	002056	01	STP IMP	2	44	1076			117
473	DUFUR	002905	63	STP IMP	2	12	1176			118
523	ST PAUL		20	STP, INT	2	41	1276			121
437	WAUNA-WESTPORT		16	STP, INT	1	24	1276			129
426	MULTNOMAH CO - INVERNESS #8			INT	2	00060	1276			130
465	GRESHAM - LINNEMAN	NA	56	INT	2	157	1076			131

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESC.	STEP	ESTIMATED PROJ. COST (1,000)	TARGET CERT. (MM/YY)	ACTUAL CERT. (MM/YY)	COMMENT	PRIOR NO.
356	COLUMBIA CITY	002071		INT	2	21	1176			132
532	HWY 101 S D	NA		INT	2	19	1176			136
467	SILVERTON	002065		STP IMP	2	26	1276			137
534	NEWBERG - NORTHWEST	NA	43	INT	2	20	1176			142
536	LAPINE			STP, INT	1	12	0976			145
447	MILL CITY		09	STP, INT	1	22	0976			147
537	SW LINCOLN CO S D		43	STP, INT	2	254	0177			148
542	CARMEL-FOULWEATHER S D		43	STP, INT	2	136	1076			149
560	ROSEBURG -RIFLE RNG	NA		INT	1	9	1176			150
607	BCVSA - WHETSTONE	NA		INT	1	12	0177			153
574	WESTSIDE S D - K FALLS		32	STP/ INT	2	80	1276			155
541	SISTERS		33	STP, INT	2	56	0177			157
449	FALLS CITY			STP, INT	1	12	0177			158
546	CRESCENT			STP, INT	1	12	0976			159
597	YONCALLA	002245		STP IMP	1	12	1176			162
608	USA - BROOKWOOD TRNK	NA		INT	2	2	1076			165
610	USA - SUNSET TRUNK	NA		INT	2	40	1176			166
613	USA - REEDSVILLE TRNK	NA		INT	2	90	0177			167
549	HILLSBORO - WESTSIDE	002334		STP AUTO	1	6	1076			169
535	CANBY	NA	60	INT	1	10	1176			171
621	PORTLAND - LINNTON INT			INT	1	00015	0177			172
568	ELKTON		47	STP	1	10	0177			173
563	ROSEBURG - LOOKINGGL	NA		INT	1	10	1076			174
562	IMBLER		67	STP, INT	2	21	1276			181
578	TROUTDALE	002052	38	INT &EXP	2	66	0177			182
552	POWERS	002693	33	STP IMP	1	3	0177			186
553	BANDON - JOHNSON	NA	33	INT	2	46	1076			187

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PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESC.	STEP	ESTIMATED PROJ. COST (1,000)	TARGET CERT. (MM/YY)	ACTUAL CERT. (MM/YY)	COMMENT	PRIOR NO.
569	STANFIELD	002697	67	STP IMP	2	43	1176			190
593	ELMIRA	NA		INT	1	8	0177			191
602	NESKOWIN			STP, INT	1	15	1276			192

PART II

DEPARTMENT OF ENVIRONMENTAL QUALITY
FY 1977 PRIORITY LIST AND SCHEDULE

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,00	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
410	WINSTON-GREEN	002879	56	STP	3	1500	0377		6
438	JOHN DAY-CANYON CITY	002722	01	STP, INT	3	1290	0577		7
600	CANYON CITY	NA		INT	3	250	0377		8
436	SUTHERLIN	002084	33	STP IMP	3	1652	0277		11
429	EAGLE POINT	002229	87	STP IMP	3	124	0477		12
404	YAMHILL	002280	84	STP IMP	3	120	0277		16
505	TILLAMOOK CITY	002066	16	STP IMP	3	800	0677		17
510	JEFFERSON	002045	84	STP, INT	3	284	0277		20
428	BROWNSVILLE	002008	36	STP IMP	3	213	0377		22
463	LAKE OSWEGO -EVERGRN	NA	91	INT	3	213	0377		28
530	LAKESIDE	002999	33	STP, INT	3	709	0377		31
448	AURORA		26	STP, INT	3	568	0477		33
581	NORTH ROSEBURG S D	002359	14	INT & PS	3	480	0477		40
486-03	BEND PHASE 1B	NA	56	SYSTEM	2	950	0777		41
585	LAKE OSWEGO -GLENMOR	NA		COLL SYS	3	600	0477		43
579	MADRAS	NA	14	INT	3	250	0577		44
619	ASTORIA - WILLIAMSPORT INT			INT	2	00080	0877		46
616	ROSEBURG SEWER REHAB	002258	14	STP, INT	3	2000	0677	PHASED	48
488	CANYONVILLE	002072	33	STP IMP	3	600	0577		49
605	PORTLAND - ELK ROCK	NA		INT	3	225	0877		50
439	MT VERNON		45	STP, INT	3	400	0677		51
489	HILLSBORO-IRRIGATION	002334		STP	3	71	0377		52
575	USA - GASTON	002015		STP IMP	2	60	0577		53
576	USA - BANKS	002012		STP IMP	2	60	0777		54
496	JUNCTION CITY	002656	09	STP IMP	3	248	0677		55
497	EUGENE AIRPORT	002648	14	STP IMP	3	142	0577		56
490	HARRISBURG	002075	52	STP	3	352	0477		57

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,00	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
452	MONMOUTH-INDEPENDENCE	002061	09	STP	3	567	0377		58
454-03	EUGENE-SPRINGFIELD		14	REHAB	3	2000	0777		59
458	CORVALLIS AIRPORT	002250	43	STP	2	57	0277		60
493	TRI-CITY S D		56	REG STP	2	670	0677		61
494	NEWBERG-DUNDEE	002025	84	REG STP	3	851	0877		62
492	USA - UPPER TUALATIN	NA	16	INT	3	2017	0677		64
605	HALSEY	002239		STP IMP	1	12	0277		65
603	USA - BRONSON CK	NA		INT	3	400	0477		66
611	USA - ROCK CK TRUNK	NA		INT	3	2000	0777		67
374	MAUPIN	002260	67	STP IMP	3	357	0377		68
413	GOLD HILL	002259	33	STP IMP	3	266	0677		70
556	REEDSPORT	NA	33	INT	3	354	0777		72
498	JACKSONVILLE	002079	30	INT	3	495	0777		73
557	PORTLAND - SLUDGE	NA		STP IMP	3	4290	0477		74
558	BCVSA - WHITE CITY	002246	14	INT	2	103	0577		75
539	ST HELENS	NA	86	INT	3	1100	0677		76
499	PRAIRIE CITY	002003	80	STP, INT	3	272	0577		77
586	RAINIER	002038		STP IMP	2	35	0577		79
475	LA GRANDE-ISLAND CITY	002046	12	STP, INT	3	1980	0577		80
472	ELGIN	002243	01	STP IMP	3	357	0677		81
501	CORVALLIS-CRESCENT V	NA		INT	3	781	0677		82
583	IONE		63	STP, INT	3	300	0877		83
584	SILETZ	002041		STP IMP	2	35	0677		86
466	PORT OF TILLAMOOK BAY	002291	04	STP IMP	2	50	0277		87
503	SEASIDE	002040	56	STP IMP	2	182	0577		88
427	AUMSVILLE	002272	36	STP IMP	3	387	0277		89
430	DAYTON	002363	84	STP IMP	2	27	0277		90

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,00	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
476	GERVAIS	002739	09	STP/ INT	3	567	0677		90
508	AMITY	002621	20	STP IMP	3	238	0577		92
509	WOODBURN	002000	16	STP, INT	3	1135	0477		93
615	CARLTON	002054		STP IMP	2	60	0677		94
273	ROCKAWAY	002330	33	STP IMP	3	1100	0777		95
511	CANNON BEACH	002022	16	STP IMP	2	74	0277		96
559	LINCOLN CITY PHASE 2	002047	56	STP, INT	3	2929	0477		97
512	COTTAGE GROVE	002055	47	STP IMP	3	845	0777		98
513	CRESWELL	002754	40	STP IMP	3	284	0577		99
618	NEWPORT			STP IMP	2	00045	0777		100
514	OAKRIDGE	002231	47	STP IMP	3	212	0877		101
592	DALLAS	002073		STP IMP	2	35	0477		104
515	SCIO	002930	36	STP IMP	3	107	0677		105
588	MT ANGEL	002876	84	STP IMP	2	35	0377		106
588	MT ANGEL	002876	84	STP IMP	3	300	0977		106
620	PHILOMATH			STP IMP	2	00040	0777		107
569	MONROE	002920	47	STP IMP	2	40	0377		108
569	MONROE	002920	47	STP IMP	3	300	0877		108
571	UMATILLA	002230		STP EXP	3	350	0377		109
571	UMATILLA	002230		STP EXP	2	50	0677		109
516	KLAMATH FALLS REGION	002630	33	STP	2	497	0677		110
517	HERMISTON	002076	56	STP, INT	3	2186	0977		111
518	ONTARIO	002062	12	STP IMP	2	44	0977		112
431	BAKER	002069	12	STP, IMP	2	146	0977		113
589	MILTON-FREEWATER	002278		STP IMP	2	185	0377		114
589	MILTON-FREEWATER	002278		STP IMP	3	800	0977		114
564	NORTH POWDER	002240	47	STP IMP	3	300	0477		115

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,00	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
519	JOSEPH	002060	01	STP IMP	3	387	0377		116
554	ENTERPRISE	002056	01	STP IMP	3	370	0377		117
473	DUFUR	002905	63	STP IMP	3	96	0577		118
521	N ALBANY S D	NA	09	INT	2	117	0477		119
522	NORTH PLAINS	NA		INT	1	10	0977		120
523	ST PAUL		20	STP, INT	3	359	0777		121
526	CLACKAMAS CO - RHODO-W		56	STP IMP	2	46	0677		122
567	HAPPY VALLEY	NA	08	INT	2	35	0277		123
567	HAPPY VALLEY	NA	08	INT	3	300	0877		123
455	SHADY COVE		30	STP, INT	2	72	0277		125
455	SHADY COVE		30	STP, INT	3	568	0877		125
456	MERLIN-COLONIAL VALLEY		40	STP, INT	1	24	0677		126
527	BCVSA - CENTRAL PT		14	INT	2	90	0577		127
582	IRRIGON			STP, INT	2	30	0877		128
437	WAUNA-WESTPORT		16	STP, INT	2	91	0777		129
426	MULT CO-INVERNESS #8	NA		INT	3	413	0577		130
465	GRESHAM - LINNEMAN	NA	56	INT	3	1061	0677		131
356	COLUMBIA CITY	002071		INT	3	200	0577		132
577	HOOD RIVER-WESTSIDE	NA	63	INT	2	15	0577		133
577	HOOD RIVER-WESTSIDE	NA	63	INT	3	100	0977		133
572	THE DALLES - FOLEY	NA	63	INT	2	20	0277		134
572	THE DALLES - FOLEY	NA	63	INT	3	100	0777		134
531	DUNES CITY			STP, INT	1	14	0577		135
532	HWY 101 S D	NA		INT	3	200	0677		136
467	SILVERTON	002065		STP IMP	3	212	0577		137
533	FLORENCE	002074	47	STP IMP	2	69	0577		139
445	DONALD		09	STP, INT	2	46	0577		141

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,0	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
534	NEWBERG - NORTHWEST	NA	43	INT	3	121	0577		142
471	TANGENT			INT	1	14	0377		143
471	TANGENT			INT	2	55	0877		143
460	ALBANY - NORTHEAST	NA		INT	1	20	0277		144
536	LAPINE			STP, INT	2	55	0477		145
622	PORTLAND - 45TH DR INT			INT	1	00015	0277		146
447	MILL CITY		09	STP, INT	2	91	0577		147
537	SW LINCOLN CO S D		43	STP, INT	3	2200	0977		148
542	CARMEL-FOULWEATHER S D		43	STP, INT	3	1063	0377		149
560	ROSEBURG -RIFLE RNG	NA		INT	2	25	0777		150
561	AGATE BEACH S D	NA		INT	1	18	0377		152
561	AGATE BEACH S D	NA		INT	2	68	0977		152
607	BCVSA - WHETSTONE	NA		INT	2	70	0977		153
540	MERRILL	002048		STP, INT	1	12	0477		154
574	WESTSIDE S D - K FALLS		32	STP/ INT	3	650	0777		155
541	SISTERS		33	STP, INT	3	434	0877		157
449	FALLS CITY			STP, INT	2	45	0577		158
546	CRESCENT			STP, INT	2	38	0377		159
587	HAINES		01	STP, INT	2	35	0377		160
587	HAINES		01	STP, INT	3	300	0877		160
597	YONCALLA	002245		STP IMP	2	50	0777		162
470	COBURG		14	STP, INT	1	22	0377		163
470	COBURG		14	STP, INT	2	91	0977		163
604	CLACK CO-KELLOGG SL	002622		STP IMP	1	10	0477		164
608	USA - BROOKWOOD TRNK	NA		INT	3	6	0377		165
610	USA - SUNSET TRUNK	NA		INT	3	320	0577		166
613	USA - REEDSVILLE TRNK	NA		INT	3	450	0777		167

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,000	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
549	HILLSBORO - WESTSIDE	002334		STP AUTO	2	25	0477		169
598	OAK LODGE S D	002614		STP IMP	1	15	0277		170
598	OAK LODGE S D	002614		STP IMP	2	50	0977		170
535	CANBY	NA	60	INT	2	23	0377		171
535	CANBY	NA	60	INT	3	142	0877		171
621	PORTLAND - LINNTON INT			INT	2	00045	0877		172
568	ELKTON		47	STP	2	40	0877		173
563	ROSEBURG - LOOKINGGL	NA		INT	2	25	0577		174
580	LEXINGTON		63	STP, INT	2	44	0277		176
580	LEXINGTON		63	STP, INT	3	380	0877		176
614	ARLINGTON	002019		STP EXP	2	20	0477		177
609	BCVSA - WEST MEDFORD	NA		INT	1	10	0377		179
612	BCVSA - WAGNER CK	NA		INT	1	6	0577		180
562	IMBLER		67	STP, INT	3	164	0577		181
591	CASCADE LOCKS	NA		INT	1	8	0377		183
606	CLATSKANIE	NA		INT	1	8	0977		184
551	SANDY	NA	04	INT	1	5	0377		185
551	SANDY	NA	04	INT	2	21	0977		185
552	POWERS	002693	33	STP IMP	2	12	0777		186
553	BANDON - JOHNSON	NA	33	INT	3	262	0377		187
468	SCOTTS MILLS			STP, INT	1	16	0377		188
468	SCOTTS MILLS			STP, INT	2	58	0977		188
477	DETROIT			STP, INT	1	16	0477		189
477	DETROIT			STP, INT	2	58	0977		189
565	STANFIELD	002697	67	STP IMP	3	335	0677		190
593	ELMIRA	NA		INT	2	19	0777		191
602	NESKOWIN			STP, INT	2	45	0877		192

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,00	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
548	SUMPTER			STP, INT 1		4	0477		193
479	JUNTURA			STP, INT 1		4	0377		194
601	WALLOWA LAKE S A			STP, INT 1		10	0277		195

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

MEMORANDUM

TO: Environmental Quality Commission

FROM: William H. Young, Director

SUBJECT: Agenda Item P, May 27, 1977 Commission Meeting: Proposed OAR 340-41-011 (Procedural Authority During Critical Situations)

Introduction

As will be evident from the attached hearing report, considerable attention has been given the proposal (Attachment A of the Hearings Report) through the hearings process. The proposal was developed on the apprehension that it might be needed this summer for low flows. (Hopefully not.) It was, however, written to address any natural disaster affecting water quality.

Because the water situation may be severe this summer, suggestions included many ideas for management of water quality in general. As will be explained below, we here categorize the comments into two groups: One group is the subject of the present recommendation. The other, we feel, should be addressed in the future.

Discussion of Present Recommendation

(See the PROPOSAL AS AMENDED on pages 5 and 6.)

Subsection (1): To emphasize that both tighter and more relaxed controls are possibilities in critical situations, we have added the language similar to that proposed by EPA which recognizes the possibility of tightening controls.

To address (in so far as we feel it appropriate at

this time) some of the concerns expressed we've also added policy language which recognizes that short sighted action could jeopardize previous water quality efforts by industry, government and others or impair long term goals.

While added language does not call for the initiation of studies, it does set forth a policy of fully utilizing existing knowledge.

Subsection (2): We agree with EPA that, in time of disaster, action to ameliorate its affects should come before any debate about whether the disaster is "natural." Consequently, the word "natural" has been removed as a modifier of "disaster" in the definition of critical situation.

We do not modify as suggested by the Emergency Services Division because we do not want the present proposed ground rules to interfere with or substitute themselves for what is agreed upon and appropriate under the Governor's disaster power.

Also, to address concerns that the rule might be interpreted as intended primarily to serve industry, we've incorporated public and private property along with economic stability on the list of public interests to be weighed.

The proposal now provides that the Commission could act where there is a critical situation or one is <u>imminently approaching</u>.

Subsection (3) has been changed to more clearly require specific findings prior to action. Also, pursuant to the suggestions of the Clean Water Project entities other than the Deparmtent might be asked to exercise their authority or perform duties.

In addition, this subsection now provides that the Commission would provide for periodic review and date of termination <u>when any action is taken</u> in response to a critical situation. After the testimony we feel lacking in foresight on these subjects and recommend they be handled when a precise situation presents itself.

Subsection (4) The proposal has been amended to provide for automatic public participation as soon as practical. This insures two benefits:

1) The Commission will, in normal course, review each action taken under this procedure at least once, even if it is terminated by the time of hearing;

2) Public input is guaranteed which will allow issues of non-discharge alternatives, reallocation of effluent loads, prioritization of interests and other issues to be addressed with any specific action and the location to be affected in mind.

General Discussion

The staff agrees with many of the suggestions for planning, announcement of priorities, investigation of alternatives, and assessment of potential long range impacts that have been made. The spector of drought has reminded the agency and the public of tasks that need to be addressed. Perhaps some prioritization of needs can take place as 303 Basin Plans are reviewed. Many alternative scenarios can and are being contemplated as, in conjunction with others, the agency studies the possible responses to drought.

However, the present proposal is not intended to guide actions but is intended to give the public an understanding of the ground rules under which actions will be taken in situations such as drought, the Columbus Day Storm or similar threats to public welfare.

Further, when a critical situation arises, if not all of the desired planning is done and not all of the desired alternatives are known but there is clearly a need for action, the public would suffer the consequences of inaction no matter who was responsible for the failure of desired preparation.

Finally, the legislature delegated to the Commission powers of great flexibility in ORS Chapter 183 (emergency

PROPOSAL AS AMENDED

Add a new section to OAR Chapter 340, Division 4, Subdivision 1 as follows:

340-41-011 PROCEDURAL AUTHORITY DURING CRITICAL SITUATIONS

(1) The EQC recognizes as follows:

(a) that critical situations may arise where action to enforce compliance with the provisions of this plan, including but not limited to water quality standards or the conditions of permits issued pursuant to ORS 468.740, would be inconsistent with the protection of the public health, safety, and welfare.

(b) that critical situations may also require more stringent limits regarding discharges in order to protect the public health, safety, and welfare.

(c) that any reaction to critical situations should be mindful of the value of conserving hard-earned gains in water quality and of retaining capability to make future progress in water quality.

(d) that any action which would relax water quality requirements or tend to increase water pollution during a critical situation should be taken only after such careful consideration is given to alternatives as time and circumstances permit.

(2) As used in this section, "critical situation" means flood, drought, fire, windstorm, or other comparable [~~natural~~] disasters where [~~such substantial damage to property occurs that~~] the health, safety, welfare [~~or~~] economic stability, public property, or private property of the state or its citizens is [~~thereby affected~~] damaged or likely to be damaged, if it appears [~~the above described standards and conditions were rigidly enforced~~] adherence to water quality plans or standards or discharge permits would cause or increase damage to one or more of the public interests set forth above [~~such health, safety, welfare or economic stability would be more materially affected~~]

(3) [~~In such cases~~] During the presence or immanent approach of one or more critical situations, the EQC may, by rule, temporarily modify any portion of [~~this~~] a water quality plan and, by order, suspend enforcement of any condition of a waste discharge permit or impose more stringent control requirements than the permit contains upon:

(a) giving such public notice as is required and practicable under the circumstances;

(b) making findings which support a conclusion that one or more critical situations contemplated in [~~subparagraph~~] subsection (2) [~~do exist~~] are present or immanently approaching;

(c) setting forth the program for control during the critical situation;

(d) specifying the geographical area or areas affected; and

(e) specifying the powers, if any, to be delegated to the Director and others during the critical situation [;].

(f) specifying the frequency with which its action shall be reviewed and the date when, absent further Commission action, the action shall be terminated.

(4) Where such has not preceded any action taken pursuant to [~~subparagraph~~] subsection (3) there shall promptly be held a public hearing with notice and opportunity to be heard as provided for rule-making hearings in ORS Chapter 183 wherein testimony may be given on whether or not the action should be terminated, modified, continued, or (if terminated at the time of hearing) re-instated or repeated in future, similar circumstances. [~~shall be reviewed by the EQC at least every 60 days and the EQC shall then modify or terminate the action as necessary to protect public health, safety and welfare or prevent irreparable damage to any resources of the state. Nor such action may remain in effect for more than one year from the date of the EQC's original action~~]

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

To: Environmental Quality Commission

From: Hearing Officer

Subject: Hearing Report: May 21 and 22, 1977. Hearings on Proposed OAR 340-41-011 (Procedural Authority During Critical Situations)

Background

Pursuant to public notice and commencing at 9:00 a.m. on May 21 and again at 1:00 p.m. on May 22, public testimony was received on the subject proposed rule (Attachment A). In addition, written testimony was offered both before and after the hearings. The hearings were held in the Department's offices and in St. Benedict's Lodge at McKenzie Bridge. Following is a summary of the testimony received.

Summary

Mr. John Vlastelicia, on behalf of the Administrator of EPA's Region X (see Attachment B):

Mr. Vlastelicia expressed his agency's concern that the proposal should not appear to relax Oregon's very good water quality program. He recognized, however, that unusual circumstances might require special rules.

It was recommended that the Commission add to the first subsection its recognition that a critical situation may require more stringent limits regarding discharges in order to protect the public health, safety, and welfare.

It was suggested that the proposal address itself to "man caused" disasters as well as natural.

The proposal was found lacking in decisional criteria. Suggested was language placing a burden on any proponents of relaxation to show strongly the absence of alternatives which would better protect against irreparable damage to streams, and loss of downstream jobs, aquatic life or drinking water supplies.

Also offered was a recent statement by the Administrator of Region X on the EPA's role during drought situations. The statement emphasizes voluntary measures and local governmental programs.

To the extent EPA is or will become involved in matters where it may take (or forego) enforcement action, the appropriate priorities were thought to be as follows:

1. safe drinking water supplies
2. livelihood of persons downstream
3. prevention of irreparable damage to streams.

Mr. Irv Jones, on behalf of the Oregon Department of Fish and Wildlife (Attachment C):

The Department recognized that occasional natural disasters may be adverse to fish and wildlife.

While opposing any action which would tend to degrade water quality, Mr. Jones recognized the proposed rule as one which would give needed flexibility in times of emergency. It was supported particularly in its provision that, in some cases, regulatory measures might become more stringent.

Citing the economic value of the state's fish and wildlife resource, Mr. Jones called for careful consideration to avoid endangering it.

On-going review was suggested as a better alternative to 60 day review.

It was suggested the rule require the DEQ to notify Fish and Wildlife so the latter could help the DEQ to identify any areas where adjustments might threaten fish or wildlife.

Ms. Judith A. Cichowicz, Oregon Emergency Services Division:

Ms. Cichowicz suggested that the term "disaster" be substituted for "critical situation" so as to employ terminology consistant with the Governor's statutory authority relative to disaster.

Ms. Mylene Simons and Mr. Jan Sokol, representing the Oregon Student Public Interest Research Group (OSPIRG) (Attachment D):

The Department's proposal was found to be worded in such a way as to ignore citizens, public water supplies, wildlife and aquatic life.

OSPIRG urged a rule which was felt to provide better recognition of the social and environmental consequences of any action.

The OSPIRG proposal is attached to OSPIRG's statement. It differs from the Department's proposal primarily in that it addresses the protection of property specifically; requires the Department's investigation of options for ceasing discharge or for reallocation of effluent limitations, should precede our action and be implemented if appropriate; calls for findings of fact regarding critical situations; requires that any Commission action be reviewed every 45 days and terminated no later than 120 days after its initiation; and requires that any Department action to modify, suspend, issue or revoke a permit because of a critical situation be reviewed by the Commission within ten days.

Mr. Thomas C. Donaca, representing Associated Oregon Industries (Attachment E):

Mr. Donaca supported the Department's proposal as one appropriately establishing procedure, sufficiently granting Departmental discretion, and adequately assuring Commission review. Mr. Donaca felt EPA's proposal for change in paragraph 1 was superfluous to existing rules and that the EPA proposal for paragraph 3 would place an undue burden on proponents of change during critical situations.

OSPIRG's assertion that disposal of organic wastewater on land has improved soil productivity was argued to be true in some cases but not always. To his Association's knowledge, it was reported, neither Rayonier nor any other pulp mill had achieved elimination of all discharge. The OSPIRG proposal was felt to parallel normal procedure in too many respects to serve an emergency.

Mr. Ian Fergusson, Sierra Club's Pacific Northwest Chapter (Columbia Group's Water Quality Committee):

Mr. Fergusson's Committee supported the proposal with some exception to the procedure in paragraph (3). Under this proposal (Attachment F), a public hearing would be necessary as would prior investigation of reallocation of wasteloads and intermittent, alternate cessation of discharge by sources.

An additional suggestion for paragraph (4) was that the action might last for over one year if the agency repeated the process required by paragraph (3). Also, the word "irreparable" would be dropped from the language. It was considered too permissive of damage.

Mr. Carlton Whitehead, Water Quality Management Policy Advisory Committee (Attachment G):

The Committee felt it necessary to maintain the waters for human consumption, agriculture, fish and other water-dependent resources. To that end, the Commission was urged to act only after reflection and never in such a way as to sacrifice long-term goals to short-term emergencies. Increased agency funding to fully enforce current water use laws was urged. Also suggested were the development of a strategy to insure minimum flows would be met, early recodification of Oregon's water laws, integration of effort among agencies, and review of the agency's priorities for the future federal grants.

Mr. J. F. Cormack, representing Crown Zellerbach:

Mr. Cormack supported the Department's proposal and noted that the incorporated flexibility was appropriate in light of the present safety margins built into Oregon's water quality standards.

Mr. Thomas Ethen, on behalf of Northwest Food Processors Association:

Mr. Ethen's Association, noting the fossil fuels, electricity and other agricultural investments that would already be invested in extremely perishable crops (such as corn) to be processed during low flows, urged adoption of the proposal to avoid loss of jobs and waste of food and energy. He added that the food processors contribute relatively insignificant BOD to the waters.

Mr. John R. Molsness, on behalf of the City of Pendleton:

Noting the high turbidity of spring waters that occurs annually in Pendleton, Mr. Molsness supported the rule as one which might allow more flexible use of such water during emergencies.

Mr. Robert N. McDouglad, representing the Home Builders Association of Metropolitan Portland:

Mr. McDougald urged consideration of a priority plan as we go into a predictable situation. He was most concerned about housing projects (non-point sources) and municiple treatment plants which might be affected. It was argued that early prioritization would let users know in advance so they could plan alternatives.

Mr. Don Simonson, past President of Willamette Chapter of the Northwest Steelheaders:

Mr. Simonson expressed the view that the streams should prevail over corporate profits and even a loss of jobs at the food processing plants should be suffered before water quality is impaired.

Mr. John Frewing, Member, Oregon Water Quality Management Planning Policy Advisory Committee:

Mr. Frewing urged that a rule be adopted that would strengthen the requirement that any judgments made in critical situations be supported by a technical record.

Also, Mr. Frewing called upon the Commission to condition retention of the rule upon the Governor's expeditious completion of review of "Oregon Water Rights Administration".

Mr. Frewing supported the concept of requiring that alternatives be examined prior to waiver of any water quality standards. It was his view that broad-based contributions by the public (such as non-use of home disposals during critical periods) should be considered along with consideration of what might be done with the few large industrial point sources. He understood that the increased oxygen in the river equivalent to 10% higher stream flows might be the result of not using home disposals.

Mr. Frewing stressed that the rule should never be applied only to a single facility to "bail it out of trouble" by relaxing permit conditions.

Finally, Mr. Frewing offered to the record a 41 page work done for the Corps of Engineers entitled Compendium of Nonstructural Flow and Wasteload Reduction Measures. The 1976 work deals with reduction of storm-water inflow to sewer systems, water conserving facilities, incentives for water conservation, and wasteload reduction measures. Mr. Frewing did not wish the Commission to consider the document prior to deciding on the rule, but wanted it in the record for purposes of reference only.

Mr. Steve Drake, representing the Oregon Clean Water Project:

Mr. Drake urged that alternatives for critical situations be developed and used to establish a comprehensive policy which would delegate authorities and specify duties and alternatives. The policy, he urged, should be specific enough to avert "last minute" decisions in critical situations which might damage the fresh water resource. Mr. Drake criticized Department's proposal as one which did not go beyond delegating authority and duty to specify alternatives from which to choose a course of action. These alternatives, he felt, should be chosen with an eye to the various dimensions of public benefit from the resource.

Mr. Drake felt DEQ and EQC should clarify to the public whether or not the agency is developing a strategy to deal with critical situations. Since the public would be affected, he said, the public is entitled to know of the criteria being used to develop the policies. It was indicated that the rule should more strongly hold forth the option of increased stringency (as counter-balanced with the possibility of relaxation).

Mr. Drake stated the Clean Water Project's view that alternatives should be explored now but chosen only at such time as the impacts to be expected of a given critical situation are more fully known.

Addressing (3)(a) of the rule, the witness found a lack of certainty as to what say, if any, the public would be given in the choosing of any course of action under the rule. He found the section short of the public participation encouragement required by PL 92-500.

It was urged that the Commission go beyond the provision that affected geographic areas could be designated in critical times and grant authority to local governmental units to declare their own critical situational areas.

The local unit would then be required to report its declaration and reasoning to the Commission.

It was the Project's view that measures for short-term problems should last 120 days and measures for long-term problems should expire in one year.

The Project supported OSPIRG's revised proposed rule to the extent of its compatibility with the Project's statement.

Mr. Larry Williams, on behalf of the Oregon Environmental Council:

Mr. Williams supported OSPIRG's proposed rule. Supported also was the introduction of a burden to be born by proponents of permit relaxation to show that the permittee has no waste disposal options available.

The Council also supported OSPIRG's proposal to shorten the time spans allowable for Commission review of actions.

It was mentioned that study of waste disposal methods were better conducted before an emergency.

Ms. Sidney Herbert, Conservation Chairperson, Lane County Audibon Society:

Ms. Herbert suggested that the benefits to be considered, such as economics, etc., not only be listed but also be prioritized now to guide any actions necessary in an emergency. She added her view that in-stream values be placed high on any such list. She felt the agency should retain some flexibility and recognize that each watershed is individual but that it should be learned early on (as is being done by utilities faced with a future power shortage) who will have and who must do without.

Ms. Gretchen Shields:

Ms. Shields pointed out that the sooner priorities are known, the sooner those who can expect difficulty can plan ways to minimize it.

Recommendation

Deferring to the Director, your Hearing Officer makes no recommendations in this matter.

Respectfully submitted,

Peter W. McSwain
Hearing Officer

PWM:cs
Attachments

PROPOSAL

Add a new section to OAR Chapter 340, Division 4, Subdivision 1 as follows:

340-41-011 PROCEDURAL AUTHORITY DURING CRITICAL SITUATIONS

(1) The EQC recognizes that critical situations may arise where action to enforce compliance with the provisions of this plan, including but not limited to water quality standards or the conditions of permits issued pursuant to ORS 468.740, would be inconsistent with the protection of public health, safety and welfare.

(2) As used in this section, "critical situations" means flood, drought, fire, windstorm, or other comparable natural disasters where such substantial damage to property occurs that the health, safety, welfare or economic stability of the state is thereby affected and if the above described standards and conditions were rigidly enforced, such health, safety, welfare or economic stability would be more materially affected.

(3) In such cases, the EQC may by rule temporarily modify any portion of this plan and, by order, suspend enforcement of any condition of a waste discharge permit or impose more stringent control requirements if necessary upon:

(a) giving such public notice as is required and practicable under the circumstances;

(b) making findings that one or more critical situations contemplated in subparagraph (2) do exist;

(c) setting forth the program for control during the critical situation;

(d) specifying the geographical area or areas affected and specifying the powers, if any, to be delegated to the Director during the critical situation;

(4) Any such action taken pursuant to subparagraph (3) shall be reviewed by the EQC at least every 60 days and the EQC shall then modify or terminate the action as necessary to protect public health, safety and welfare or prevent irreparable damage to any resources of the state. No such action may remain in effect for more than one year from the date of the EQC's original action.

ATTACHMENT A

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

OREGON OPERATIONS OFFICE

1220 S.W. MORRISON STREET, RM. 310

PORTLAND, OREGON 97205

REPLY TO ATTN OF: 10000

May 20, 1977

Peter McSwain, Hearings Officer
Oregon Department of Environmental Quality
1234 S.W. Morrison Street
Portland, Oregon 97205

Dear Mr. McSwain:

Please accept the attached statements by the Environmental Protection Agency, Region X, as part of the hearing record relating to the Department's proposed rules dealing with water quality standards during situations of drought or other comparable natural disaster.

Sincerely,

John Vlastelicia, Director
Oregon Operations Office

cc: H. Sawyer, w/attachments
R. Burd, w/attachments
ATTN: D. Petke

ATTACHMENT B

Statement

of the

U. S. Environmental Protection Agency

before the

Department of Environmental Quality

May 22, 1977, at McKenzie Bridge, Oregon

I am pleased to appear here today as a representative of the Environmental Protection Agency. Our Regional Administrator, Donald P. Dubois, asked me to thank you for the opportunity and to express his appreciation for your active search, through public participation, of program suggestions regarding drought-related problems.

Specifically, you have asked for our comments regarding a proposal to add a new section to your Oregon regulations (OAR Chapter 340, Division 4, Subdiv. 1) regarding Procedural Authority During Critical Situations. We will have some comments as to specific changes which we recommend regarding the proposal, and then our views will be given as to the circumstances pursuant to which we believe the proposal would operate. I say this because, on one hand, we are quite concerned with proposals which appear to relax a regulatory program which is operating as well as Oregon's Water Quality Standards and Permit Program operates; while on the other hand, we are also realists and recognize that unusual situations such as the drought require special handling and may require special rules.

With regard to Paragraph 1 of the proposal, the paragraph indicates that

enforcement would be inconsistent with protection of public health safety and welfare but does not indicate that in some situations rigorous enforcement and special permit conditions may be needed to assure compliance with health standards. We recommend that paragraph read as follows:

> The EQC recognizes that critical situations may arise where action to enforce compliance with the provisions of this plan, including but not limited to water quality standards or the conditions of permits issued pursuant to ORS 468.740, would be inconsistent with the protection of public health, safety and welfare. In addition, such critical situations may require more stringent limits regarding discharges in order to protect the public health, safety and welfare.

We note that more stringent limitations are provided for in Paragraph 3.

Paragraph 2: This paragraph addresses natural disasters only. We recommend that it be expanded to man-caused disasters as well. Since practically the results of the disaster are being addressed in the program for which this regulation is being drafted and not necessarily the cause of the disaster. The change in the language of the regulation would be simply to add "and man-caused" after natural in line 2 of paragraph 2. As an example of a man-caused disaster we would cite the collapse of the Teton Dam and the consequent flooding. We recognize the extension to man-caused disaster requires a further and close definition of the

kinds of disasters which will be addressed through this proposal and which parties should benefit from the exercise of the proposal.

Paragraph 3: We believe this paragraph establishes procedural requirements but lacks necessary criteria. We suggest, as an example, the addition, therefore, of language as follows:

> EQC will view adversely proposed exercise of this policy which purports to relax compliance with existing permit terms or water quality requirements absent a strong showing by proponents that the modification is necessary and that maximum consideration has been given to other available alternatives to minimize adverse affect on any of the following:
>
> (1) Adequate drinking water supplies.
> (2) The livelihood of persons, downstream.
> (3) Maintenance of the recuperative powers of a downstream ecosystem -- prevention of irreversible damage.
> (4) Maintenance of beneficial aquatic life in the receiving waters.

These are offered as examples of the considerations we believe should be written into the regulation.

This proposed rule does not state explicitly EPA's role in reviewing emergency action authorized by this proposal. However, as you know,

EPA does have veto and review and approval/disapproval authority of these actions through operation of the planning, WQ standards and NPDES provision of the FWPCA and our related mutual State/Federal agreements. Therefore, we need not repeat such procedures here.

I would like at this time to also offer our agency's more general comments as part of this testimony. And we do this in the best spirit of cooperation with your agency. I will offer as part of my testimony our Regional Administrator's recent position statement on the drought.

Statement by Donald P. Dubois
Regional Administrator
Region X
U.S. Environmental Protection Agency

Water Drought Situation

The Environmental Protection Agency has been receiving requests as to what its position is regarding the water drought situation. Since becoming aware of the critical situation in the Pacific Northwest, I have convened a special Regional task force to maintain an "alert" and to develop an action program to be responsive to developments. This program has already handed up some recommendations, which I will discuss in a minute. First, let me explain that it should be clearly understood that the Environmental Protection Agency, as a Federal agency, looks to the state and local governments to respond to the needs of their citizens. This philosophy of government is built into our laws upon request of state and local governments and is very much a part of the Federal system designed to resolve local problems through local action wherever possible. We have no argument with this system and wish to make it known that the Federal government intends to work within that framework.

The crying need is for constructive suggestions as to things people can actually do to meet what may become a crisis in the near future. It is one thing to measure the expectations; it is another to be able to predict or recommend what to do

about the expected situation. Let me start then by telling you some of the things we feel can be done.

A. Low Flow Augmentation

- Storage and timed releases from storage
- Pumping and diversion into streams from groundwater, irrigation canals, lakes, etc.
- Inter-basin diversions

B. Water Conservation

- Recycling irrigation runoff, cooling water, industrial process water
- Rationing of public and private water supply
- Evaporation suppression in water storage facilities

C. Waste Treatment Management

- Increased waste treatment efficiencies via chemical application, improved operation, etc.
- Storage and transport of wastes to minimize impact--use of temporary holding ponds, land application, etc

D. Adjust Industrial Production Schedules

- Defer processing of product (e.g., sugar beets and potatoes, which can be temporarily stored) during critical times
- Defer industrial product production

E. Curtail Production

- Use only where necessary to protect critical water uses, e.g., to supply drinking water and to maintain water quality during anadromous fish passage.

F. Develop an Emergency Plan for Drinking Water

- Before a State can achieve primacy under the Safe Drinking Water Act (SDWA) it must develop a plan for the provision of drinking water under emergency circumstances (P.L. 93-523, § 1413 (a)(5). Such plans should be given a high priority and developed during the next few weeks.

So you see, based on the practical needs of the situation, there are a number of things that, in fact, can be done — beginning immediately. All of these things taken together will ameliorate the critical situation which may occur in the next few months. Largely, to move swiftly enough to do any good, these programs will be based on volunteer actions on the part of the business community, agricultural community, and the citizens individually. I cannot overemphasize the importance of this aspect of the program — volunteer cooperation. We simply cannot face a critical social and economic problem as all-pervasive as that before us and continue to "do business as usual." It will be sheer folly to proceed on that course of action. On the other hand, if each one of the industrial, agricultural and private sectors gives up something in a program of self-regulation and constraint, the entire Pacific Northwest will come out of this as best as possible. Our economic and social welfare is, in fact, interdependent.

What I am recommending in this action program is a phased approach to resolving situations on a river basin-by-river basin basis. Suggestions have been made that environmental protection requirements be entirely suspended during emergency periods — that industry and municipalities be able to dump whatever they wish into streams or otherwise violate environmental standards during such critical periods. This makes no sense whatsoever. We need our health standards all the more during critical periods and want to be certain that the diminished water resources we

have are protected to a greater extent from abuse. We do not throw out laws when they are needed most. Such a course of action is what I would consider to be a panic response, and that is not what I will endorse under such circumstances. The States of Washington, Idaho and Oregon have within their existing state laws and permit regulations the means by which water use permits may be modified appropriately on a case-by-case basis, if conditions warrant modification. This is the appropriate method by which a permit holder—a water user—should be regulated.

I have asked the Permits and Enforcement Division of my Regional Office for its specific recommendations as to actions available to the State Environmental Protection Offices as well as my Office. The policies which I am reviewing concerning enforcement is as follows:

First, safe drinking water will be a predominant concern. While existing levels of pollutants allowed to be discharged by NPDES permits may pose no hazard, low flows (which may have to be augmented by further polluted water) might create serious risk for water supplies. EPA has powers under section 1431 of the Safe Drinking Water Act both to issue orders and to seek court injunctions where a contaminant in a water system may present an imminent and substantial endangerment to health. EPA also has power to seek court injunctions where one or more pollution sources present an imminent or substantial endangerment either

to the health of persons, or to the welfare (i.e., the livelihoo of such persons. Safe drinking water will no doubt also be the prime concern of State authorities, and hopefully no supplementary action by EPA will be necessary.

Second, the livelihood of persons is the second major concer of EPA under section 504 of the Federal Water Pollution Control Act. There are many industries which depend upon water to function and employ our citizens. The northwest salmon fishery is most directly and longlastingly affected by drought conditions. Depending on the precise geographical area, we can foresee the probability that some holders of NPDES permits may be asked to perform more intense wastewater treatment or curtail or eliminate discharges. Others may be compelled by circumstances to discharge wastewater without having treated it as intensively as required by their NPDES permit. In the former case, most permits in Washington, Oregon and Idaho have provisions under which permit terms can be temporarily tightened or loosened because of critical conditions in the receiving waters. In the latter case, both EPA and the States can exercise prosecutorial discretion and forego enforcement against permit violations necessitated by drought impact.

In still further instances where water users hold no NPDES permits and instead make dry land disposal of wastewater, some of these may be asked to discharge that wastewater to canals or streams. Such conduct can be regulated by administrative

orders under section 309 of the FWPCA and comparable State laws.

Hopefully, no occasion will arise where EPA becomes at odds with State or other Federal officials in deciding whether one or more pollution sources presents an imminent and substantial endangerment to the livelihood of persons. Nevertheless, this pre-emptive power is available in appropriate discrete instances.

Third, the major concern of EPA is the recuperative powers of any given ecosystem. Most ecosystems depend heavily upon certain minimum qualities to maintain the life cycles within their waters. Unless pre-empted by human health emergencies, EPA will attempt to preclude any situation where recuperation of an ecosystem is jeopardized because of discharges of pollutants into its waters. Under section 302(a) of the FWPCA, this Agency is charged with protecting ecosystems by adopting additional effluent limitations where necessary to protect water quality. Additionally, EPA has review authority under section 303 over State revisions to water quality standards, and ecosystem recuperation will be a prime concern in any such review. After July 1, 1977, all point sources are required by section 301(b)(1)(c) of the FWPCA to achieve any more stringent limitation necessary to fulfill approved water quality standards. Hopefully, only minor and temporary incursions will occur below existing water quality standards. However, EPA is prepared to evaluate independently any situation in which it appears that recuperation of that ecosystem is jeopardized by the incursions.

EPA issues all NPDES permits to federal facilities in Washington, Oregon and Idaho. Region X's permits personnel will be advising such facilities that under section 313 of the FWPCA such facilities must comply with a States substantive requirements, and that under Executive Order 11752 EPA is charged with enforcing those requirements as well as the NPDES permits. We anticipate that federal facilities will fully cooperate with a State's action plan for drought impacted areas, and that little EPA confirmatory action will be required.

With respect to degradation of the air due to coal-fired plants being activated because of shortages of hydro-electric power, EP has already exercised prosecutorial discretion on the east coast where natural gas shortages occurred. We expect to do the same here in the northwest so long as human health is not jeopardized.

Landfills which may leak contaminants into receiving waters will come under particular scrutiny by EPA. Under the Refuse Act or under section 301 of the FWPCA, effort will be made to halt promptly any such contaminating discharges.

Lastly, in the next generation of NPDES permits, explicit provisions will be proposed which will allow flexibility in emergency situations. There is no assurance that the forthcoming water shortage won't happen again. Permit provisions allowing prompt temporary variation of permit effluent limitations are necessary, and permit holders should expect to see them.

I'd like to recapitulate and re-emphasize the strategies set out above. With respect to EPA's role as the Federal regulatory agency commissioned to enforce the Federal Water Pollution Control Act, the Safe Drinking Water Act, and the Clean Air Act, the following priorities and approaches have been developed for Region X for the forthcoming water shortage period.

First, this Agency is aware of the predominance of human health and welfare as the interest to be primarily protected by our various environmental laws. In examining cases of alleg violations in drought impacted locations, that will be a primar concern in determining--most discreetly on a problem area geographical basis--what enforcement action or prosecutorial discretion should be applied in each case.

Second, this Agency is acutely aware of the primary role held by State authorities under most federal environmental laws and is aware that EPA's concurrent role is supplementary and supportive for the most part. Prospective EPA enforcement actions in drought impacted locations will first take into accout the overall State and local measures being implemented there in order to avoid their disruption wherever possible. However, EPA's enforcement powers are pre-emptive in many instances, and in any case of needless and non-discriminating disregard of Federal environmental requirements pre-emptive action will be evaluated.

Third, during these critical next few months, environmental degradation is highly probable, but this Agency feels obligated to address vigorously any situation where an ecosystem's recuperative powers appear jeopardized.

Fourth, Federal facilities in the states of Washington, Oregon, and Idaho will be subjected to increased EPA scrutiny to assure that they observe the substantive requirements the States may impose during this drought period.

Fifth, my Regional Counsel will be in recurring contact with State Attorneys-General offices to keep informed on overall State legal strategies, and my enforcement staff will be in recurring contact with their State and local counterparts and with U.S. Attorneys offices to try to assure that if legal actions become necessary, they will be promptly commenced and completed.

My Agency has begun a systematic, cooperative program with other Federal and state agencies (to respond to the situation). We have communicated with Jasen King, Staff Assistant to Governor Ray, to coordinate this program within the State of Washington. Similarly, we are coordinating our Federal action program with the State of Oregon through Bill Young, Director of the State's Department of Environmental Quality. My staff and I have personally begun to attend Federal, state and local meetings designed to keep me and my staff fully informed and responsive to the state and local needs regarding the situation.

On February 24, 1977 an interagency meeting is being held in Portland for this purpose. On March 4 a public hearing will be in Spokane regarding its drinking water supply. We feel certain that these meetings will result in further recommendations and courses of action to ameliorate what may be a critical situation.

# # #

STATEMENT OF THE

OREGON DEPARTMENT OF FISH AND WILDLIFE

to the

ENVIRONMENTAL QUALITY COMMISSION

Regarding Proposed Rules
dealing with
Water Quality Standards
During Situations of Drought or Other Comparable
Natural Disaster

May 21, 1977
Portland, Oregon

Mr. Chairman and members of the Environmental Quality Commission. Ladies and gentlemen.

Thank you for the opportunity to present the views of the Oregon Department of Fish and Wildlife regarding the proposed rules dealing with Oregon water quality standards.

The Fish and Wildlife Commission is charged under Oregon law with protecting, preserving and regulating the use of Oregon's fish and wildlife resources. To that end, the Department of Fish and Wildlife cooperates with other agencies in protecting the food, water, and cover essential to the survival of those resources. We recognize that natural disasters adverse to the well-being of fish and wildlife can be expected during some years.

The Department urges the Environmental Quality Commission and the Department of Environmental Quality to exercise strict control over wastes entering the waters of the state. While we cannot approve any action tending to degrade water quality, we recognize that the proposed rule would provide the flexibility needed for the emergency response to environmental stress situations.

ATTACHMENT C

The Department of Fish and Wildlife supports the proposed additions requiring more stringent control of wastes discharged under permit. That type of regulation would agree with the state's policy of environmental protection.

A substantial contribution to Oregon's economic health results from maintaining water quality which will support fish and wildlife. Careful consideration must be given to assure that water quality remains adequate to support fish and wildlife during drought periods, even though conditions may be nearer to critical levels than present water quality standards would permit.

In addition to a 60-day mandatory review as provided in the draft, we recommend an on-going review during the period of rule suspension so that discharges may be regulated on a short-term basis. Such a review would permit more timely modifications to reduce environmental stress.

The Department of Fish and Wildlife would welcome the opportunity to identify with the DEQ those areas of concern where water quality degradation threatens Oregon's fish and wildlife resources. We recommend that the rule require notification of our Department to provide for such coordination.

Thank you for the opportunity to present our views. If there are any questions, we shall attempt to answer them.

OSPIRG
Oregon Student Public Interest Research Group
918 S.W. Yamhill
Portland, Oregon 97205
(503) 222-9641

TESTIMONY OF MYLENE SIMONS

BEFORE THE ENVIRONMENTAL QUALITY COMMISSION
OF THE
STATE OF OREGON

Portland, Oregon

May 21, 1977

My name is Mylene Simons, and I am representing the Oregon Student Public Interest Research Group (OSPIRG). I am here to testify on proposed rules dealing with Department of Environmental Quality (DEQ or Department) and Environmental Quality Commission (EQC) authority during critical situations.

The DEQ staff has proposed a rule for your consideration which would allow, inter alia, temporary suspension of conditions of waste discharge permits during critical situations. The general import of the rule seems to be that only industry and cities will be affected by critical situations. It fails to take into account the effect such situations will have on citizens, public water supplies,[1] wildlife and aquatic life.[2]

To better serve the interests of all Oregonians, including industry, agriculture, municipalities and citizens, OSPIRG would like to present an alternative rule for your consideration. (A copy of the proposed rule is attached.) The OSPIRG rule recognizes that critical situations requiring extraordinary action will have not only economic, but also social and environmental consequences.

Subsection (2) of our proposed rule defines "Critical Situations". An example of a critical situation might be this year's drought and the subsequent reduction of stream flow and water level in many of the state's rivers and streams.[3] Present

ATTACHMENT D

DEQ or EQC authority may not be flexible enough to deal with this type of crisis.

To insure needed flexibility, Subsection (3) of OSPIRG's rule directs the DEQ to research, investigate and if necessary, develop alternative waste disposal techniques which do not require discharges into water. This subsection conforms to subsections (A) and (B) of Section III, Policies and Guidelines Generally Applicable to All Basins, in the Oregon Water Quality Management Plan.[4]

There are alternatives to discharging liquid wastes into rivers and lakes. Land treatment of waste water has been successfully used by both cities and industries. Muskegon County, Michigan has received national attention for its waste water irrigation project which uses sewage from a treatment plant serving a community of 160,000 people.[5] Several other cities, including Bakersfield, California; Lake George, New York and Phoenix, Arizona have used land treatment methods to dispose of waste water.[6] Land irrigation with waste water has also been extensively practiced in the pulp and paper and dairy industries;[7] successful operations by large food processing and canning plants have been well documented.[8] Studies have also shown that disposal of organic waste water on land has improved soil productivity.[9]

The Port Angeles division of ITT Rayonier produces various grades of pulps; it has successfully eliminated water discharge, recovered spent liquor and increased process efficiency by treating its ammonia-base sulphite process with a 3-stage Vapor Compression Falling-Film system.[10]

Electrodialysis has been used to treat wood pulp wash water, a very salty water effluent. The effluent after electrodialysis is separated into sodium hydroxide solution and chlorine, a water stream and brine stream. Each of these components are then reused in the wood pulp process.[11]

Subsection (3) of OSPIRG's proposed rule also directs the DEQ to investigate the "feasibility of reallocating effluent limitations among holders of permits who

discharge into the same receiving waters." For example, on a particular section of a river there may be a municipal treatment plant and a food processing plant. The processing plant may not be in full operation until the end of the summer. Because of low water levels resulting from the drought, the discharge from the municipal treatment plant may violate its biological oxygen demand (BOD) effluent limitation and water quality standards. By temporary allocation of the food processing plant's BOD effluent limitations to the municipal facility, water quality standards can still be maintained. Neither industry, government nor citizens of Oregon are adversely affected by such reallocation of limitations.

OSPIRG maintains that neither water quality standards nor conditions of waste discharge permits should be suspended or modified if feasible alternative methods of achieving those standards exist.

If no alternative method is found for waste discharge, than under terms of our proposed Subsection (4), the Environmental Quality Commission could modify portions of the Oregon Water Quality Plan, suspend conditions of waste discharge permits or, at the other extreme, impose more stringent requirements upon permit holders. The EQC must, however, insure "adequate protection of property and preservation of the public health, safety, welfare and resources of the state" (paragraph (4)(c)). Also any action taken by the state with respect to the Plan must be approved by the Administrator of the United States Environmental Protection Agency.[12]

Subsection (5) of our rule would require the EQC to re-evaluate any modification or suspension of the Plan or waste discharge permits at its next regularly scheduled meeting, and at least once every 45 days thereafter. Such review would insure that modifications or suspensions are still necessary. Subsection (6) would require the EQC to review any waste discharge permit modification, suspension or revocation action by the DEQ because of a critical situation. Presently, the DEQ can modify a permit

upon 20 days notice,[13] and may suspend a permit without notice if it is in the public interest.[14] Subsection (6) attempts to achieve uniformity in emergency actions taken because of critical situations by requiring the EQC review.

The Environmental Quality Commission does need emergency authority to deal with critical situations.[15] All of us must accept some of the consequences of changing conditions. Protection of the public health, safety and welfare includes continuance of a healthy environment as well as economic prosperity. OSPIRG's rule better addresses the concerns of all Oregonians.

Government, industry and the people of Oregon have worked hard in the last decade to clean up the rivers in the state. The clean rivers are not the result of industry moving away from the water's edge, but are the result of everyone, including industry, joining together to limit the amount and kinds of pollutants going into the rivers. The Willamette and other rivers which had once been allowed to deteriorate, are again clean enough for swimming and fish runs. OSPIRG urges the EQC to closely examine any proposed rule to insure that the work of so many people over so many years is not seriously damaged.

FOOTNOTES

1. There are approximately 2,500 water systems serving more than one family in Oregon. Information regarding the number and location of public water systems on major rivers is not readily available. Telephone interview with Darrell Learn, Department of Water Resources, May 6, 1977. Such information is essential if the EQC temporarily suspends conditions of waste discharge permits.

2. Aquatic life is sensitive to changes of instream pollutant levels. A minimum dissolved oxygen (DO) level of 5 p.p.m. must be maintained to insure survival of game fish. Telephone interview with Irv Jones, Department of Fish and Wildlife, March 25, 1977.

3. Several sections of the Upper Willamette River Basin are at critical stages in stream flow:

River & Location	Long Term Avg. May Discharge (ft^3/sec)	1977 Most Recent Discharge (ft^3/sec)	Natural & Reservoir Minimum Flow (ft^3/sec)
(a) Willamette Coast Fork at its confluence with the Row River	160	30.2-April 15	15 & 100
(b) Fall Creek at its confluence with the Willamette Middle Fork	484	85-May 16	40 & 470
(c) South Fork of the McKenzie at its confluence with the McKenzie River	1174	100-May 16	200 & 230
(d) Long Tom River at USGS Gage #1700	246	40-May 16	0 & 350

Data provided by the Corps of Engineers-Water Control (Portland office), Stan Holbrook, United States Weather Service (Portland office) and United States Geological Survey-Water Resources Division (Eugene-Springfield office).

4. OAR 340-41-___(adopted December 1976).

5. W.J. Bauer and D.E. Matsche, Large Wastewater Irrigation Systems: Muskegon County, Michigan and Chicago Metropolitan Region (1973).

6. R.W. Crites and C.E. Pound, "Treatment of Soils with Wastewater," 10 Env. Sci. & Tech. 549 (1976).

7. R.H. Sullivan, "Federal and State Legislative History and Provisions for Land Treatment of Municipal Wastewater Effluents and Sludges," in Recycling Municipal Sludges and Effluents on Land (Proceedings of a joint conference, Champaign, Ill., Nat'l. Ass'n. St. Univ. Land Grant Coll., Wash., D.C., July 9-13, 1973).

8. See e.g., D.H. DeBruce, "Disposal of Food Processing Wastes Using Spray Irrigation," 429 (Proc. Cornell Univ. Agr. Waste Management Graphics Management Corp., Wash.,

D.C., 1972); J.P. Law, R.E. Thomas and L.H. Meyers, "Cannery Wastewater Treatment by High-Rate Spray on Grassland," 42 J. Water Poll. Control Fed. 1621 (1970); H. G. Lubey, "Spray Irrigation of Vegetable and Fruit Processing Wastes, 35 J. Water Poll. Control Fed. 1252 (1963).

10. "Energy Recovery From Pulp Wastes," 10 Env. Sci. & Tech. 735 (1976).

11. F.B. Leitz, "Electrodialysis for Industrial Water Cleanup," 10 Env. Sci. and Tech. 136 (1976).

12. 33 USC § 1313(c)(2) (Supp. 1, 1974). The Water Quality Management Plan was conditionally approved May 11, 1977. One of the conditions imposed was that the DEQ better relate pollution control measures to instream water quality.

13. OAR 340-14-040, 340-45-055 (effective April 15, 1972).

14. OAR 340-14-045, 340-45-060 (effective October 25, 1973).

15. The DEQ and the EQC must coordinate their efforts with other state agencies in dealing with this summer's drought. Neither the Department of Water Resources, the Department of Fish and Wildlife, nor the Department of Forestry have adopted emergency plans to deal with the drought. The EQC must take the lead in protecting the quality of waters in this State.

Add a new section to OAR Chapter 340, Division 4, Subdivision 1 as follows:

340-41-011 EMERGENCY AUTHORITY

(1) The EQC recognizes that critical situations may occur in certain waters of the state which require extraordinary action. In order to deal with these situations:

(a) Temporary modification or suspension of portions of the Water Quality Management Plan, OAR 340-41-___ (adopted December 1976) including water quality standards or the conditions of permits may be necessary to maintain economic stability in the state; or

(b) More stringent control requirements may be necessary to insure adequate protection of property and preservation of the public health, safety, welfare and resources of the state; or

(c) Alternative waste disposal techniques may be necessary to protect the quality of the waters of the state for public water supplies, for the propagation of wildlife, fish and aquatic life and for domestic, agricultural, industrial, municipal and recreational uses; or

(d) Temporary reallocation of effluent limitations among holders of permits who discharge into the same receiving waters may be necessary to maintain the quality of waters in the state.

(2) As used in this section:

(a) "Critical Situations" include flood, drought, or other comparable natural disasters which require extraordinary action in order to maintain economic stability and to insure adequate protection of property and preservation of the public health, safety, welfare and resources of the state.

(b) "Permits" mean waste discharge permits issued pursuant to ORS 468.740.

(3) Before the EQC takes any action pursuant to subsection (4):

(a) The Department shall:

(1) investigate, research and develop waste disposal techniques which do not require discharge of wastes into the waters of the state;

(2) investigate the feasibility of reallocating effluent limitations among holders of permits who discharge into the same receiving waters; and

(3) present its findings to the EQC.

(b) The EQC may by order require:

(1) a holder of a permit to utilize the waste disposal techniques investigated, researched and developed by the Department pursuant to paragraph (3)(a), or any other technique approved by the EQC, which does not require discharge into the waters of the state; and

(2) temporary reallocation of effluent limitations among holders of permits who discharge into the same receiving waters in accordance with effluent guidelines as long as applicable water quality standards are not violated.

(4) Subject to subsection (3), the EQC may by rule temporarily modify any portion of this Plan and, by order, suspend enforcement of a permit, or impose more stringent control requirements upon:

(a) giving such public notice as is required and practicable under the circumstances;

(b) making findings of fact that a critical situation as defined in subsection (2) exists in a particular receiving water;

(c) setting forth a program for control during this critical situation which insures adequate protection of property and preservation of the public health, safety, welfare and resources of the state;

(d) specifying the portion or portions of the Plan or permit affected; and

(e) specifying the powers, if any, to be delegated to the Director during this critical situation.

(5) The EQC shall review any action taken pursuant to subsections (3) and (4) at its next regularly scheduled meeting, and at least once every 45 days thereafter, and then modify or terminate the action if necessary to insure adequate protection of property and preservation of the public health, safety, welfare and resources of the state. No action taken pursuant to this section may remain in effect for more than 120 days from the date of the EQC's original action.

(6) If the Department, because of a critical situation as defined in subsection (2), modifies, suspends, revokes or issues a permit pursuant to OAR 340-14-040, or 340-14-045, 340-14-050, 340-45-055, or 340-45-060, the EQC shall within 10 days review such modification, suspension, revocation or issuance and if necessary to insure adequate protection of property and preservation of the public health, safety, welfare and resources of the state, modify or rescind the Department's action.

ASSOCIATED OREGON INDUSTRIES

1149 COURT ST. N.E. / P.O. BOX 12519 / SALEM, OREGON 97309 / 503 588-0050
PORTLAND AREA 503 227-5636

Ivan Congleton, executive vice president

May 23, 1977

Mr. Peter W. McSwain, Hearings Officer
Department of Environmental Quality
1234 S. W. Morrison
Portland, Oregon 97205

RE: Proposed Rule 340-41-011

Dear Mr. McSwain:

The proposed rule appears to satisfactorily meet the requirements for the establishment of a procedure to be followed during critical situations. The rule grants the necessary discretion for the modification of standards during certain critical periods and also provides for the necessary review of the conditions by the EQC. We support the proposed rule.

With regard to the comments of the Environmental Protection Agency, it is our belief that their suggestion for changes in Paragraph 1 fails to recognize that other DEQ water quality rules already require the same action as their additions to the proposed rule. With regard to their Paragraph 3, it is our belief that such a change would tie the hands of the agency in times of critical situations by placing an undue burden on the proponents to meet the requirements to "minimize adverse effect" on each of the items listed. It is our belief that the agency will have examined each of these matters in light of the existing situation and would recommend implementation of the rule only when there is no reasonable alternative.

With regard to the OSPIRG statement, we note that on page 2 of their testimony there is no Footnote No. 9 to support their general statement that "Studies have also shown that disposal of organic waste water on land has improved soil productivity.". We are sure this is true in some instances, but we are also sure it is not true in all instances. Further, we do not believe that Rayonier (see page 2) has "successfully eliminated water discharge". To our knowledge, no pulp mill has achieved this.

It is our belief the OSPIRG proposed rule essentially parallels existing agency procedure under normal conditions, and is not flexible enough nor comprehending enough of what may be required during a "critical situation".

With the understanding that the implementation of this rule would only be for temporary situations occuring under most unusual circumstances, we urge your adoption of the proposed rule as submitted by the DEQ.

Sincerely,

Thomas C. Donaca

Thomas C. Donaca
General Counsel

ATTACHMENT E

TCD/mg

COLUMBIA GROUP

Environmental Quality Commission
1220 SW Morrison
Portland, Oregon

May 23, 1977

Dear Sirs;

Thank you for allowing this written testimony to be included in the record after the hearing dates of May 21 and 22.

The Water Quality Committee of the Columbia Group of the Sierra Club recommends that the proposal to add a new section to OAR Chapter 340, Division 4., Subdivision 1 be modified as follows:

1. Subparagraph (1) to remain as drafted.

2. Subparagraph (2) to remain as drafted.

3. Subparagraph (3) to read as follows:

In such cases, the EQC may by rule temporarily modify any portion of this plan and, by order, suspend enforcement of any condition of a waste discharge permit or impose more stringent control requirements if necessary upon:

(a) making findings that one or more critical situations contemplated in subparagraph (2) do exist;
(b) giving public notice and specifying the time and place of a public hearing with respect to any request for variance in the conditions of a waste discharge permit or any action contemplated by the EQC concerning an individual permit, class of permits or modification of water quality standards;
(c) investigating jointly with any concerned permit holders alternate methods other than suspension of conditions or standards; such alternate methods to include reallocation of waste loads and intermittent alternate cessation of discharges by two or more permit holders;
(d) setting forth the program for control during the critical situation;
(e) specifying the geographical area or areas affected and specifying the powers, if any, to be delegated to the Director during the critical situation;

Pacific Northwest Chapter
SIERRA CLUB
2637 S.W. Water Street·Portland, Oregon 97201·(503) 222-1963

ATTACHMENT F

4. Subparagraph (4) to read as follows:

Any such action taken pursuant to subparagraph (3) shall be reviewed by the EQC at least every 60 days and the EQC shall then modify or terminate the action as necessary to protect public health, safety and welfare or prevent substantial damage to any resources of the state. No such action may remain in force for more than one year from the date of the EQC's original action, unless formally extended by repeating the process outlined in subparagraph (3).

Comments:

Subparagraph (2): We feel that economic factors should in general be given lower priority than the health, safety and welfare of both the citizens and the waterways of the state.

Subparagraph (3): We consider it imperative that public hearings be held on a case-by-case basis and that all efforts be made to prevent any degredation of water quality. Cooperation, forced or otherwise, between permit holders may prevent such degredation.

Subparagraph (4): a. We object to the use of the word "irreparable"; any damage should not be allowed to approach that condition. b. There may be cases where it would be to the greater good to continue a given action; accordingly, we see no reason for an inflexible one-year limit. Any renewal of an action after one year should follow only upon completion of the sequence specified in subparagraph (3).

Sincerely,

Ian Ferguson

Ian Fergusson
Chairman, Water Quality Committee

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> Any such action taken pursuant to subparagraph (3) shall be reviewed by the EQC at least every 60 days and the EQC shall then modify or terminate the action as necessary to protect public health, safety and welfare or prevent substantial damage to any resources of the state. No such action may remain in force for more than one year from the date of the EQC's original action, unless formally extended by repeating the process outlined in subparagraph (3).

Comments:

Subparagraph (2): We feel that economic factors should in general be given lower priority than the health, safety and welfare of both the citizens and the waterways of the state.

Subparagraph (3): We consider it imperative that public hearings be held on a case-by-case basis and that all efforts be made to prevent any degredation of water quality. Cooperation, forced or otherwise, between permit holders may prevent such degredation.

Subparagraph (4): a. We object to the use of the word "irreparable"; any damage should not be allowed to approach that condition. b. There may be cases where it would be to the greater good to continue a given action; accordingly, we see no reason for an inflexible one-year limit. Any renewal of an action after one year should follow only upon completion of the sequence specified in subparagraph (3).

Sincerely,

Ian Fergusson

Ian Fergusson
Chairman, Water Quality Committee

Mr. Joe B. Richards
Chairman
Environmental Quality Commission
777 High Street
P.O. Box 10747
Eugene, Oregon 97401

May 3, 1977

Dear Joe:

I am enclosing a copy of the policy position on water and the drought situation adopted by the Water Quality Management Planning Policy Advisory Committee on February 24, 1977.

We urge that this statement of our views be included in the record of hearings recently announced by the Department of Environmental Quality and by your Commission in dealing with changes in water quality standard rules as a result of the drought.

Sincerely,

Carleton

CARLETON WHITEHEAD
Chairman
Water Quality Management
Policy Advisory Committee

Attachment

cc: PAC Members
William H. Young
Harold Sawyer
John R. Churchill

ATTACHMENT G

POLICY POSITION

Water Quality Management Planning Policy Advisory Committee

WHEREAS this Water Quality Management Planning Policy Advisory Committee has been established by the Environmental Quality Commission and the Department of Environmental Quality to review and advise the state government on the development and conduct of a Water Quality Management Program;

WHEREAS the Policy Advisory Committee has received briefings on the current drought water conditions in Oregon and various government and interest group plans/proposals for dealing with this situation;

WHEREAS we believe it is imperative that the quality of Oregon's water in this time of shortage be maintained for human consumption, agricultural, fish preservation and maintenance of other vital natural resources dependant upon water;

WHEREAS some proposals for water resource projects have potential for encouragement of inefficient water uses and potential for a negative impact upon water quality;

THEREFORE, we urge that the State avoid precipitous decisions to meet short term emergencies that involve long term commitments on water projects and planning;

THEREFORE, we urge increased agency funding for full enforcement of current water use laws so as to minimize waste and assure minimum flows for water quality purposes;

THEREFORE, we urge the development of a strategy to insure minimum flows for water quality including, if necessary, revision of policies, regulations and federal and state laws;

THEREFORE, we urge promotion and early implementation of Oregon water law re-codification in process for the past two years;

THEREFORE, we urge integration of water quality objectives among all appropriate agencies and their full commitment to the development and adoption of Best Management Practices to obtain water quality objectives;

THEREFORE, we urge DEQ staff review of proposals for water quality/water quantity management and recommend alternative reallocations or high priority projects for the next round of federal grant applications.

ROBERT W. STRAUB
GOVERNOR

Environmental Quality Commission

1234 S.W. MORRISON STREET, PORTLAND, OREGON 97205 PHONE (503) 229-5696

MEMORANDUM

TO: Environmental Quality Commission

FROM: William H. Young, Director

Subject: Proposed Use of FY 1977 Sewage Works Construction Grant Funds Administered through EPA

Background

When the Commission approved the FY 77 grants priority list last fall, we had estimated that $43.5 million in federal funds would be allocated to Oregon by February 1977. Projects ranked 1 through 95 on Part II of the priority list were to be funded out of the expected allocation. A copy of that list is attached.

It is our understanding that Oregon will soon receive approximately $8.328 million which is our total EPA grant allotment for FY 77. These monies were included in a supplemental appropriations bill for EPA's grant program (HR 4877). The bill was signed by the President on May 4, 1977. An additional $140,871.00 in EDA Title 3 money (under the Public Works Employment Act of 1976, PL 94-369) is also available for obligation with the EPA funds.

Total Available Funds	$8,468,871
Less 15% Reserve	- 1,270,331
Funds Available for Project Funding	$7,198,540

According to original estimates, we are about $35 million short on federal funding. We must have a decision from the EQC on how these new limited grant resources should be used.

Evaluation of Alternatives

We identified three alternate ways to utilize available funds, including:

1. Develop a new priority list to replace Part II. This new list would reflect the latest available assessment of water pollution control need.

Comment At least 60-90 days would be required to get a list developed, taken through the hearing process and adopted by the Commission. Several projects would be delayed. Most of the projects which could make use of funds would probably be the same as those already included on the Part II list (i.e., ranked 6 through 95).

2. Fund projects ranked 96 through 192 on Part I of the present priority list (copy attached).

Comment Over $5 million could not be obligated if this alternative is selected since actual funding need is limited. In addition, lower priority projects would be receiving funding while higher priority needs on Part II would remain stalled.

3. Fund those projects on Part II of the priority list that will be ready for certification before October 1, 1977. The project with highest rank (Priority No. 6) would be funded first and on down the list till all funds would be committed.

Comment Specific projects on Part II that are identified below can use grant funds as soon as they are made available. This would be consistent with Part V(E) of our Criteria for Priority Ranking which discusses scheduling. These projects, expected grant certification dates, and updated grant amounts are as follows:

Prior.#	Project	Step	Priority List Grant Amt. ("Reserved")	Actual Updated Grant Funding Need	New Target Certification Date (MM-YY)
6	Winston-Green	3	$1,500,000	$3,600,000	07-77
7	John Day (Phase I)	3	1,290.000	382,000	07-77
8	Canyon City	3	250,000	440,000	07-77
11	Sutherlin	3	1,652,000	2,145,000	06-77
16	Yamhill	3	120,000	136,684	06-77
28	L. Oswego (Evergreen)	3	213,000	180,000	07-77

Note: Funding would run out here. If projects above this line could not be certified before October 1, 1977, then other projects of lower priority would be certified such as:

31	Lakeside	3	709,000	1,162,000	08-77
40	N. Roseburg S.D.	3	480,000	450,000	08-77
41	Bend (Phase 1B)	2	950,000	950,000	08-77
50	Portland-Elk Rock	3	225,000	183,000	08-77
53	USA-Gaston	2	60,000	60,000	08-77
54	USA-Banks	2	60,000	60,000	09-77
55	Junction City	3	248,000	200,000	08-77

Etc.

Summary

Alternatives 1 and 2 should be eliminated from further consideration since 1 would cause about three month's delay in getting funds obligated and 2 would not be acceptable in terms of DEQ program emphasis and EPA requirements.

Alternate 3 would fund projects of high priority on the Part II list which are willing and able to get underway prior to October 1, 1977. This alternate would also assure that updated grant funding needs would be met. In addition, if a project of relatively higher priority could not use the funds within an acceptable time frame, then an alternate project of lower priority would be allowed to get the funds.

Recommendations

It is recommended that the EQC:

1. Approve the use of Oregon's limited FY 77 grant allotment to fund those specific projects appearing in priority order on Part II of the priority list which, based on updated costs and target certification dates, will use the money prior to October 1, 1977.

2. Authorize the Director to utilize FY 77 grant funds as soon as Oregon receives its allotment from EPA.

Bill

WILLIAM H. YOUNG
Director

THB:ak
Attachments
May 25, 1977

PART II **DEPARTMENT OF ENVIRONMENTAL QUALITY**
FY 1977 PRIORITY LIST AND SCHEDULE

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,000)	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
410	WINSTON-GREEN	002879	56	STP	3	1500	0377		6
438	JOHN DAY-CANYON CITY	002722	01	STP, INT	3	1290	0577		7
600	CANYON CITY	NA		INT	3	250	0377		8
436	SUTHERLIN	002084	33	STP IMP	3	1652	0277		11
429	EAGLE POINT	002229	87	STP IMP	3	124	~~0477~~ FY78	Rescheduled	12
404	YAMHILL	002280	84	STP IMP	3	120	0277		16
505	TILLAMOOK CITY	002066	16	STP IMP	3	800	~~0677~~ FY78	Rescheduled	17
510	JEFFERSON	002045	84	STP, INT	3	284	~~0277~~ FY78	Rescheduled	20
428	BROWNSVILLE	002008	36	STP IMP	3	213	~~0377~~ FY78	Rescheduled	22
463	LAKE OSWEGO -EVERGRN	NA	91	INT	3	213	0377		28
530	LAKESIDE	002999	33	STP, INT	3	709	0377		31
~~448~~	~~AURORA~~		~~26~~	~~STP, INT~~	~~3~~	~~968~~	~~0477~~	Reprioritized	33
581	NORTH ROSEBURG S D	002359	14	INT & PS	3	480	0477		40
486-03	BEND PHASE 1B	NA	56	SYSTEM	2	950	0777		41
585	LAKE OSWEGO -GLENMOR	NA		COLL SYS	3	600	~~0477~~ FY78	Rescheduled	43
579	MADRAS	NA	14	INT	3	250	~~0577~~ FY78	Rescheduled	44
619	ASTORIA - WILLIAMSPORT INT			INT	2	00080	~~0877~~ FY78	Rescheduled	46
616	ROSEBURG SEWER REHAB	002258	14	STP, INT	3	2000	~~0677~~ FY78	Rescheduled PHASED	48
488	CANYONVILLE	002072	33	STP IMP	3	600	~~0577~~ FY78	Rescheduled	49
605	PORTLAND - ELK ROCK	NA		INT	3	225	0877		50
439	MT VERNON		45	STP, INT	3	400	~~0677~~ FY78	Rescheduled	51
489	HILLSBORO-IRRIGATION	002334		STP	3	71	~~0377~~ FY78	Rescheduled	52
575	USA - GASTON	002015		STP IMP	2	60	0577		53
576	USA - BANKS	002012		STP IMP	2	60	0777		54
496	JUNCTION CITY	002656	09	STP IMP	3	248	0677		55
497	EUGENE AIRPORT	002648	14	STP IMP	3	142	0377		56
490	HARRISBURG	002075	52	STP	3	352	~~0477~~ FY78	Rescheduled	57

Note: no FY78 schedule changes marked beyond page one

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,000)	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
452	MONMOUTH-INDEPENDENCE	002061	09	STP	3	567	0377		58
454-03	EUGENE-SPRINGFIELD		14	REHAB	3	2000	0777		59
458	CORVALLIS AIRPORT	002250	43	STP	2	57	0277		60
493	TRI-CITY S D		56	REG STP	2	670	0677		61
494	NEWBERG-DUNDEE	002025	84	REG STP	3	851	0877		62
492	USA - UPPER TUALATIN	NA	16	INT	3	2017	0677		64
605	HALSEY	002239		STP IMP	1	12	0277		65
603	USA - BRONSON CK	NA		INT	3	400	0477		66
611	USA - ROCK CK TRUNK	NA		INT	3	2000	0777		67
374	MAUPIN	002260	67	STP IMP	3	357	0377		68
413	GOLD HILL	002259	33	STP IMP	3	266	0677		70
556	REEDSPORT	NA	33	INT	3	354	0777		72
498	JACKSONVILLE	002079	30	INT	3	495	0777		73
557	PORTLAND - SLUDGE	NA		STP IMP	3	4290	0477		74
558	BCVSA - WHITE CITY	002246	14	INT	2	103	0577		75
539	ST HELENS	NA	86	INT	3	1100	0677		76
499	PRAIRIE CITY	002003	80	STP, INT	3	272	0577		77
586	RAINIER	002038		STP IMP	2	35	0577		79
475	LA GRANDE-ISLAND CITY	002046	12	STP, INT	3	1980	0577		80
472	ELGIN	002243	01	STP IMP	3	357	0677		81
501	CORVALLIS-CRESCENT V	NA		INT	3	781	0677		82
583	IONE		63	STP, INT	3	300	0877		83
584	SILETZ	002041		STP IMP	2	35	0677		86
466	PORT OF TILLAMOOK BAY	002291	04	STP IMP	2	50	0277		87
503	SEASIDE	002040	56	STP IMP	2	182	0577		88
427	AUMSVILLE	002272	36	STP IMP	3	387	0277		89
430	DAYTON	002363	84	STP IMP	2	27	0277		90

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,000)	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
476	GERVAIS	002739	09	STP/ INT	3	567	0677		90
508	AMITY	002621	20	STP IMP	3	238	0577		92
509	WOODBURN	002000	16	STP, INT	3	1135	0477		93
615	CARLTON	002054		STP IMP	2	60	0677		94
273	ROCKAWAY	002330	33	STP IMP	3	1100	0777		95
511	CANNON BEACH	002022	16	STP IMP	2	74	0277		96
559	LINCOLN CITY PHASE 2	002047	56	STP, INT	3	2929	0477		97
512	COTTAGE GROVE	002055	47	STP IMP	3	845	0777		98
513	CRESWELL	002754	40	STP IMP	3	284	0577		99
618	NEWPORT			STP IMP	2	00045	0777		100
514	OAKRIDGE	002231	47	STP IMP	3	212	0877		101
592	DALLAS	002073		STP IMP	2	35	0477		104
515	SCIO	002930	36	STP IMP	3	107	0677		105
588	MT ANGEL	002876	84	STP IMP	2	35	0377		106
588	MT ANGEL	002876	84	STP IMP	3	300	0977		106
620	PHILOMATH			STP IMP	2	00040	0777		107
569	MONROE	002920	47	STP IMP	2	40	0377		108
569	MONROE	002920	47	STP IMP	3	300	0877		108
571	UMATILLA	002230		STP EXP	3	350	0377		109
571	UMATILLA	002230		STP EXP	2	50	0677		109
516	KLAMATH FALLS REGION	002630	33	STP	2	497	0677		110
517	HERMISTON	002076	56	STP, INT	3	2186	0977		111
518	ONTARIO	002062	12	STP IMP	2	44	0977		112
431	BAKER	002069	12	STP, IMP	2	146	0977		113
589	MILTON-FREEWATER	002278		STP IMP	2	185	0377		114
589	MILTON-FREEWATER	002278		STP IMP	3	800	0977		114
564	NORTH POWDER	002240	47	STP IMP	3	300	0477		115

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,000)	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
519	JOSEPH	002060	01	STP IMP	3	387	0377		116
554	ENTERPRISE	002056	01	STP IMP	3	370	0377		117
473	DUFUR	002905	63	STP IMP	3	96	0577		118
521	N ALBANY S D	NA	09	INT	2	117	0477		119
522	NORTH PLAINS	NA		INT	1	10	0977		120
523	ST PAUL		20	STP, INT	3	359	0777		121
526	CLACKAMAS CO - RHODO-W		56	STP IMP	2	46	0677		122
567	HAPPY VALLEY	NA	08	INT	2	35	0277		123
567	HAPPY VALLEY	NA	08	INT	3	300	0877		123
455	SHADY COVE		30	STP, INT	2	72	0277		125
455	SHADY COVE		30	STP, INT	3	568	0877		125
456	MERLIN-COLONIAL VALLEY		40	STP, INT	1	24	0677		126
527	BCVSA - CENTRAL PT		14	INT	2	90	0577		127
582	IRRIGON			STP, INT	2	30	0877		128
437	WAUNA-WESTPORT		16	STP, INT	2	91	0777		129
426	MULT CO-INVERNESS #8	NA		INT	3	413	0577		130
465	GRESHAM - LINNEMAN	NA	56	INT	3	1061	0677		131
356	COLUMBIA CITY	002071		INT	3	200	0577		132
577	HOOD RIVER-WESTSIDE	NA	63	INT	2	15	0577		133
577	HOOD RIVER-WESTSIDE	NA	63	INT	3	100	0977		133
572	THE DALLES - FOLEY	NA	63	INT	2	20	0277		134
572	THE DALLES - FOLEY	NA	63	INT	3	100	0777		134
531	DUNES CITY			STP, INT	1	14	0577		135
532	HWY 101 S D	NA		INT	3	200	0677		136
467	SILVERTON	002065		STP IMP	3	212	0577		137
533	FLORENCE	002074	47	STP IMP	2	69	0577		139
445	DONALD		09	STP, INT	2	46	0577		141

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,000)	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
534	NEWBERG - NORTHWEST	NA	43	INT	3	121	0577		142
471	TANGENT			INT	1	14	0377		143
471	TANGENT			INT	2	55	0877		143
460	ALBANY - NORTHEAST	NA		INT	1	20	0277		144
536	LAPINE			STP, INT	2	55	0477		145
622	PORTLAND - 45TH DR INT			INT	1	00015	0277		146
447	MILL CITY		09	STP, INT	2	91	0577		147
537	SW LINCOLN CO S D		43	STP, INT	3	2200	0977		148
542	CARMEL-FOULWEATHER S D		43	STP, INT	3	1063	0377		149
560	ROSEBURG -RIFLE RNG	NA		INT	2	25	0777		150
561	AGATE BEACH S D	NA		INT	1	18	0377		152
561	AGATE BEACH S D	NA		INT	2	68	0977		152
607	BCVSA - WHETSTONE	NA		INT	2	70	0977		153
540	MERRILL	002048		STP, INT	1	12	0477		154
574	WESTSIDE S D - K FALLS		32	STP/ INT	3	650	0777		155
541	SISTERS		33	STP, INT	3	434	0877		157
449	FALLS CITY			STP, INT	2	45	0577		158
546	CRESCENT			STP, INT	2	38	0377		159
587	HAINES		01	STP, INT	2	35	0377		160
587	HAINES		01	STP, INT	3	300	0877		160
597	YONCALLA	002245		STP IMP	2	50	0777		162
470	COBURG		14	STP, INT	1	22	0377		163
470	COBURG		14	STP, INT	2	91	0977		163
604	CLACK CO-KELLOGG SL	002622		STP IMP	1	10	0477		164
608	USA - BROOKWOOD TRNK	NA		INT	3	6	0377		165
610	USA - SUNSET TRUNK	NA		INT	3	320	0577		166
613	USA - REEDSVILLE TRNK	NA		INT	3	450	0777		167

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,000)	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
549	HILLSBORO - WESTSIDE	002334		STP AUTO	2	25	0477		169
598	OAK LODGE S D	002614		STP IMP	1	15	0277		170
598	OAK LODGE S D	002614		STP IMP	2	50	0977		170
535	CANBY	NA	60	INT	2	23	0377		171
535	CANBY	NA	60	INT	3	142	0877		171
621	PORTLAND - LINNTON INT			INT	2	00045	0877		172
568	ELKTON		47	STP	2	40	0877		173
563	ROSEBURG - LOOKINGGL	NA		INT	2	25	0577		174
580	LEXINGTON		63	STP, INT	2	44	0277		176
580	LEXINGTON		63	STP, INT	3	380	0877		176
614	ARLINGTON	002019		STP EXP	2	20	0477		177
609	BCVSA - WEST MEDFORD	NA		INT	1	10	0377		179
612	BCVSA - WAGNER CK	NA		INT	1	6	0577		180
562	IMBLER		67	STP, INT	3	164	0577		181
591	CASCADE LOCKS	NA		INT	1	8	0377		183
606	CLATSKANIE	NA		INT	1	8	0977		184
551	SANDY	NA	04	INT	1	5	0377		185
551	SANDY	NA	04	INT	2	21	0977		185
552	POWERS	002693	33	STP IMP	2	12	0777		186
553	BANDON - JOHNSON	NA	33	INT	3	262	0377		187
468	SCOTTS MILLS			STP, INT	1	16	0377		188
468	SCOTTS MILLS			STP, INT	2	58	0977		188
477	DETROIT			STP, INT	1	16	0477		189
477	DETROIT			STP, INT	2	58	0977		189
565	STANFIELD	002697	67	STP IMP	3	335	0677		190
593	ELMIRA	NA		INT	2	19	0777		191
602	NESKOWIN			STP, INT	2	45	0877		192

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,000)	TARGET CERT. (MM/YY)	COMMENT	PRIOR. NO.
548	SUMPTER			STP, INT 1		4	0477		193
479	JUNTURA			STP, INT 1		4	0377		194
601	WALLOWA LAKE S A			STP, INT 1		10	0277		195

ATTACHMENT NO. 2

PART I

DEPARTMENT OF ENVIRONMENTAL QUALITY
FY 1977 PRIORITY LIST AND SCHEDULE

PROJECT NO.	PROJECT	NPDES NO.	ENGR CODE	PROJECT DESCR.	STEP	ESTIMATED PROJECT COST (1,000)	TARGET CERT. (MM/YY)		COMMENT	PRIOR NO.
355	CORVALLIS - AMENDED PROJECT			STP IMP	2	00600	1076		INCR	1
323	NETARTS-OCEANSIDE S D	002988	43	STP, INT	3	1400	1076			2
411	REDWOOD S D	002994	14	STP, INT	3	2185	0876	0976		3
347	REDMOND	NA	43	SYSTEM	3	11000	0976			4
432	FOSTER-MIDWAY	NA	14	SYSTEM	3	1866	1076			5
410	WINSTON-GREEN	002879	56	STP	2	412	0376	0676	RECERTIF	6
438	JOHN DAY-CANYON CITY	002722	01	STP, INT	2	22	0776	0976		7
600	CANYON CITY	NA		INT	2	20	0776	0876		8
421	USA - LOWER TUALATIN	NA	16	INT	2	150	0776	0776		9
421	USA - LOWER TUALATIN	NA	16	INT	3	2200	0976			9
434	GLENDALE	002273	33	STP IMP	3	867	1276			10
429	EAGLE POINT	002229	87	STP IMP	2	21	1275	0176		12
423	CAVE JUNCTION	002833	30	STP IMP	2	28	0676	0676		13
423	CAVE JUNCTION	002833	30	STP IMP	3	213	0177			13
424	BOARDMAN	002070	80	STP IMP	3	1247	0876	0976		14
226	WHEELER - NTCSA INCR	002068	50	INT	3	612	0776	0776		15
404	YAMHILL	002280	84	STP IMP	2	11	1275	0576	RECERTIF	16
505	TILLAMOOK CITY	002066	16	STP IMP	2	189	0976	0976		17
444	MOLALLA	002238	84	STP EXP	3	293	1176			18
446	LEBANON	002081	14	STP IMP	3	1800	1076			19
510	JEFFERSON	002045	84	STP, INT	2	31	0876	0976		20
450	LINCOLN CITY-PHASE 1	NA	56	INT	3	500	0177			21
385	VENETA	002053	52	PS -STP	3	80	1076		INCR	23
373-	CHILOQUIN		32	PS & INT	3	25	1076		INCR	24
453	BONANZA		78	STP IMP	3	425	1076			25
524	LAKE OSWEGO -HARVEY	NA	16	INT	3	142	0976			26
525	LAKE OSWEGO -TERRACE	NA	88	INT	3	110	1176			27

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PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESCR.	STEP	ESTIMATED PROJ. COST (1,000)	TARGET CERT. (MM/YY)	ACTUAL CERT. (MM/YY)	COMMENT	PRIOR NO.
463	LAKE OSWEGO -EVERGRN	NA	91	INT	2	23	0276	0276		28
313	WEST LINN-LOWER TUAL	NA	20	INT	3	112	0976	0976		29
528	COVE	NA	50	STP IMP	3	568	1276			30
417	PACIFIC CITY S D		26	STP, INT	2	45	0576	0576		32
417	PACIFIC CITY S D		26	STP, INT	3	355	0177			32
448	AURORA		26	STP, INT	2	72	0576	0576		33
451	TWIN ROCKS S D	002349	50	INT, STP	3	150	0776	0776		34
538	ROADS END S D	NA	33	INT	3	212	1176			35
544	ADRIAN		12	STP, INT	3	238	1076			36
545	PRINEVILLE -LAUGHLIN	NA	43	INT	3	220	0177			37
547	UKIAH	NA	01	STP, INT	3	267	1076			38
566	PORT OF PORTLAND	NA		INT	3	141	1076			39
581	NORTH ROSEBURG S D	002359	14	INT & PS	2	50	0876	0776		40
486-01	BEND PHASE 1A	NA	56	SYSTEM	2	700	1076			41
585	LAKE OSWEGO -GLENMOR	NA		COLL SYS	2	80	1076			43
579	MADRAS	NA	14	INT	2	35	1176			44
382-02	USA - FANNO PHASE 5	NA	56	INT	3	139	0976			45
619	ASTORIA - WILLIAMSPORT	INT		INT	1	00019	1276			46
487-02	ROSEBURG METRO	002258	14	STP, INT	2	1300	0177			47
616	ROSEBURG SEWER REHAB	002258	14	STP, INT	2	300	1076		PHASED	48
488	CANYONVILLE	002072	33	STP IMP	2	69	0976			49
439	MT VERNON		45	STP, INT	2	50	1176			51
489	HILLSBORO-IRRIGATION	002334		STP	2	8	0976			52
575	USA - GASTON	002015		STP IMP	1	9	0976			53
576	USA - BANKS	002012		STP IMP	1	9	1176			54
496	JUNCTION CITY	002656	09	STP IMP	2	32	0976			55
497	EUGENE AIRPORT	002648	14	STP IMP	2	19	0976			56

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESC.	STEP	ESTIMATED PROJ. COST(1,000)	TARGET CERT. (MM/YY)	ACTUAL CERT. (MM/YY)	COMMENT	PRIOR NO.
490	HARRISBURG	002075	52	STP	2	34	1076			57
452	MONMOUTH-INDEPENDENCE	002061	09	STP	2	72	0976			58
454-02	EUGENE-SPRINGFIELD	002620	14	STP	2	697	1176			59
494	NEWBERG-DUNDEE	002025	84	REG STP	2	108	1176			62
570	SPRINGFIELD	002632		STP IMP	2	200	1276			63
492	USA - UPPER TUALATIN	NA	16	INT	2	153	1176			64
603	USA - BRONSON CK	NA		INT	2	60	1176			66
611	USA - ROCK CK TRUNK	NA		INT	2	200	1176			67
374	MAUPIN	002260	67	STP IMP	2	31	0976			68
474	EUGENE - EASTSIDE	NA	14	INT	2	900	1276			69
413	GOLD HILL	002259	33	STP IMP	2	34	1276			70
617	OAKLAND	002049		STP IMP	1	15	0177			71
556	REEDSPORT	NA	33	INT	2	45	1176			72
498	JACKSONVILLE	002079	30	INT	2	81	1276			73
557	PORTLAND - SLUDGE	NA		STP IMP	2	277	0976			74
539	ST HELENS	NA	86	INT	2	165	1176			76
499	PRAIRIE CITY			STP, INT	2	00040	1176			77
342	PORTLAND - SE RELIEV	NA		INT	3	2888	1276			78
586	RAINIER	002038		STP IMP	1	10	1076			79
475	LA GRANDE-ISLAND CITY	002046	12	STP, INT	2	181	1176			80
472	ELGIN	002243	01	STP IMP	2	31	1276			81
501	CORVALLIS-CRESCENT V	NA		INT	2	111	0976			82
583	IONE		63	STP, INT	2	35	0177			83
502	HAMMOND	002274	43	INT	2	36	0177			84
590	BAY CITY	002257		STP IMP	1	12	1276			85
584	SILETZ	002041		STP IMP	1	10	1276			86
466	PORT OF TILLAMOOK BAY	002291	04	STP IMP	1	13	0976			87

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PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESC.	STEP	ESTIMATED PROJECT COST (1,000)	TARGET CERT. (MM/YY)	ACTUAL CERT. (MM/YY)	COMMENT	PRIOR NO.
503	SEASIDE	002040	56	STP IMP	1	49	1076			88
427	AUMSVILLE	002272	36	STP IMP	2	36	0976			89
506	SHERIDAN-WILLAMINA	002064	47	STP IMP	2	48	1076			91
508	AMITY	002621	20	STP IMP	2	21	1276			92
476	GERVAIS	002739	09	STP/ INT	2	66	1176			93
509	WOODBURN	002000	16	STP, INT	2	132	1176			93
615	CARLTON	002054		STP IMP	1	20	1076			94
273	ROCKAWAY	002330	33	STP IMP	2	184	1176			95
559	LINCOLN CITY PHASE 2	002047	56	STP, INT	2	337	0976			97
512	COTTAGE GROVE	002055	47	STP IMP	2	105	0976			98
513	CRESWELL	002754	40	STP IMP	2	36	1076			99
518	NEWPORT			STP IMP	1	00015	1076			100
514	OAKRIDGE	002231	47	STP IMP	2	28	0177			101
573	LOWELL	002004		STP IMP	2	50	0177			102
594	ESTACADA	002057		STP IMP	1	20	1276			103
515	SCIO	002930	36	STP IMP	2	14	1176			105
620	PHILOMATH			STP IMP	1	00012	1176			107
517	HERMISTON	002076	56	STP, INT	2	263	1276			111
589	MILTON-FREEWATER	002278		STP IMP	1	50	0976			114
564	NORTH POWDER	002240	47	STP IMP	2	35	0976			115
519	JOSEPH	002060	01	STP IMP	2	50	1076			116
554	ENTERPRISE	002056	01	STP IMP	2	44	1076			117
473	DUFUR	002905	63	STP IMP	2	12	1176			118
523	ST PAUL		20	STP, INT	2	41	1276			121
437	WAUNA-WESTPORT		16	STP, INT	1	24	1276			129
426	MULTNOMAH CO - INVERNESS #8			INT	2	00060	1276			130
465	GRESHAM - LINNEMAN	NA	56	INT	2	157	1076			131

PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESC.	STEP	ESTIMATED PROJ. COST (1,000)	TARGET CERT. (MM/YY)	ACTUAL CERT. (MM/YY)	COMMENT	PRIOR NO.
356	COLUMBIA CITY	002071		INT	2	21	1176			132
532	HWY 101 S D	NA		INT	2	19	1176			136
467	SILVERTON	002065		STP IMP	2	26	1276			137
534	NEWBERG - NORTHWEST	NA	43	INT	2	20	1176			142
536	LAPINE			STP, INT	1	12	0976			145
447	MILL CITY		09	STP, INT	1	22	0976			147
537	SW LINCOLN CO S D		43	STP, INT	2	254	0177			148
542	CARMEL-FOULWEATHER S D		43	STP, INT	2	136	1076			149
560	ROSEBURG -RIFLE RNG	NA		INT	1	9	1176			150
607	BCVSA - WHETSTONE	NA		INT	1	12	0177			153
574	WESTSIDE S D - K FALLS		32	STP/ INT	2	80	1276			155
541	SISTERS		33	STP, INT	2	56	0177			157
449	FALLS CITY			STP, INT	1	12	0177			158
546	CRESCENT			STP, INT	1	12	0976			159
597	YONCALLA	002245		STP IMP	1	12	1176			162
608	USA - BROOKWOOD TRNK	NA		INT	2	2	1076			165
610	USA - SUNSET TRUNK	NA		INT	2	40	1176			166
613	USA - REEDSVILLE TRNK	NA		INT	2	90	0177			167
549	HILLSBORO - WESTSIDE	002334		STP AUTO	1	6	1076			169
535	CANBY	NA	60	INT	1	10	1176			171
621	PORTLAND - LINNTON INT			INT	1	00015	0177			172
568	ELKTON		47	STP	1	10	0177			173
563	ROSEBURG - LOOKINGGL	NA		INT	1	10	1076			174
562	IMBLER		67	STP, INT	2	21	1276			181
578	TROUTDALE	002052	38	INT &EXP	2	66	0177			182
552	POWERS	002693	33	STP IMP	1	3	0177			186
553	BANDON - JOHNSON	NA	33	INT	2	46	1076			187

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PROJECT NO.	PROJECT	NPDES NO.	ENGR. CODE	PROJECT DESC.	STEP	ESTIMATED PROJ. COST (1,000)	TARGET CERT. (MM/YY)	ACTUAL CERT. (MM/YY)	COMMENT	PRIOR NO.
565	STANFIELD	002697	67	STP IMP	2	43	1176			190
593	ELMIRA	NA		INT	1	8	0177			191
602	NESKOWIN			STP, INT	1	15	1276			192

O'DONNELL, RHOADES & GERBER
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811 N. W. 19TH AVENUE
PORTLAND, OREGON 97209

AREA CODE 503
TELEPHONE 222-4402

May 26, 1977

Environmental Quality Commission
State of Oregon
1234 SW Morrison Street
Portland, Oregon 97205

Re: Happy Valley Facilities Plan

Dear Commissioners:

I represent a group of landowners known as the Happy Valley Landowners Committee. Each of my clients owns sizable acreage within the City which is currently undeveloped. Efforts to obtain development approvals in the past have been frustrated by city officials, who have manipulated sewage disposal problems in Happy Valley to preclude further development.

The history of opposition to the installation of sewers in Happy Valley by city officials is well documented. Despite continued malfunctions in subsurface sewage disposal systems, city officials have striven to prevent the installation of sewers in order to effect a no growth policy in the City. In 1973, the City adopted a comprehensive plan which establishes minimum lot sizes based on requirements for sufsurface sewage disposal fields. Since approximately 90% of the City is unsuitable for septic tank disposal methods, these regulations have served as an effective moratorium on development in Happy Valley. This is evidenced by the fact that only 8 building permits were granted during the period 1973-1976.

DEQ has been an unwitting participant in a strategy devised by city officials to control growth in the City. The resistance of local officials to area wide solutions to sewage disposal problems continues to this date. This resistance has resulted in the absence of effective land use planning and the frustration of orderly development. It is hoped that the Commission will act expeditiously in imposing a schedule on Happy Valley to complete its facilities plan and to initiate construction of a

comprehensive sewage disposal system.

Thank you for your attention to this matter.

Sincerely,

O'DONNELL, RHOADES & GERBER

Terry D. Morgan

Terry D. Morgan
TDM:np

cc: Mr. and Mrs. Delmert L. Eisert
Mr. and Mrs. Mas Fujimoto
Mr. and Mrs. Robert J. Guy

STATEMENT OF THE

OREGON KRAFT PULPING INDUSTRY

TO PROPOSED REVISION TO

OAR 350-25-150 THROUGH 25-200

PRESENTED AT THE ENVIRONMENTAL QUALITY COMMISSION MEETING

MAY 27, 1977

ALBANY, OREGON

MY NAME IS ANDRE CARON. I'VE BEEN ASKED TO SAY A FEW WORDS ON BEHALF OF THE NWPPA FOR THE OREGON KRAFT PULPING INDUSTRY ON THE REVISIONS PROPOSED FOR OAR 340-25-150 THROUGH 25-200. THE KRAFT PULP MILL EMISSION LIMITATIONS.

THE INDUSTRY WOULD LIKE TO EXPRESS ITS APPRECIATION AND COMMEND THE STAFF RELATIVE TO THE POSITIVE APPROACH TAKEN IN THE REVISIONS PROPOSED AND CONSIDERATION GIVEN TO DATA SUBMITTED AS WELL AS OTHER INPUTS. WE FEEL THE REGULATIONS HAVE BEEN IMPROVED BUT ARE STILL CONCERNED ON TWO POINTS.

THE FIRST IS RELATIVE TO SECTION 25-185 <u>"REPORTING"</u> ITEM 8. THIS ITEM WOULD REQUIRE EACH MILL TO REPORT THE CUMULATIVE NUMBER OF HOURLY AVERAGES EACH DAY THE RECOVERY FURNACE AND LIME KILN TRS AND PARTICULATE EMISSIONS EXCEED THE NUMERICAL REGULATORY LIMIT. WHILE WE RECOGNIZE THE DEPARTMENT'S INTEREST IN ACQUIRING THE INFORMATION, IT DOES PRESENT A RATHER DIFFICULT TASK FOR THE MILLS. WE FURTHER DO NOT UNDERSTAND THE NEED FOR THIS INFORMATION ON AN "ACROSS THE BOARD" BASIS. WE SUGGEST THAT CONSIDERATION BE GIVEN TO ADDING THE WORKS <u>"UNLESS OTHERWISE APPROVED IN WRITING"</u> TO THIS ITEM.

THE SECOND POINT IS SECTION 25-200 "SPECIAL STUDIES." THIS SECTION IS NOT NECESSARY SINCE THERE IS CURRENTLY SUBSTANTIAL INFORMATION ON THE MATTERS PROPOSED FOR STUDY. WE BELIEVE THAT ORGANIZATION OF THE DATA AVAILABLE IN THE PUBLISHED LITERATURE, IN MILL FILES AND FROM CURRENT STUDIES WILL PROVIDE THE STAFF THE INFORMATION IT DESIRES. IT IS FURTHER RECOGNIZED THAT THE MEASUREMENT TECHNOLOGY IN THIS AREA IS NOT WELL DEVELOPED. SHOULD ADDITIONAL DATA OR STUDIES BE DETERMINED TO BE NECESSARY, WE WILL THEN WORK WITH THE D.E.Q STAFF TO PROVIDE THIS INFORMATION. WE FURTHER RECOMMEND THAT AT THE END OF ONE YEAR THE STAFF REPORT PROGRESS IN THIS EFFORT TO THE COMMISSION. WE THEREFORE URGE THIS SECTION BE DELETED FROM THE CURRENT PROPOSED REGULATIONS.

THE OREGON KRAFT PULPING INDUSTRY APPRECIATES THE TIME YOU HAVE TAKEN FROM TODAY'S BUSY AGENDA TO HEAR US.

THANK YOU.

THE LEAGUE OF WOMEN VOTERS OF CENTRAL LANE COUNTY

Affiliated with the League of Women Voters of Oregon and of the United States

May 26, 1977

TO: Environmental Quality Commission

FROM: League of Women Voters of Oregon and Central Lane County

RE: Proposed rules during natural disaster

The League of Women Voters believes that all water policy should be guided by the principle that water belongs to the public and should be managed for the benefit of the public. We are glad to learn, therefore, that the Environmental Quality Commission is developing a regularized procedure for dealing with disaster. We are also pleased that it will be the Commission itself which will examine the facts, approve the emergency measures, and then review the situation at stated intervals. We do believe that the intervals should be short; we suggest no longer than 30 days.

Drought is not an unforeseen disaster. We feel that a plan for tightening or loosening regulations should be in readiness.

We are concerned that water quality standards be maintained. We are assuming that the drought condition, while unusual, gives us a foretaste of water shortages which can become chronic if our present policies for use and allocation of water continue.

This is a good opportunity, therefore, to begin to alter both citizen attitudes and public policies. The drought may conveniently be used as an excuse for deliberate failure to meet Federal guidelines and timetables. We think that with EQC leadership, conservation measures can be adopted by municipalities which will make it unnecessary for them to seek a lifting of water quality standards. A plan for temporarily ceasing industrial discharges should be in readiness so that economic impact will be reduced and at the same time, the public interest will be protected.

We have observed that other State bodies in the past, notably the Water Resources Board, have been unable to sustain minimum flows. Public water rights and public instream values were subjugated to the demands of junior water right holders claiming economic hardship. We urge the Commission to prioritize discharges now so that such pressures can be minimized.

The priorities of the State should be developed publicly, be stated clearly, and put into effect before an atmosphere of panic developes.

Thank you for your consideration of our comments.

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REFERENCES: AIR QUALITY AND THE ROLE OF FIRE IN OREGON'S FORESTS, MAUL, 3/1/77.

THE ROLE OF FIRE IN OREGON FORESTS, OSDF GENERAL FILE 1-1-3-400, 3/77.

ENVIRONMENTAL EFFECTS OF FOREST RESIDUES MANAGEMENT IN THE PACIFIC NORTHWEST, USDA REPORT PNW-24, 1974.

FORESTRY PROGRAM FOR OREGON, OSDF, APRIL, 1977.

ANNUAL REPORTS, OREGON SMOKE MANAGEMENT PLANS 1975 AND 1976.

REFORESTATION MANUAL (DRAFT), OREGON STATE UNIVERSITY, 1977.

II. WHY WE BURN FOREST LANDS, AND TYPES OF BURNING; HAZARD REDUCTION AND SILVICULTURAL

FIRE HAS LONG BEEN A NATURAL, OFTEN DESTRUCTIVE, COMPONENT OF THE WESTERN OREGON FOREST ECOSYSTEM. WITHOUT FIRE WE WOULD NOT HAVE THE DOUGLAS-FIR FORESTS WE ENJOY AND DEPEND ON IN THE PACIFIC NORTHWEST TODAY.

FIRE INFLUENCES THE FOREST ENVIRONMENT IN SEVERAL WAYS:

IT INFLUENCES THE PHYSICAL-CHEMICAL ENVIRONMENT TO ALLOW GERMINATION OF SEEDS AND GROWTH OF SEEDLINGS. WHEN TOXIC CHEMICAL COMPOUNDS ARE LEACHED FROM PLANT MATERIALS AND BUILD UP IN SOIL, CREATING A CONDITION TERMED "ALLELOPATHY", GERMINATION AND GROWTH ARE RETARDED. RESEARCH HAS DEMONSTRATED THAT HEAT FROM A FIRE VOLATIZES THE TOXIC COMPOUNDS AND RE-ESTABLISHES CONDITIONS SUITABLE FOR SEEDLING DEVELOPMENT.

FIRE REGULATES THE AMOUNT OF DRY MATTER ACCUMULATION IN THE FORESTS TO PREVENT BUILD-UPS WHICH WOULD RETARD TREE GROWTH AND CREATE FIRE HAZARDS. IN OREGON'S CLIMATE, PRODUCTION OF RESIDUES EXCEEDS DECOMPOSITION, AND FIRE IS IMPORTANT IN REDUCING THIS EXCESS DEBRIS.

FIRE CONTROLS AND PERPETUATES PLANT SPECIES AND COMMUNITIES BY PERIODICALLY ADJUSTING THE ENVIRONMENT WHERE THEY ARE FOUND AND CAN FLOURISH.

FIRE DETERMINES WILDLIFE PATTERNS AND POPULATIONS BY HELPING TO MAINTAIN AND CREATE DESIRABLE HABITAT FOR THE VARIETY OF ANIMALS WHICH POPULATE OREGON'S DYNAMIC FORESTS. WITHOUT FIRE, MANY SPECIES WOULD BE FORCED TO ADAPT TO LESS DESIRABLE ENVIRONMENTS.

FIRE HELPS CONTROL FOREST INSECTS, PARASITES AND FUNGI. PERIODIC BURNING REDUCES THE BREEDING SITES OF MANY INSECTS AND SANITIZES FORESTS TO PREVENT POTENTIALLY DAMAGING POPULATION BUILD-UPS. SOME FOREST DISEASES ARE KNOWN TO BE RETARDED BY BURNING.

FIRE CONTROLS MAJOR ECOSYSTEM PROCESSES AND CHARACTERISTICS SUCH AS NUTRIENT CYCLES, ENERGY FLOW, SUCCESSION, DIVERSITY, PRODUCTIVITY AND STABILITY.

DISTURBANCE OF THE FOREST BY FIRE TENDS TO RECYCLE THE SYSTEM AND MAINTAIN DIVERSITY. MODIFICATION OF THE SYSTEM BY ELIMINATING DISTURBANCES AND RECYCLING BECOMES DETRIMENTAL TO THE SYSTEM.

BEFORE THE ARRIVAL OF THE EARLY SETTLERS IN THE OREGON TERRITORY, LIGHTNING WAS THE PRINCIPLE FIRE SOURCE IN THE EASTERN PART OF THE STATE. LIGHTNING WAS A LESS IMPORTANT SOURCE ON THE WEST SIDE WHERE INDIANS CUSTOMARILY BURNED THE INTERIOR VALLEYS TO PROVIDE ADDITIONAL FOOD-GATHERING SOURCES AND PRODUCE FORAGE FOR GAME ANIMALS. LATER ON, THE SETTLERS INTRODUCED FIRE TO CLEAR LARGE AREAS FOR AGRICULTURE.

FIRE HAS ALWAYS BEEN PART OF THE FOREST ENVIRONMENT WITH DAMAGE AND SMOKE, WHEN UNCONTROLLED, DIRECTLY PROPORTIONAL TO THE ACCUMULATION OF FOREST DEBRIS. THE FORESTER ATTEMPTS TO DUPLICATE SOME OF THE RESULTS OF WILDFIRE WITH SOME VERY IMPORTANT DIFFERENCES. THE BIGGEST DIFFERENCE IS IN THE AMOUNT OF PARTICULATE PRODUCTION OR SMOKE PRODUCED. COMBUSTION ROOM EXPERIMENTS INDICATE THAT WILDFIRE OFTEN PRODUCES UP TO TEN TIMES MORE SMOKE VOLUME THAN PRESCRIBED BURNING, WHILE CONSUMING THREE TIMES AS MUCH FUEL. OTHER MAJOR DIFFERENCES INCLUDE REDUCED DAMAGES TO FOREST AND RELATED RESOURCES. WILDFIRE IS NOT SELECTIVE BECAUSE THE HIGH BURNING INTENSITIES PRODUCED UNDER MORE SEVERE WEATHER CONDITIONS COMBINE TO CONSUME REAL PROPERTY AS WELL AS THE STANDING FOREST RESOURCE.

CONTROLLED BURNING ON FOREST LAND IS AN IMPORTANT FOREST MANAGEMENT TOOL RECOGNIZED PRIMARILY AS AN AID IN ESTABLISHING NEW CROPS AND PREVENTING EXCESS FUEL BUILD-UPS. FORESTERS REFER TO PRESCRIBED USES OF FIRE AS "SILVICULTURAL

BURNING" WHEN USED TO CONVERT UNDERPRODUCTIVE BRUSHLANDS AND TO PREPARE PLANTING SITES. "HAZARD REDUCTION" REFERS TO FIRE USED TO REDUCE THE QUANTITY OF DEBRIS OR BREAK THE CONTINUITY OF FOREST FUELS. THESE ARE DISTINCTLY DIFFERENT APPLICATIONS OF BURNING.

HAZARD REDUCTION. THE OLD-GROWTH DOUGLAS-FIR FORESTS OF WESTERN OREGON CAN PRODUCE LOGGING RESIDUES AS HIGH AS 275 TONS PER ACRE. IF UNTREATED, SUCH FUELS AMOUNT TO A "FIRE WAITING TO HAPPEN". ALL THE MAJOR WILDFIRES IN RECENT OREGON HISTORY SUCH AS THE TILLAMOOK AND OXBOW FIRES, WERE IN OLD-GROWTH FORESTS AND WERE STOKED BY SUCH FUEL CONCENTRATIONS. IF SUCH DEVASTATING CONFLAGRATIONS AS THESE ARE TO BE REDUCED OR ELIMINATED, THESE TYPES OF FUEL CONCENTRATIONS MUST ALSO BE REDUCED OR ELIMINATED.

EFFECTIVENESS OF THE FIRE PREVENTION SYSTEM ITSELF HAS INCREASED THE NEED FOR PRESCRIBED BURNING. AROUND 1910, CONCERN OF THE OREGON FOREST LANDOWNERS FOR THE WILDFIRE PROBLEM RESULTED IN THE BEGINNINGS OF CURRENT FOREST FIRE FIGHTING SYSTEMS. LIKE MOST FIRE FIGHTING SYSTEMS, IT BECAME MORE EFFICIENT, EFFECTIVE AND POWERFUL WITH THE PASSING OF TIME. CONTROL OF LARGE AND MORE POWERFUL FIRES HAS BECOME REALITY. HOWEVER, SUPPRESSION ACTIVITIES THEMSELVES OFTEN PRESERVE THE AVAILABLE FUELS BY DELAYING OR SUPPRESSING WILDFIRES. WITH THE INCREASED FUEL LOAD, THE NEXT FIRE MAY STAND A BETTER CHANCE OF ESCAPING THE FIRE CONTROL ORGANIZATION. PRESCRIBED BURNING IS THE MOST EFFECTIVE TOOL IN THE PREVENTION OF THIS TYPE OF SITUATION.

DEPARTMENT RECORDS INDICATE THAT ABOUT 47 PERCENT OF ALL THE ACRES HARVESTED IN WESTERN OREGON WERE TREATED BY FIRE IN THE 1970'S. DURING THE 1960'S NEARLY 70 PERCENT OF THE ACRES HARVESTED WERE TREATED. IN 1975, 93,300 ACRES WERE TREATED. OF THAT, 80.1 PERCENT (75,666 ACRES) WAS FOR HAZARD REDUCTION; IN 1976, 73.1 PERCENT (83,047 ACRES) WAS FOR HAZARD REDUCTION.

BROADCAST BURNING TO DISPOSE OF SLASH HAS BEEN GENERALLY DECREASING FOR SOME TIME AND THE USE OF PILING AND BURNING HAS INCREASED AS A METHOD OF REDUCING HAZARDS. THIS PRACTICE PRODUCES LESS SMOKE AND EXTENDS THE BURNING SEASON.

ACREAGES OF UNTREATED SLASH ARE INCREASING AS LAND-OWNERS ELECT OPTIONS TO PROVIDE EXTRA PROTECTION OR PURCHASE RELEASES IN LIEU OF ABATING SLASH HAZARDS CREATED BY OPERATIONS. AN IMPORTANT FACTOR IN THE DECREASED BURNING DECISIONS HAS BEEN THE AIR QUALITY REQUIREMENTS THAT PREVENT BURNING ON MANY DAYS BECAUSE OF INADEQUATE SMOKE DISPERSION. CONSEQUENTLY, HAZARD FROM FUELS REMAINING AFTER LOGGING HAS BEEN INCREASING. WITH FUELS ON THE INCREASE, AND THE NATURAL AND HISTORIC METHODS OF ABATING THEM SEVERELY LIMITED, THE CHANCES OF AIR QUALITY IMPACTS FROM LARGE WILDFIRES DURING CRITICAL PERIODS ARE GROWING. THESE IMPACTS MAY EXCEED THOSE FROM PRESCRIBED BURNING.

<u>SILVICULTURAL BURNING</u>. PRESCRIBED BURNING IS USED EXTENSIVELY IN MANAGEMENT OF DOUGLAS-FIR FORESTS TO PREPARE PLANTING SITES AND REDUCE COMPETITION. ON STEEP TERRAIN

AND EASILY COMPACTED SOILS, FIRE IS OFTEN REGARDED BY THE FORESTER AS THE ONLY FEASIBLE MEANS OF CONVERTING BRUSHFIELDS AND REMOVING UNDERGROWTH AND EXCESS DEBRIS FOLLOWING LOGGING. FIRE IS OFTEN USED IN COMBINATION WITH OTHER SITE PREPARATION METHODS INVOLVING MECHANICAL AND CHEMICAL TECHNIQUES. EACH METHOD HAS ITS APPROPRIATE APPLICATION IN FOREST LAND MANAGEMENT AND THERE IS NO ONE "BEST" METHOD. ALTERNATIVE TECHNIQUES CANNOT REPLACE PRESCRIBED BURNING AT THIS TIME.

THE CONVERSION OF BRUSHLANDS TO TIMBER AND THE CONVERSION OF UNMERCHANTABLE ALDER TO SOFTWOODS FREQUENTLY PRODUCES LARGE VOLUMES OF RESIDUES WHICH ARE FIRE HAZARDS. NEVERTHELESS, WE TERM THESE OPERATIONS "SILVICULTURAL" TREATMENTS BECAUSE THE RESIDUE RESULTED FROM MAN'S ATTEMPTS TO MANAGE VEGETATION.

SO CALLED "SILVICULTURAL" BURNING HAS BEEN INCREASING IN WESTERN OREGON DURING THE LAST FEW YEARS AS A RESULT OF ATTEMPTS TO RECLAIM UNDERPRODUCTIVE FOREST LANDS AND TO RE-ESTABLISH STANDS WITHOUT LONG REGENERATION LAGS FOLLOWING LOGGING. IN 1975 APPROXIMATELY 18 PERCENT (16,607 ACRES) OF THE PRESCRIBED BURNING WAS FOR SILVICULTURAL PURPOSES; IN 1976 APPROXIMATELY 25 PERCENT (28,856 ACRES) WAS FOR SILVICULTURAL PURPOSES. THIS TREND MAY CONTINUE FOR THE NEXT THREE DECADES AS UNDERPRODUCTIVE BRUSHLANDS ARE RECLAIMED.

A RECENT STUDY OF UNDERPRODUCTIVE LANDS ON 3.8 MILLION ACRES OF HIGH SITES IN THE COAST RANGE REVEALED THAT 567 THOUSAND ACRES (18 PERCENT) ARE UNDERPRODUCTIVE

(CONTAINED LESS THAN 150 SEEDLINGS PER ACRE). BECAUSE OF THE STEEPNESS OF TERRAIN, FIRE IS AN IMPORTANT FACTOR IN EFFORTS TO RECLAIM THESE LANDS. WITHOUT FIRE, MOST OF THESE LANDS (80 TO 85%) AND SIMILAR BRUSH-IMPACTED AREAS THROUGHOUT WESTERN OREGON WILL NOT LIKELY BE RETURNED TO SOFTWOOD PRODUCTION IN THE FORESEEABLE FUTURE.

FUTURE APPLICATIONS. LAST WEEK THE BOARD OF FORESTRY ADOPTED A FORESTRY PROGRAM FOR OREGON WHICH CONTAINS POLICIES AND ACTION PROGRAMS NECESSARY TO PREVENT PROJECTED TIMBER SUPPLY DECLINES OF 22 PERCENT IN WESTERN OREGON DURING THE NEXT THIRTY YEARS. ONE OF THE KEY ELEMENTS IN THE PROGRAM IS TO INCREASE MANAGEMENT INTENSITY ON ALL FOREST OWNERSHIPS TO GROW MORE TIMBER IN ORDER TO MAINTAIN CURRENT HARVEST LEVELS AND AVOID SEVERE SOCIAL AND ECONOMIC IMPACTS.

DURING THE NEXT DECADE, THE PROGRAM CALLS FOR A 29 PERCENT HARVEST INCREASE FROM NATIONAL FORESTS; 6 PERCENT INCREASE FROM BLM LANDS; 44 PERCENT INCREASE FROM STATE AND OTHER PUBLIC LANDS; AND NEARLY A 300 PERCENT INCREASE FROM OTHER PRIVATE LANDS TO OFFSET THE PROJECTED DECLINE OF 32 PERCENT IN FOREST INDUSTRY HARVESTS.

ACCOMPLISHING THE OBJECTIVES IN THE PROGRAM REQUIRES PROMPT REGENERATION OF HARVESTED ACRES AND CONVERSION OF BRUSHLANDS TO PRODUCTIVE CONIFER STANDS. PROJECTIONS OF TREATMENTS NEEDED SHOW THAT THE NUMBER OF ACRES CONVERTED DURING THE NEXT THREE DECADES MUST INCREASE OVER CURRENT LEVELS BY AN AVERAGE OF NEARLY 60 PERCENT. REGENERATION

ACRES MUST INCREASE BY 7 TO 10 PERCENT DURING THIS SAME PERIOD TO ACCOMPLISH THE PROGRAM OBJECTIVES. IN ADDITION, THE PROGRAM CALLS FOR INCREASED HARVESTING OF MATURE AND OVERMATURE TIMBER ON FEDERAL LANDS IN WESTERN OREGON TO FILL THE GAP CREATED AS PRIVATE OWNERS BEGIN GROWING NEW STANDS. AN AVERAGE 11 PERCENT INCREASE IN ACRES HARVESTED IS CALLED FOR OVER THE NEXT THIRTY YEARS ON THESE FEDERAL LANDS. HAZARDS ASSOCIATED WITH HARVESTING THIS OLD GROWTH, OFTEN DEFECTIVE, TIMBER WILL BE GREATLY INCREASED WITHOUT FIRE AS A TOOL FOR FUEL MANAGEMENT.

WE CAN ASSUME THAT FUTURE HARVESTED ACRES SHOULD BE BURNED IN ABOUT THE SAME PROPORTION AS THEY ARE NOW (45 TO 50 PERCENT AVERAGE). AS OLD-GROWTH STANDS ARE REPLACED BY REGULATED FORESTS WITH LESS DEFECT, MORE ACRES WILL BE HARVESTED ANNUALLY TO MAINTAIN OREGON'S CONTRIBUTION TO THE TIMBER SUPPLY. THIS MEANS THAT THE NEED FOR PRESCRIBED BURNING ASSOCIATED WITH HARVESTING WILL ALSO INCREASE, ALTHOUGH THE NEED MAY BE PARTIALLY OFFSET BY GREATER UTILIZATION AND ADVANCED TECHNOLOGY.

CONVERSION OF OVER 297,000 ACRES OF UNDERPRODUCTIVE LANDS IS CALLED FOR DURING THE NEXT DECADE AND SIMILAR AMOUNTS DURING THE 1990 AND 2000 DECADE IN WESTERN OREGON. PRELIMINARY ESTIMATES INDICATE THAT FAILURE TO RECLAIM THESE LANDS WILL DECREASE THE EFFECTIVE TIMBER-GROWING BASE IN WESTERN OREGON BY ABOUT 7 PERCENT. SINCE MOST OF THESE LANDS ARE ON VERY PRODUCTIVE SITES, HARVEST REDUCTIONS OF 14 PERCENT OR MORE COULD RESULT BY 2070 IF THEY ARE NOT BROUGHT BACK INTO PRODUCTION DURING THE NEXT THIRTY YEARS.

ANOTHER IMPORTANT ASPECT OF THE FORESTRY PROGRAM FOR OREGON IS PROTECTION OF THE FOREST RESOURCE. THE PROJECTED 22 PERCENT DECLINE IN TIMBER HARVESTS BY THE YEAR 2000 IS BASED ON THE ASSUMPTION THAT THERE WILL BE NO CATASTROPHIC LOSSES FROM FIRES, INSECTS AND DISEASE.

UNCONTROLLED FIRES BURNED AN AVERAGE OF 14,000 ACRES OF FOREST LAND ANNUALLY OVER THE PAST FIVE YEARS, DESTROYING 65 TO 70 MILLION BOARD FEET EACH YEAR. SINGLE WILDFIRES IN THE PAST HAVE PERIODICALLY DESTROYED 10 TO 15 TIMES THIS AMOUNT AND THE POTENTIAL FOR FUTURE CATASTROPHIC LOSS INCREASES AS FUEL ACCUMULATES. LOSSES OF WILDLIFE HABITAT, RECREATION OPPORTUNITIES AND OTHER MULTIPLE USES ALSO RESULT FROM WILDFIRE, BUT THESE IMPACTS ARE DIFFICULT TO QUANTIFY.

CONTROL OF INSECTS AND DISEASE THROUGH SOUND SILVICULTURAL PRACTICES IS ALSO CALLED FOR IN THE FORESTRY PROGRAM TO MINIMIZE THE ESTIMATED 5.8 BILLION BOARD FEET LOST ANNUALLY TO THESE PESTS. PRESCRIBED BURNING IS RECOGNIZED AS A STAND SANITATION PRACTICE WHICH ELIMINATES BREEDING SITES AND CONDITIONS WHICH FAVOR BUILD-UPS OF INSECTS AND DISEASES. RESEARCH HAS NOT IDENTIFIED THE MAGNITUDE OF THE CONTRIBUTION OF FIRE IN REDUCING INSECT AND DISEASE LOSSES, BUT IT IS CLEARLY AN IMPORTANT FACTOR.

IN SUMMARY

FIRE IS BEING USED LESS AS A ROUTINE TOOL IN FOREST MANAGEMENT AND MORE AS A PRESCRIBED TOOL. IT IS ESSENTIAL FOR DEBRIS REDUCTION IN SOME INSTANCES WHERE THERE IS NOT A SATISFACTORY SUBSTITUTE. THE ENVIRONMENTAL SAFEGUARDS ARE OF A PREVENTIVE NATURE. THAT IS, UNDER A PROGRAM OF FUEL MANAGEMENT, THE TOTAL FUEL BURNED AND THE SMOKE PRODUCED OVER THE LONG RUN WILL LIKELY BE LESS THAN THE CONSEQUENCES OF WILDFIRES, WHICH WILL SURELY COME WITHOUT FUELD MANAGEMENT. WITH FUEL MANAGEMENT, THE AREA BURNED DESTRUCTIVELY BY WILDFIRE WILL CERTAINLY BE REDUCED. AND MOST IMPORTANT, THE SMOKE FROM PRESCRIBED BURNING, WOULD RESULT WHEN DISPERSION CONDITIONS WERE FAVORABLE UNDER A SUCCESSFUL SMOKE MANAGEMENT PROGRAM. REGULATIONS SHOULD BE AIMED AT PREVENTING SMOKE PROBLEMS, NOT AT PROHIBITING THE USE OF FIRE AS A FOREST MANAGEMENT TOOL.

IF AIR QUALITY WAS THE ONLY FACTOR THAT WE NEED TO BE CONCERNED WITH, THE NEED FOR PRESCRIBED FOREST LAND BURNING WOULD NOT EXIST. HOWEVER, WE ARE CONCERNED ABOUT OTHER FIRE-DEPENDENT ELEMENTS OF OUR ENVIRONMENT SUCH AS FORESTS AND WILDLIFE.

TRADEOFFS IN THE ELIMINATION OF PRESCRIBED FIRE ON FOREST LAND WOULD BE:

1. INCREASE LOSSES OF OUR FOREST RESOURCES DUE TO WILDFIRE;

2. Loss in productive capacity of our forest lands due to long delays in establishing new forests and reclaiming lands taken over by brush and lesser tree species, due to past mistakes in forest land management; and

3. Economic and social losses to the people of the State of Oregon.

We believe that the Smoke Management Program can protect air quality and still allow the essential use of fire.

26-013 LIMITATION AND ALLOCATION OF ACREAGE TO BE OPEN BURNED.

(5) For the {1976} 1977 burning season, in the event that more than {195,000} 95,000 acres are registered to be burned, the Department may issue acreage allocations to growers totaling not more than {195,000} 95,000 acres plus ten (10) percent or {214,500} 104,500 acres. The Department shall monitor burning and shall cease to issue burning quotas when a total of {195,000} 95,000 acres have been reported burned.

{a.--Allocations-to-growers-will-be-made-by-applying-a-first and-second-allocation-procedure.}

{{A}-A-first-allocation-will-be-made-to-each-grower-based-on all-of-his-registered-acreage-up-to-and-including-100-acres.}

{{B}-A-second-allocation-will-be-made-to-each-grower-having-more-than-100-registered-acres-based-on-the-grower's-proportional--share-of-the-unallocated-remainder-of-the-total-{214,500} 104,500 acre-grower-allocation.}

{{b}-The-fire-district-allocation-shall-be-the-sum-of-all-first allocations-applied-to-growers-within-the-district-plus-the proportionate-district-share-of-the-unallocated-portion-of the-{195,000} 95,000-total-burnable-acres.}

(a) The Department shall sub-allocate the 104,500 acre allocation established by the Commission to the respective growers on the basis of individual acreage registered as of April 1, 1977 to the total acreage registered as of April 1, 1977.

(b) The Department shall sub-allocate the 95,000 acre allocation established by the Commission to the respective fire permit issuing agencies on the basis of the acreage registered within each fire permit issuing agency's jurisdiction as of April 1, 1977 to the total acreage registered as of April 1, 1977.

(c) In an effort to insure that permits are available in areas of greatest need, to coordinate completion of burning, and to achieve the greatest possible permit utilization, the Department may adjust, in cooperation with the fire districts, allocations of the {~~195,000~~} 95,000 burnable acres made to those fire districts.

(d) Transfer of allocations for farm management purposes may be made within and between fire districts on a one-in/one-out basis under the supervision of the Department. Transfer of allocations between growers are not permitted after {~~195,000~~} 95,000 acres have been burned within the Valley.

(e) Except for additional acreage allowed to be burned by the Governor pursuant to ORS 468.475(5), no fire district shall allow acreage to be burned in excess of their allocations assigned pursuant to (b), (c), and (d) above.

(f) In ~~1976~~ 1977 the Department may supervise "wide area energy concentrated convective ventilation experiments" to investigate the possible use of the techniques as an alternative to open burning. The total acreage involved with such experimentation shall be deducted from the total acreage allocations prior to making the sub-allocations of (a) and (b), shall not exceed that amount specifically authorized in writing by the Department, and shall not exceed 10,000 acres.

Oregon Field Sanitation Committee

May 11, 1977

To Members of
The Environmental Quality Commission
State of Oregon

Gentlemen:

The Oregon Field Sanitation Committee in compliance with directives under existing law at its May 11, 1977 meeting by unanimous decision made recommendations as follows:

1. The Committee recommends a straight percentage cut by all growers in allocation to open burn acreage registered in excess of permitted quantity.

2. The six mobile sanitizers developed through Committee authorization will be ready for growers to sanitize fields for grass seed crops following the 1977 seed harvest. Up to 1500 acres could be expected to be sanitized by the machines.

3. Taking into consideration the speculative aspects of drought as well as increased marketing efforts, a straw market possibly double the 60,000 tons per year normally sold by growers in the Willamette Valley, or a total of 100,000 tons up to 200,000 tons is apparent for 1977.

The list of acreage and growers involved with 1976 season operation of mobile sanitizers, when a total of 1100 acres were sanitized by the machines despite the wet summer and late start, is included in the Consulting Engineer's Report for 1975-1976.

T.R.M.

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A Study of the Nutritive Value of Oregon Grass Straws

Special Report 473
January 1977

Oregon State University
Extension Service, Corvallis

A STUDY OF THE NUTRITIVE VALUE OF OREGON GRASS STRAWS

Harold Youngberg, Extension Agronomist, and
Lester Vough, Extension Research Agronomist,
Oregon State University

Oregon grass seed straws can be an integral part of maintenance rations for livestock. However, livestock producers frequently hesitate to feed their animals grass straws because they do not have information on their relative nutritional value. There have been no comprehensive surveys of the nutritive value of the various grass straws grown in the state. Only the crude protein analysis of individual lots of grass straw have been generally available for comparative purposes.

A study was undertaken in 1975 to determine the range and the mean values of grass straw residues produced in western Oregon. The study was to provide a guide in the selection and feeding of these materials. Several chemical tests are available to assess nutritive value and these were used to provide a guide to proper selection of grass straw for feed purposes.

The crude protein concentration is widely used in evaluating feeds. However, this test is of limited value in rating grass seed straws. The low concentration of protein and the fact that much of the dry matter consists of cellulose and hemicellulose reduces the availability of crude protein to the animal. Some authorities feel that when the crude protein is below 5% it does not contribute to the animal's protein needs.

Several techniques have been developed to more accurately evaluate digestibility. These include:

1. The digestion trial. A direct method in which both the material consumed and the material excreted by a test animal are analyzed. These trials are lengthy and costly. They are accurate and can be used as a standard against which chemical tests are checked.

1/ Extension Agronomist, Seed Crops; Extension Agronomist, Forages, respectively, Oregon State University, Corvallis. The authors acknowledge the financial support of the Oregon Field Sanitation Committee and the cooperation of the research workers and laboratories in this analysis.

2. In vitro rumen fermentation techniques. Data from the in vitro technique most closely approximates energy availability or digestibility in forages as measured in the animal. Forage samples are combined with a buffer solution and rumen under controlled conditions. Standardized rumen fluids are needed to obtain uniformity and consistency of results. This test can be carried out on a routine basis by forage analytical laboratories.

3. Chemical techniques. Techniques proposed by Van Soest use detergents to account for lignin and other non-digestible components of the plant. The system attempts to partition plant parts into two classes--cell walls and cell contents.

   Plant cell contents consist of sugars, starch, fructosans, pectin, protein, nonprotein nitrogen, lipids, water-soluble minerals, and vitamins. The true digestibility of each of these cell contents is nearly 100%.

   The cell wall constituents consist of cellulose, hemicellulose, lignin, silica, keratin, waxes, cutin, insoluble minerals, lignified nitrogen compounds, and lignocellulose. The digestibility of this structural portion of the forage is low and affects the volume a feed will occupy in the digestive tract. Feedstuffs with high levels of these cell wall constituents limit the feed consumption by animals. Some forages, including very mature grasses and straws, are high in non-digestible components, making it difficult for animals to obtain adequate nourishment from the volume of feed they are capable of consuming. Therefore, analysis for these constituents does aid in determining a feed's nutritive value.

Methods

This survey was undertaken during the summer of 1975 to evaluate the nutritive value of various grass straws. Representative random samples of straw were collected from seed fields within a few days after combining. These samples were taken from loose material in the field which would normally be picked up in a baling operation.

A Wiley mill with a 20-mesh screen was used to grind samples in preparation for analysis. Crude protein and acid detergent fiber analyses were performed by the Oregon State University Forage Analytical Laboratory. In vitro dry matter digestibility was determined by Dr. Ralph L. Phillips, ARS Animal Scientist at the Eastern Oregon Agricultural Research Center, Union, Oregon. This test was made using rumen fluid from an animal conditioned on grass straw. Enzymatic dry matter digestibility was measured under the direction of Dr. Howard G. Walker, Jr., at the Western Regional Research Laboratory, Albany, California. In vitro dry matter digestibility, cell wall constituents, and cell wall constituent disappearance values of certain samples were determined under the direction of Dr. Vic Lechtenberg, Associate Professor of Agronomy, Purdue University.

Several samples of wheat straw were collected from storage in May 1976 and analyzed for comparison. The samples were ground and prepared for crude protein and acid detergent fiber tests in the same manner as the grass straw by the Oregon State University Forage Analytical Laboratory.

Results

1. Crude Protein

The bluegrasses contained the highest average of crude protein at 7.7 percent (Table 1). The single common bluegrass sample tested was much lower in crude protein than the named varieties (Appendix 1, page 2).

The average for the turf-type perennial ryegrass was slightly lower at 6.7 percent. The turf-type perennial ryegrasses had a much wider range in crude protein than any of the other grasses (4.2 to 11.8 percent).

Tall fescue ranked third with a mean crude protein of 5.7 percent. Tall fescue had the smallest range of any of the grass species (4.8 to 6.4 percent).

Table 1. Crude Protein Content of Oregon Grass Straws

Species	Number of Samples	Protein Content (Dry Matter Basis)	
		Range (percent)	Mean (percent)
Bluegrass	6	5.0- 9.4	7.7
Ryegrass, Perennial Turf-type	15	4.2-11.8	6.7
Fescue, Tall	7	4.8- 6.4	5.7
Bentgrass	18	3.3-10.6	5.2
Ryegrass, Perennial Forage-type	14	2.5- 7.2	4.9
Orchardgrass	15	3.1- 7.7	4.8
Ryegrass, Annual	12	2.7- 5.9	3.7
Fescue, Chewings and Red	11	1.3- 5.1	3.1

Fine-leaved fescues and annual ryegrasses had the lowest average crude protein at 3.0 and 3.7 percent, respectively.

Bentgrass, forage-type perennial ryegrass, and orchardgrass were in the mid-range with a crude protein of 5.2, 4.9, and 4.8 percent, respectively.

2. Dry Matter Digestibility

a. Acid Detergent Fiber

Acid detergent fiber (ADF) is widely used to estimate the dry matter digestibility (DDM) and digestible energy. The ADF values are highly correlated with DDM values in alfalfa, as well as in temperate and sub-tropical grasses.

Bentgrass, turf-type perennial ryegrass, and tall fescue had the lowest fiber content and thus should be the most digestible (Table 2). Orchardgrass, annual ryegrass, and chewings and red fescue had the highest ADF values.

Table 2. Acid Detergent Fiber Content of Oregon Grass Straws

		Acid Detergent Fiber	
Species	No. of Samples	Range (percent)	Mean (percent)
Bentgrass	18	35.8-46.5	41.1
Ryegrass, Perennial Turf-type	15	39.0-45.2	42.4
Fescue, Tall	7	39.0-46.7	42.5
Bluegrass	6	38.2-49.7	43.6
Ryegrass, Perennial Forage-type	14	41.7-52.6	45.5
Orchardgrass	15	44.0-53.8	49.6
Ryegrass, Annual	12	44.4-53.8	50.5
Fescue, Chewings and Red	11	45.2-58.5	51.5

There is considerable overlap in the ADF ranges of these straws, suggesting that selection for digestibility on the basis of species alone is not a completely satisfactory criterion.

b. Cell Wall Constituents

Cell wall constituent has the highest correlation with the voluntary intake of forages. It estimates the rate of digestion which in turn influences the rate of passage and, ultimately, the amount of forage the animal can consume.

Table 3. Average Percentage of Cell Wall Constituents of Oregon Grass Straws

Species	Cell Wall Constituents (percent)
Bentgrass	67.7
Ryegrass, Perennial Turf-type	68.1
Fescue, Tall	69.3
Ryegrass, Perennial Forage-type	72.1
Bluegrass	73.2
Ryegrass, Annual	75.6
Orchardgrass	79.0
Fescue, Chewings and Red	81.1

Bentgrass, turf-type perennial ryegrass, and tall fescue had the lowest average percentages of cell wall constituents. These results indicate that generally the animal intake should be greater with these species.

c. In Vitro Dry Matter Digestibility

Tall fescue, turf-type perennial ryegrass, and bluegrass had the highest available in vitro dry matter digestibility. Bentgrass and forage-type perennial ryegrass were in a mid-range. Annual ryegrass, chewings and red fescue, and orchardgrass had the lowest digestibility using this technique.

Table 4. In Vitro Dry Matter Digestibility (IVDDM) of Oregon Grass Straws

Species	Number of Samples	Percent Range	Percent Mean
Tall Fescue	7	44.1-53.8	48.8
Ryegrass, Perennial Turf-type	13	42.8-55.9	48.2
Bluegrass	6	40.1-53.9	46.7
Bentgrass	10	37.9-50.7	43.0
Ryegrass, Perennial Forage-type	12	39.7-48.3	42.9
Ryegrass, Annual	11	34.1-41.5	36.8
Fescue, Chewings and Red	6	27.3-38.9	34.9
Orchardgrass	14	28.2-42.0	34.7

d. Enzymatic Dry Matter Digestibility

The enzymatic dry matter digestibility analysis was determined only on selected samples. The ranking of the species is similar to the in vitro dry matter digestibility, although the numerical digestibility values differed. Further investigation is necessary to explain differences observed. Data is presented in the appendix.

e. Cereal Straws

Several western Oregon wheat straw samples were analyzed for comparison with the grass straws. The wheat straw samples were very low in crude protein and high in acid detergent fiber. The mean crude protein in the wheat straw was 2.36 percent, which is below the level of all the grass straws tested. The 55.0 percent acid detergent fiber was higher than that of the grass straws.

Table 5. Crude Protein and Acid Detergent Fiber of Wheat Straw

No. of Samples	Crude Protein (DM Basis)		ADF	
	Range	Mean	Range	Mean
6	1.8-3.7%	2.4%	52.1-56.9%	55.0%

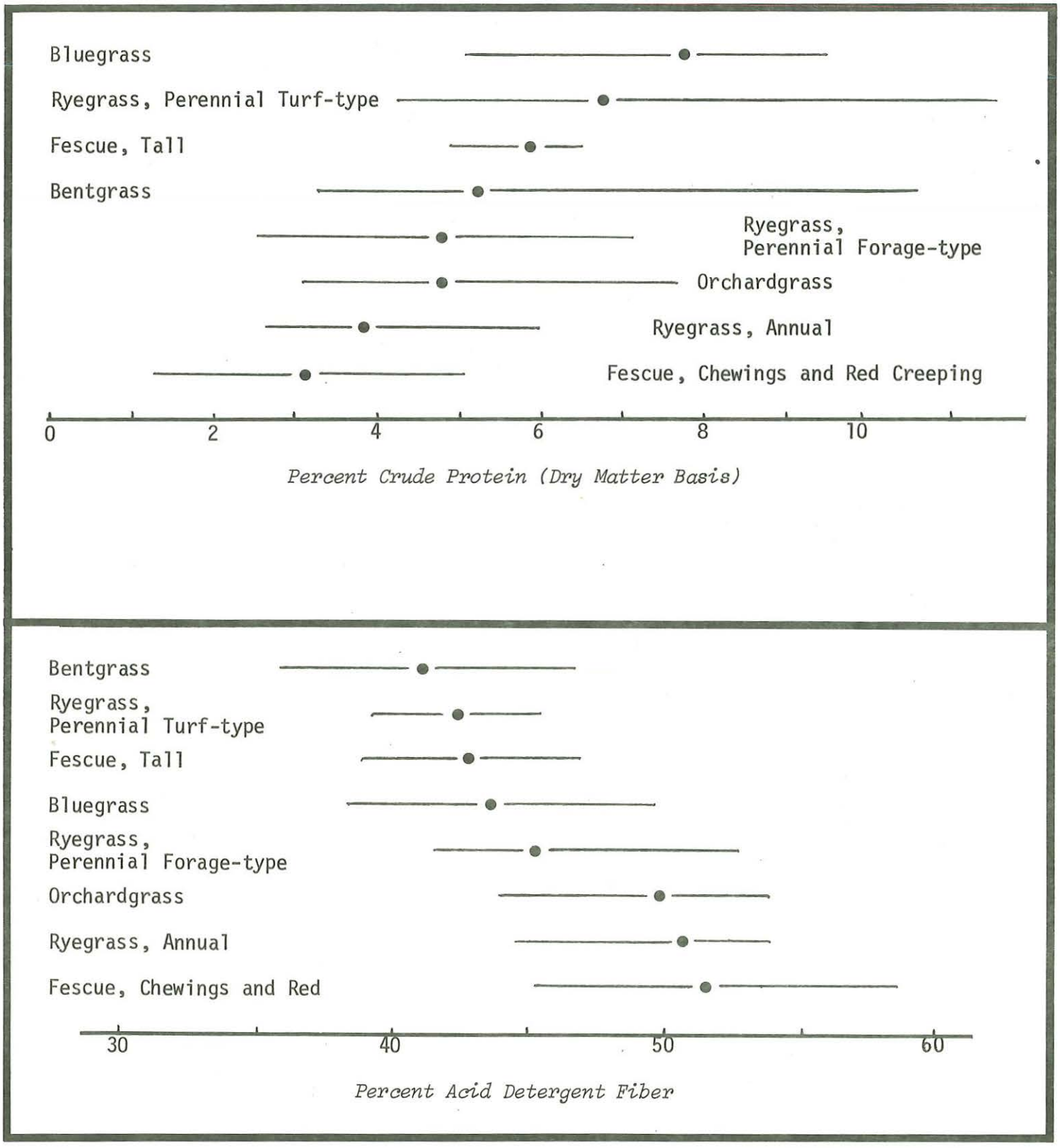
Discussion

Figure 1 provides a graphic comparison of crude protein and acid detergent fiber for the various grass straws analyzed in this study. Turf-type perennial ryegrass and bentgrass had the widest range in crude protein. This indicates that these straws may be quite variable in quality, depending on the source.

Bluegrass, turf-type perennial ryegrass, and tall fescue contained the highest percentages of crude protein. The same grasses plus bentgrass had the lowest acid detergent fiber and cell wall constituent percentages. In general, these grass straws would be preferable for livestock feed.

It is clear from Figure 1 that there is a considerable overlap in crude protein and acid detergent fiber levels in the samples from the different species. The poorer samples in the top groups were usually below the better samples in the lower groups. Each lot of straw must be considered individually. Selection should be based on the amount of leaves, the color, the odor, the condition, and the kind of straw. Characteristics that detract from palatability should certainly not be overlooked such as extreme weathering from sun bleaching and rain damage. Excessive rain damage and prolonged high moisture conditions will induce molds.

Figure 1. Range and Mean Percentages of Crude Protein and Acid Detergent Fiber. Each line represents the range of samples tested and the "●" represents the mean of all samples.



A word of caution should be given to growers, handlers, and buyers of grass seed residues. Since nearly all of the post-harvest residue in grass seed production has been burned in the past, many pesticides now in use were not registered to permit grazing of fields or using straw for livestock feed. When a grower plans to feed or sell straw for feed purposes, he should check the label statement on each pesticide used to assure that grazing or feeding of straw is permitted after treatment. Users of pesticides must stay within the recommended terms and conditions stated on the printed product labels.

Summary

Since there is rather wide variation in quality, even within any particular grass species, chemical analysis should be used whenever possible to determine the relative feeding value of a given lot of straw. Crude protein and acid detergent fiber analyses are available on a routine basis. *In vitro* dry matter digestibility analysis may be commercially available in the future, although standardization of this procedure presents a problem.

Much of the straw residue from the grass seed industry in Oregon can be used as feed for certain classes of livestock. Proper supplementation with feed additives may be necessary. This study has identified some of the species which may be preferable as livestock feed based on their chemical analysis.

APPENDIX

WILLAMETTE VALLEY GRASS STRAW SURVEY, 1975

VARIETY	SAMPLE NUMBER	CRUDE PROTEIN 1/ (DM Basis) (percent)	ADF 1/ (percent)	IN VITRO DDM 2/ (percent)	ENZYMATIC DDM 3/ (percent)
Orchardgrass (Late)					
Sterling	27-25	4.45	48.41	34.32	21.0
Sterling	27-31-L	4.96	49.05	---	--
Latar	27-22	5.35	50.92	33.85	20.0
Latar	27-06	3.59	52.35	35.79	25.8
Pennmead	27-05	4.02	51.21	31.89	23.5
Able	24-0-01	4.61	53.31	31.56	23.6
Napier	02-09	5.75	48.15	37.99	24.2
Mean		*4.68*	*50.49*	*34.23*	*23.0*
Orchardgrass (Early)					
S-143	02-01	6.35	44.00	38.49	25.9
Potomac	02-06	4.60	46.15	36.49	24.2
Potomac	02-08	7.65	45.85	41.95	26.6
Potomac	02-12	5.35	50.63	35.15	--
Potomac	27-01	5.52	45.14	37.71	27.4
Potomac	27-04	3.57	52.65	32.38	24.3
Potomac	27-21	3.05	51.90	29.72	--
Potomac	27-30	3.70	53.76	28.16	16.2
Mean		*4.97*	*48.76*	*35.00*	*24.1*
All orchardgrass mean		*4.83*	*49.56*	*34.67*	*23.6*
Tall Fescue					
Alta	22-03	6.10	38.95	51.53	35.6
Alta	27-07	5.00	41.45	51.15	35.2
Fawn	27-08	6.44	41.06	53.80	--
Fawn	27-12	6.55	45.13	44.90	30.3
Fawn	27-18	4.94	40.50	49.49	32.6
Fawn	27-26	4.84	44.05	46.29	28.1
Fawn	36-01	5.70	46.65	44.14	29.3
Mean		*5.65*	*42.54*	*48.76*	*31.9*

1/ Oregon State University Forage Analytical Laboratory
2/ Eastern Oregon Agricultural Research Center, Dr. Ralph L. Phillips
3/ Western Regional Research Laboratory, Dr. Howard G. Walker, Jr.

VARIETY	SAMPLE NUMBER	CRUDE PROTEIN 1/ (DM Basis)	ADF 1/	IN VITRO DDM 2/	ENZYMATIC DDM 3/
Bentgrass					
Highland	02-16	6.71	39.01	50.72	--
Highland	02-18	4.50	40.72	40.54	34.6
Highland	02-19	4.92	42.20	41.96	--
Highland	24-BN-01	5.70	43.71	---	--
Highland	24-BN-02	5.24	41.20	---	--
Highland	24-BN-03	4.10	42.13	---	--
Highland	24-BN-04	4.30	45.55	---	--
Highland	27-33L	6.15	40.53	---	--
Highland	27-34L	5.01	40.68	---	--
Highland	27-36L	4.59	41.13	---	--
Highland	36-04	3.40	38.86	44.87	39.5
Highland	36-05a	3.40	46.53	38.68	--
Highland	36-05b	5.45	39.74	39.95	--
Highland	36-07	3.26	39.22	37.87	--
Astoria	36-02	4.11	39.41	41.23	32.0
Astoria	36-03	5.52	35.81	47.22	35.6
Penncross	02-15	10.55	42.50	47.31	--
Penncross	27-30L	5.85	41.40	---	--
Mean		*5.15*	*41.13*	*43.04*	*35.4*
Bluegrass					
Bonnieblue	24-BL-02	8.90	43.40	50.05	28.4
Merion	24-BL-01	7.75	43.14	46.70	30.1
Merion	24-B-01	6.80	49.66	40.31	23.8
Merion	24-BL-03	8.15	39.96	49.24	32.9
Merion	24-BL-04	9.45	38.24	53.91	38.3
Common	27-14	4.95	47.33	40.11	21.2
Mean		*7.67*	*43.62*	*46.72*	*29.1*
Chewings and Red Fescue					
Chewings	03-03	3.50	54.41	---	--
Cascade	03-02	1.71	55.22	---	--
Highlight	27-02	4.85	46.80	37.37	27.0
Jamestown	24-F-05	3.50	49.77	36.11	22.0
Menuet	24-F-04	5.05	47.72	30.99	19.1
Rainier	02-07	3.60	46.99	38.70	26.3
Pennlawn	03-01	1.95	54.58	---	--
Pennlawn	03-04	2.05	55.08	---	--
Pennlawn	03-05	1.25	58.50	---	--
Pennlawn	24-F-03	3.15	52.20	27.32	17.7
Pennlawn	24-F-01	3.30	45.15	38.94	28.2
Mean		*3.08*	*51.48*	*34.91*	*23.4*

VARIETY	SAMPLE NUMBER	CRUDE PROTEIN 1/ (DM Basis)	ADF 1/	IN VITRO DDM 2/	ENZYMATIC DDM 3/
Perennial Ryegrass (Forage Type)					
Linn	02-02	3.90	43.50	41.06	33.3
Linn	02-04	3.94	45.80	39.59	33.7
Linn	02-05	4.20	44.90	44.41	34.8
Linn	03-06	3.75	52.62	---	--
Linn	22-06	7.15	46.72	44.17	--
Linn	22-07	4.76	45.66	42.62	--
Linn	22-08	3.90	47.79	39.67	--
Linn	22-09	6.20	41.70	46.71	--
Linn	22-10	5.45	44.59	40.98	--
Linn	22-11	6.85	44.65	42.27	--
Linn	27-13	3.52	44.50	42.10	--
Linn	27-32L	2.50	45.55	---	--
Reveille	27-09	6.85	43.77	48.32	--
Taptoe	27-15	4.89	44.55	43.20	35.5
Mean		*4.85*	*45.45*	*42.93*	*34.3*
Perennial Ryegrass (Turf Type)					
Derby	27-28L	4.80	44.75	---	--
Game	02-11	9.05	41.98	48.23	--
Game	22-13	4.20	44.59	42.75	--
Game	27-23	7.25	42.61	49.80	--
Manhattan	02-10	5.90	43.35	47.42	36.3
Manhattan	22-12	11.80 4/	42.01	51.36	--
Manhattan	24-R-02	4.40	44.59	43.73	31.2
Manhattan	24-R-03	5.11	45.20	44.75	--
Manhattan	27-29L	4.25	41.53	---	--
NK-100	27-10	5.15	42.32	44.27	--
NK-200	49-02	11.35 5/	39.41	55.86	--
Pennfine	24-R-01	5.31	42.56	48.65	--
Pennfine	27-16	8.65	40.84	48.82	--
Pennfine	49-01	5.45	41.40	46.17	--
Eton	27-19	7.29	39.03	55.26	--
Mean		*6.66*	*42.41*	*48.24*	*33.8*
Hard Fescue					
Biljart	24-F-02	7.45	40.69	43.63	33.9

4/ Rerun 10.80
5/ Rerun 11.10

VARIETY	SAMPLE NUMBER	CRUDE PROTEIN 1/ (DM Basis)	ADF 1/	IN VITRO DDM 2/	ENZYMATIC DDM 3/
Annual Ryegrass					
HW 51	27-11	2.85	44.40	38.77	--
T-3	27-17	2.65	47.81	35.10	--
HW2	27-24	3.05	53.78	34.56	--
Mammoth Ace	27-27	3.35	48.71	41.49	--
Common	22-01	3.70	49.70	38.03	25.6
Common	22-04	2.90	52.03	34.15	25.1
Common	27-35L	3.36	52.11	---	--
Gulf	02-03	4.90	50.73	38.67	25.2
Gulf	22-02	3.65	52.62	35.03	22.8
Gulf	22-05	4.94	51.62	34.12	--
Gulf	27-03	3.41	52.48	36.64	--
Gulf	27-20	5.90	49.70	38.31	22.6
Mean		*3.72*	*50.47*	*36.81*	*24.3*

WSS/CI Paper 77-15

THE COMBUSTION OF STRAW - MOBILE AND STATIONARY

by

Thomas R. Miles
Consulting Engineer

1977 Spring Meeting
Western States Section
The Combustion Institute

Seattle, Washington
April 18-19, 1977

Photo: Forward Flowing Flame in a Mobile Field Sanitizer

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INTRODUCTION

The developments and data included in this paper are a portion of the results from my having been retained for the past three years as the engineering and administrative consultant to the Oregon Field Sanitation Committee whose legislative charge is to eliminate the practice of open field burning of the straw after seed harvest from some 280,000 acres of grass seed crop lands. And as such I'm responsible for the initiation, design and development of over 25 projects in the areas of a) Collection, Storage and Transport of straw, b) Uses and Markets and c) Design and Development of Mobile Field Sanitizers. The Committee maintains a pilot plant facility and sponsors work and collaborates with other firms, industries and universities, including our host, the University of Washington, and Oregon State University.

Our problem in Oregon is to develop economic markets for 500,000 tons of surplus straw in order to eliminate the pollution generated by open field burning - as prescribed by legislative dictum and with a deadline of 1978, after which only 50,000 acres per year may be open burned. Thus our stimulus is primarily political but the solutions must obviously be practical and economically viable. Only by establishing efficient Collection and Storage Systems to supply the manufacture of marketable products or other Uses can we hope to serve the double purpose of offsetting the costs of removing straw which is necessary for more economic machine sanitizing - and conserve a clean, renewable resource of naturally stored solar energy. Obviously Fuel Uses stand high on our list of potential markets, along with Fibers, Feedstuffs, Feedstocks for Chemicals, Fertilizers and even Food, in roughly that order - but not neglecting natural combinations such as Fiber and Fuel.

The accompanying chart of Alternatives to Open Field Burning illustrates the need for thermal sanitizing with these grass seed crops. It must be understood this simplified chart cannot include all of the fine points, nor can the cost figures be considered absolute.

TABLE I - ALTERNATIVES TO OPEN FIELD BURNING

PERENNIAL GRASS SEED CROPS
Yearly Crop Cost - Approx. $220-315.00/A

WINDROWING	Alternate		Cost		Agronomic Results
COMBINING SEED HARVEST	OPEN BURN	4T/A	Labor Fee (1977)	$1.00 5.50	GOOD
				$6.50/A	
REMOVE 2 T/A STRAW IN STACK	OPEN BURN	2T/A	Labor & Fee Straw Rem.	$6.50 16.00	POOR to FAIR
				$22.50/A	
	MACHINE SANITIZE	2T/A	Sanitize Straw Rem.	$34.00 16.00	GOOD
				$50.00	
REMOVE ALL STRAW POSSIBLE 3 T/A	PROPANE FLAME	1T/A	Propane Straw Rem.	$30.00 24.00	FAIR to GOOD
				$54.00	
	CREW CUT		Cutting Straw Rem.	$20.00 24.00	25% loss/yr - weeds, diseas
				$44.00	
	CHEMICALS		None Approved		
	SHORT CYCLE ROTATION	3 yrs not 5	Increased Establ. Straw Rem.	$25.00 $24.00	Reduced Yield & Quality
				$49.00	
	NO TREATMENT		Straw Rem.	$24.00	30-70% Red. Yield + Weeds Diseases
	ALTERNATE CROPS		Choice Limited by Crop Contracts and Variable Yearly		

ANNUAL RYEGRASS CROPS
Yearly Crop Cost - Approx. $220/A

	OPEN BURN	4-6 T/A	Labor Fee (1977)	$1.00 5.50	GOOD
				$6.50	
REMOVE 2 - 4 TONS STRAW/A	CHOP & PLOW IN	2T/A	Chop Straw Rem. Extra Fert. Herbicide Yearly Till	$10.00 24.00 20.00 30.00 35.00	Accumula. of Humus, Weeds & Disease
				$119.00	
	ALTERNATE CROPS		Virtually No Options on Dayton Soils		

WHAT IS STRAW?

Straw is just about the most universally available agricultural residue, since virtually all parts of the world grow grains and grasses. Nature has a marvelous process of accumulating nutrients in the green growing stems and leaves of cereals and grasses until a sufficient height is reached for the seeds to properly scatter. These nutrients then are concentrated in the seeds as proteins and starches while the tubular stems and leaves become structurally stiffer to support the heavy seed heads. This is done by the polymerizing of some of the sugars and starches into hemi-celluloses and alpha-cellulosic fibers on the outside of the tube walls - with a bit of wax on the surface to repel water.

If you harvest these crops before they go to seed you have moist green hay with a 60%-80% digestibility. After going to seed, the "straw-colored" dry straw has a digestibility of 30%-35% and yields from 1.5 to 5 tons per acre.

For millennia man has used straws as feed for his stock, as fiber for clothing, as thatch for his roofs - and as a fuel. Three weeks ago in Hampshire, 30 minutes from London, I watched a master "Thatcher" renewing a 30 year old straw thatch roof on a beautiful brick "cottage" built in 1680.

A most interesting characteristic of straws is the very uniform wall thickness in the tubular stem and also the leaf. The range is between .006 and .010 inches except for the occasional "nodes" which are solid through the stem. This characteristic is very significant in reducing the power required to grind or chop straw for fuels or processing.

The elemental analysis of typical grass straws is given in Table II as well as the organic composition. The pentosans are typical hemicelluloses.

TABLE II - THE ELEMENTAL ANALYSIS OF TYPICAL GRASS STRAWS

Component	% of Dry Weight	Elemental Composition, % Dry Weight								
		C	H	O	N	Na	Ca	K	P	Othe
Cellulose	46.0	20.5	2.9	22.6						
Lignins	16.0	11.8	1.1	3.1						
Pentosans	25.0	11.4	1.5	12.1						
Protein	6.0	2.4	0.5	2.2	0.9					
Fats	1.0	0.8	0.1	0.2						
Ash	6.0					0.2	0.2	1.0	0.2	4.4
	100.0%	46.9	6.1	40.1	0.9	0.2	0.2	1.0	0.2	4.4

From Robert R. Groner, Dept. of Agri. Chem., OSU, 1969

PHYSICALLY straw stems are from 6" to 30" long, the tubes are 1/16" to 3/16" in diameter and hollow, except for the nodes. At its usual harvest moisture of 8%-12% most straws are stiff and resist compression into bales, resulting in lower bale densities than resilient, conforming hay, for example. U. S. balers produce 60#-80# straw bales with densities of 7#-10#/ft^3 and tied with wire or plastic twine. European bales are approximately 4#-6#/ft^3. The leaf fraction is more amenable but is a minor percentage. Straw stacks produced by the "stackwagon" harvester are 2#-3#/ft^3, and open stacks are 1.5#-2#/ft^3. Because of its waxy outside surface, straw is virtually impossible to cube into dense (50#-60#/ft^3) cubes without a binder. To make truck transport practical a bale density of 15#-16#/ft^3 is necessary to meet both weight and volume limits.

BIOCHEMICALLY straw is quite reactive, as we can guess from the organic composition in Table II, is nature's principal forage for ruminants and some monogastrics, providing fiber, energy and a little protein, can be treated with the enzyme cellulase to yield as much as 50% glucose, can be treated with NaOH (3%) to increase rumen digestibility from 30% to 50%, can be thermo-mechanically defibrized to provide a substrate for SCP (single cell protein), can be composted, with addition of nitrogen, to grow mushrooms, is naturally subject to a few toxic fungi (A. flavius) if wet for long, is used traditionally as a surface mulch for vegetables, plants etc., can be ensiled with other pithy materials such as corn, cannot be incorporated in quantity in

most soils since it anaerobically produces toxins and acetic acid to inhibit plant growth, and degrades slowly.

CHEMICALLY Table II illustrates the relatively simple elemental composition with predominant carbohydrates, lignin being classed as an hydrocarbon. 15% to 18% of most straws are soluble in water, mostly simple sugars. Some straws have a high silica content, such as rice straw at 18%, as compared with wheat and grass straws at 3% to 6%.

COMBUSTION CHARACTERISTICS

A singularly unique property of whole straw is that it contains sufficient air within its tubular stems to sustain a degree of combustion, even without the air in the cracks between stems. We can't very well utilize this feature but it is most frustrating to anyone attempting to put out a fire in straw.

With its inherently low moisture, straw is readily ignited and devolatilizes quickly, leaving a filamentous carbon-ash structure to be secondarily oxidized over a considerably longer period. If the tubes are opened, the uniform thickness leaves a fairly wide length range, 1/8" to 3/4" long, that burns well under the same circumstances. This simplifies fuel preparation and often allows product and process fuel to come from a common bin. See Figure 11.

An approximate heat value of 8,000 BTU/#, and almost no sulfur provides a basis for clean combustion and less noxious emissions. The relatively light, bulky nature of straw does produce particulate emissions problems, especially with suspension burning. These emissions are 95% non-combustible and virtually inert except for the 15%-20% water soluble portion (See Table III).

Typical of all solid fuels, straws need "time-to-burn" and in a zone of high heat flux to complete combustion. By combining heat release values of 50-80 MBh/ft^3 with sufficient residence time and properly applied secondary air, visible smoke has been virtually eliminated.

Flame temperatures range from 1400°F to 2050°F, the highest we've found in any system. 1700°-1800°F is more usually encountered. In the stationary as well as mobile units we achieve cleanest combustion by a minimum, or even a lack, of excess air in the primary zone followed by an excess to finish it off.

Suspension velocities in the order of 1500-2000 FPM during burning allow some latitude in adjusting residence time.

As with many solid fuels, an almost inevitable pulsation developed in our boiler test, requiring the pilot to be on. This pulsation has been absent in the other tests - and especially on the mobile units, for a variety of reasons.

ASH CHARACTERISTICS

In all the tests we experienced three forms of ash: 1) as glassy slag on the walls of refractory, 2) as grey-black filaments collecting in any eddy or plugging the fire tubes and 3) as fine particulate emissions. Both 1) and 2) are illustrated in the photo of the firebox of the OSU test boiler. Significantly the ash has a melting point of approximately 1600°-1700°F, which follows from the relatively high K and Na content, and apparently explains the agglomeration of small particles into the filaments which are much longer than any of the ground fuel being burned.

Typical ash samples were collected and leached with water, with the results shown in Table III. Obviously there can be long-term refractory problems with straw fuels. Also the position that as much ash as possible should be left on the fields is substantiated by the quantities of solubles per ton and figuring an average of 2 tons of stubble per acre.

TABLE III- PROXIMATE COMPOSITION OF STRAW ASH

	% of Ash	% of Straw	#/Ton - Nom.
Total Ash	100%	7%	140#
Water Insoluble	80%	5.6	112#
Water Soluble	20%	1.4	28#
Consisting of:			
K+ Potassium	8.4	.59	11.8
Na+ Sodium	2.3	.16	3.2
Cl- Chloride	1.5	.10	2.0
OH- Hydroxide	1.9	.13	2.6
$CO_3^=$ Carbonate	.9	.06	1.2
$SO_4^=$ Sulfate	3.0	.21	4.2
$PO_4^{\equiv}$ Phosphate	1.8	.13	2.6
Traces	.2	.02	.4
	20.%	1.40	28.0

Traces include in order of concentration:
V(67ppm), B, Se, Ca(7ppm), Mo, Al, Pb, Fe,
Mg, Zn, Ni (1ppm), Cu, Cd, Co, Cr, Mn

From Krawczyk for Oregon Field Sanitation Comm., 1975

EXPLOSIBILITY TESTS

To serve the dual purpose of establishing a measure of comparative combustibility for suspension burning as well as straw processing plant explosion hazards, a series of preliminary tests were conducted on various sizes of screened "strawdust" milled through 1/8" and 3/16" screens. Tables IV and V list sieve sizes, chemical analysis and ash contents of sieve fractions. Note high density of thru-200-mesh sample.

The test apparatus was a 3-inch diameter x 12-inch long acrylic tube with a dished dispersion cup in the bottom, previously used by Bisonett and Maas (O.S.U. Mechanical Engineering Dept. 1975) on sander dust tests. A pulse of air dispersed the weighed sample into the tube and around a continuously arcing 1/4" spark gap. A filter paper cover held with a rubber band confined the "explosions". Successively smaller samples (weight) were tested until 10 tests produced no explosion, then the next higher concentration was considered the lower explosibility limit (L.E.L.).

Unconfined samples would not explode - some would partially burn. Burning was experienced with medium concentrations with sharper detonations occurring as the L.E.L. was approached. Table VI charts the test results, Table VII compares the straw L.E.L. data with other materials (Bumines #5753). The Bumines test conditions were different and a "severity of explosion" could not be measured to determine a comparative Index.

However, we can conclude that ground straw exhibits the usual agricultural material tendency to "burn" rather than explode in unconfined spaces. Also the effect of moisture content is graphically shown by the L.E.L. difference in the 9% M.C. and dry samples of the same size. Thus for safety holding the moisture at 10% or above will greatly inhibit explosive hazards (10% M.C. is maintained at an ambient relative humidity of 50% at 60°F.).

If we roughly equate combustibility in suspension with L.E.L., we note that fine grinding does not have as much effect as moisture. Subsequent firing tests confirm this, especially if the tubular stems are opened up.

RYEGRASS STRAWDUST

TABLE IV- SIEVE AND CHEMICAL ANALYSIS

Sieve Analysis - Sample A

Ryegrass Straw, hammermilled 1/8" and under, as received, 9% H_2O.

Thru	Held on	Sample Density #/CF	%
	+30 mesh	15.2	35.0
30 -	60 mesh	12.4	39.7
60 -	100 mesh	14.0	15.4
100 -	200 mesh	13.0	5.4
200 mesh		38.0	4.5
			100.0%

Chemical Analysis

Dry basis, furnished by Dr. D. O. Chilcote, OSU.

	% by wt.
Carbon	46.9
Hydrogen	6.1
Oxygen	40.1
Ash, etc.	6.9
	100.0%

TABLE V - ASH BREAKDOWN

Thru	Held on	% Ash in Sample	% of Total Ash
	+30 mesh	3.6	1.26
30 -	60 mesh	7.1	2.82
60 -	100 mesh	17.1	2.63
100 -	200 mesh	18.5	1.00
200 mesh		19.1	0.86
			8.57 Composite Total

TABLE VI- LOWER EXPLOSIBILITY LIMIT (L.E.L.) OF RYEGRASS STRAW

Material	Screen Mesh	Moisture	oz/ft^3	g/m^3
1. Dry Straw (calc)	(Theo. air)	Dry	0.207	207
2. Sample A	As rec'd	9%	1.24-1.25	1240-1250
3. Sample A	30 -	9%	0.401-0.418	401-408
4. Sample A	As rec'd	Dry	0.226-0.234	226-234
5. Sample A	30 -	Dry	0.112-0.108	112-108
6. Sample A	200 +	Dry	0.226-0.234	226-234
7. Sample B	As rec'd	Dry	0.961-1.07	961-1070
8. Sample B	As rec'd	9%	would not explode	

Sample A - Hammermilled thru 1/8" screen
Sample B - Hammermilled thru 3/16" screen

Above Tables by Arthur D. Hughes, Professor (Emeritus), Mechanical Engineering, O.S.U., 1975 for Oregon Field Sanitation Committee.

TABLE VII- OTHER AGRICULTURAL DUSTS [-1]

Material	Index of Explosibility [-2]	L.E.L. oz/ft^3	Ignition Temp. °C
Pittsburgh Coal	1.0 (Standard)	0.06	610
Corncobs	12.2	0.04	400
Cornstarch	35.6	0.04	380
Grain Dust	9.2	0.03	430
Nut Shells	13.8	0.03	420
Potato Starch	20.9	0.02	440
Sugar, Powdered	13.2	0.03	350
Wheat Starch	49.8	0.02	380
Wheat Straw	5.0	0.055	470
Sander Dust 200 mesh		0.031 (OSU)	
30 mesh		0.058 (OSU)	
Ryegrass "Strawdust"	5.0 (est.)	0.23 (OSU)	510

[-1] From Bumines #5753, all samples thru 200 mesh and dry, tested at 100 psi, except OSU tests.

[-2] Index of Explosibility is sum of ignition sensitivity and explosion severity - Bumines.

MOBILE FIELD SANITIZERS

The need for an alternative to open field burning has been discussed earlier in the introduction. Early (1969) conclusions seized on the machine sanitizer as being the answer. Non-thermal alternatives were, and have been since, continuously investigated - to no avail.

Fire has always been the universal cleanser - if not destroyer. Primitive man, and nature, fired the grasslands for better production. He also burned his straw-thatched huts after disease or a death.

The sequence of machine development is illustrated by the following sketches and photos:

Figure 1 - 1970, Pick-up-and-burn, OSU
" 2 - 1971, Air Bar with screen, OSU
" 3 - 1972-74, Forced Draft, OSU-Rears
" 4 - 1972-74, Induced Draft, Turbo-Cycle
" 5 - 1974, Rotary Path Prototype, Miles
" 6 - 1974, Interim Flamer, Camran-Miles
" 7 and Photo - 1975, 3 "Dragonflies" 75-01,-02,-03 and Prototype 75-04, Miles
Photo of Rear's 2-Stack (1975)
Photos of #75-01, -02, -03, -04 as modified and operating in 1976, Miles
Figure 8 and Photos of 1976 "Condors" 76-05 & 76-06, Miles

Briefly reviewing, the earlier models were discontinued for a variety of reasons. The Forced Draft (Figure 3) and Induced Draft (Figure 4) machines, 1972-74, both used air bars in the flame. The Forced Draft was too clumsy and had too low a heat release (we later found). The Induced Draft also had too low a heat release and operated somewhat better backward than forward.

The 1974 Rotary Path Prototype (Figure 5) used the cyclone-vortex principle and was the most efficient combustor with the least emissions. It operated 200 hours in 1974 but was too involved for scale-up, in our opinion.

A need arose in 1974 for an interim machine that would use propane on fields too wet or green to support their own flame. To conserve fuel and heat we conceived the idea of directing the flame forward to use the radiation as long as possible to dehydrate and ignite the stubble. It worked too well. The fire overran the tractor and the propane nozzles fell off in 2 hours - but it continued to work without the propane. Thus was born the "forward-flowing-flame" principle which was amazingly successful - and simple - at least as compared to previous systems. We now know that two additional factors were in play: 1) ignition could occur whenever the stubble was dry enough, 2) the long flame path provided the "time-to-burn" necessary for complete combustion.

In 1975 we built first a 10' wide prototype, 75-04 (see Photo), with part of the air going to air bars and part to nozzles in the Venturi stack to: induce a negative pressure in the combustion box, preventing flame spread, and providing secondary combustion air. The 75-04 prototype was successfully tested in April 1975, and three 22' wide x 24' long "Dragonflies" were built for the 1975 season. The machines were 22' wide in the field but would fold their "wings" for a road width of 12', and were designed for 3 Acres/Hour with 2 Tons/Acre of stubble, after removing 2 Tons/Acre of loose straw. They performed well as sanitizers but needed a good bit of maintenance. Some 450 acres were sanitized, with 250 more acres being sanitized by the three Rears 2-stack units operating on the same general flame principle.

For 1976, we decided to modify the four 1975 units to various configurations trying different refinements, mostly detail mechanical rather than principles. We also built two new "Condor" models on the same principle but 32' wide x 30' long, with a rated capacity of 6 A/Hr on 2 T/A stubble fields. They both worked well along with the other four. Altogether over 1100 acres were sanitized by the machines in 1976.

They are all stainless skins, mild steel frames, articulated steering and some can vary their height.

1976 proved that we can sanitize fields with as little as 1.2 T/A of stubble, maintain the necessary 250°F or over for 10 seconds to kill weeds and diseases and remove stubble. We also confirmed our predictions of management problems on the farm during harvest with additional requirements for straw removal and sanitizer crews - totalling three times the harvest crews.

We have reason to believe that the machine emissions are larger, will fall back sooner, and are more inert than the partially combusted hydrocarbons comprising open burning smoke.

Also, it was impressively demonstrated that the basic problem of dissipating the heat of combustion of 12 tons of straw per hour (6A/Hr at 2T/A), which is the BTU equivalent of 1200 gallons of oil per hour, is a very sticky problem as well as being expensive.

Although we very satisfactorily sanitized 192 acres of bluegrass and thinned out the thatch, we were never able to completely get rid of the characteristic black smoke from this specie.

And finally, we have concluded that the machines may be dubbed "Successful Failures", since they do a good job of sanitizing without fossil fuels - but they need more development to be durable, and they are certainly very expensive to own and operate - $50.00 or more per acre, including straw removal.

Obviously finding markets and uses for the 2T/A of loose straw is necessary to help offset these costs.

STATIONARY APPLICATIONS

The most obvious stationary application is, of course, open field burning, where the loose 2 T/A is used as fuel to burn the stubble and sanitize the soil. Without good air access, with an infinite radiation sink in the sky and cool, often damp, ground below - no wonder combustion is incomplete and great clouds of smoke develop to drift into urban areas. But it only costs $1.50/Acre and 100 acres can burn in 1 hour - instead of 20 or 30.

In 1974 an ENERGEX vortex furnace (Figure 9) was fired with 1/8" strawdust at 2 T/Hr with good results - but with no instrumentation.

A PARTICLE BOARD rotary chip dryer was fired in 1975 with "strawdust" ground through an 1/8" screen and with a Coen burner normally firing sander dust. Good results were experienced when switched to strawdust. Unfortunately no instrumentation was available to record data. It just worked.

The ROTARY PATH burner of 1974 was installed on a firebrick setting, Figure 10, in 1975 and used in various tests during 1975 and 1976. Burning straw, and cotton gin trash, introduced with the air, also burning bales loaded in the bottom, it performs very well producing clean gases that we use for drying disc-refined straw fiber, Figure 11. We're just now in the midst of particulate and gas tests. The recirculating of the particles thrown out of the central vortex appears to clean up the gases and the incoming air is preheated while helping cool the walls and drying the fuel also. We are refining this suspension-or-bed system as a process heat source for dehydrating purposes.

A HEATING BOILER at Oregon State University, Figure 12 and photo, was experimentally fired and quite well recorded for several days in 1976. The setting was designed for gas or oil and was obviously too short as evidenced by the turning-back flame and slag deposit around the fire port. See photo.

The ash agglomeration mentioned earlier was very bad in this case and regularly plugged the entrances to the fire tubes as shown in the photo. The excessive emissions of .7 gr/SDCF were a problem along with a persistent wispy grey smoke. It was ironic to have this smoke in a stationary unit when we'd apparently solved it in the mobile units. Wrong shape and size of firebox is the cause along with a low heat release.

PYROLYSIS

We have been working with several firms toward a viable method of pyrolysis of straw - especially in combination with MSW. We know that we can produce "Town gas" fuels from these materials. We also know that we can convert the 2 tons of loose straw from one acre into sufficient liquid fuel (methanol) and fertilizer (ammonia) to farm and fertilize at least 8 acres of most crops - <u>when it is economically timely</u>.

<u>Conclusions</u>:

Straw is a bit different to handle and to combust but certainly is to be considered as an energy source - especially on the farm of its origin or in a straw processing plant with already existing handling equipment.

As with most agricultural residues, it is necessary to pay for their collection, storage and transport, but it is already reasonable to consider straw as a practical storage of solar energy. See Table VIII, p. 16.

Too long have we become used to "convenient" fuels which pour or flow in pipes. So for many agricultural and industrial areas, straw corn stalks, cotton and other residues offer multi-use opportunities as chemicals, fibers, feeds - as well as fuels.

A COMPARISON OF APPROXIMATE RAW MATERIAL COSTS FOR FUEL OR FIBER

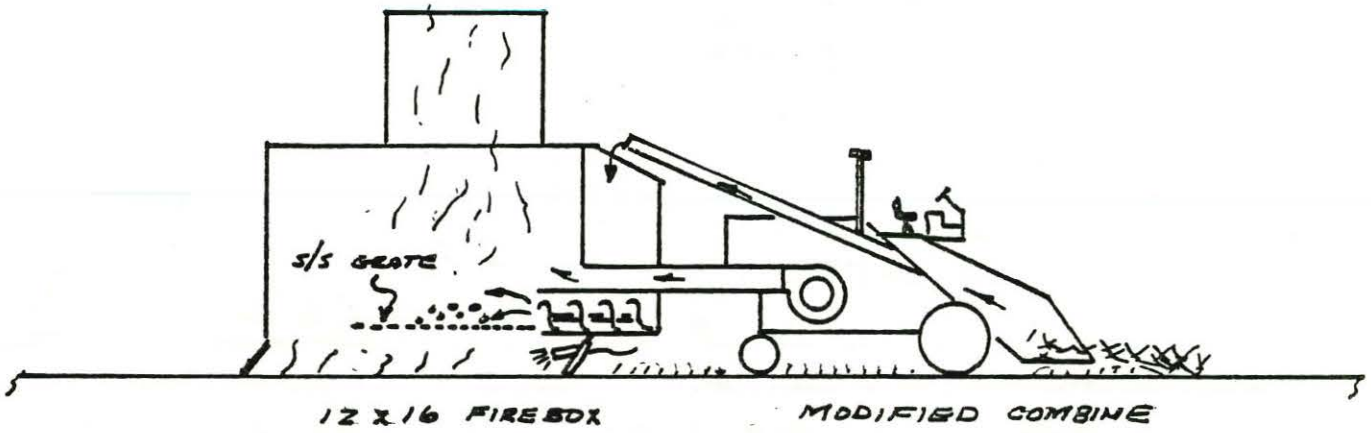
Revised to December 1976

Material Gross BTU Value	Unit Cost	Fuel Cost $ per Million BTU
Oil, Diesel 145,000 BTU/gallon	$ 0.39/gallon	$ 2.69
Oil, Heavy $12.13/42 gallon barrel	$ 0.29/gallon	$ 2.00
Natural Gas Therm = 100,000 BTU = 100 cubic feet	$ 0.20/therm	$ 2.00
Coal, Wyoming 12,000 BTU/pound	$50.00/ton	$ 2.08
Hog Fuel (mostly bark) Unit = 2,000 lb. Bone Dry 8000 BTU/lb.	$ 5.00/unit	$ 0.31
Wood Chips Unit = 2,000 lb. Bone Dry 8000 BTU/lb.	$40.00/unit	$ 2.00
Straw, baled (12 months supply) 8000 BTU/lb.	$27.50/ton	$ 1.72
Municipal Refuse 5000 BTU/lb.	($5.00/ton)	($ 0.50)

Costs F.O.B. Willamette Valley

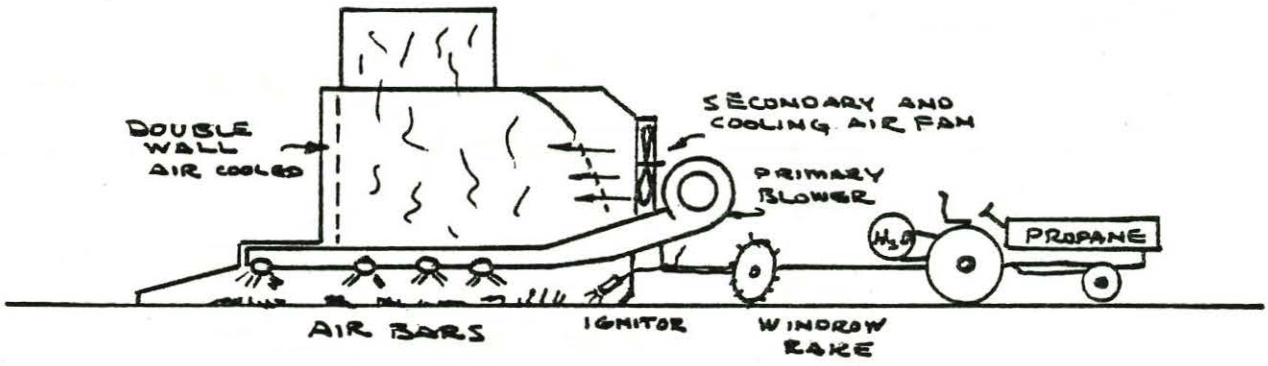
I wish to gratefully acknowledge the patience, cooperation and tenacity of many individuals, companies, agencies and my own staff members in continuing with me toward a solution of this agro-urban dilemma - to the benefit of all. My thanks also to you, the Combustion Institute, for inviting me and to the Oregon Field Sanitation Committee for their support and encouragement.

Thos. R. Miles



FIRST SANITIZER 1970, OSU PICKUP MODEL

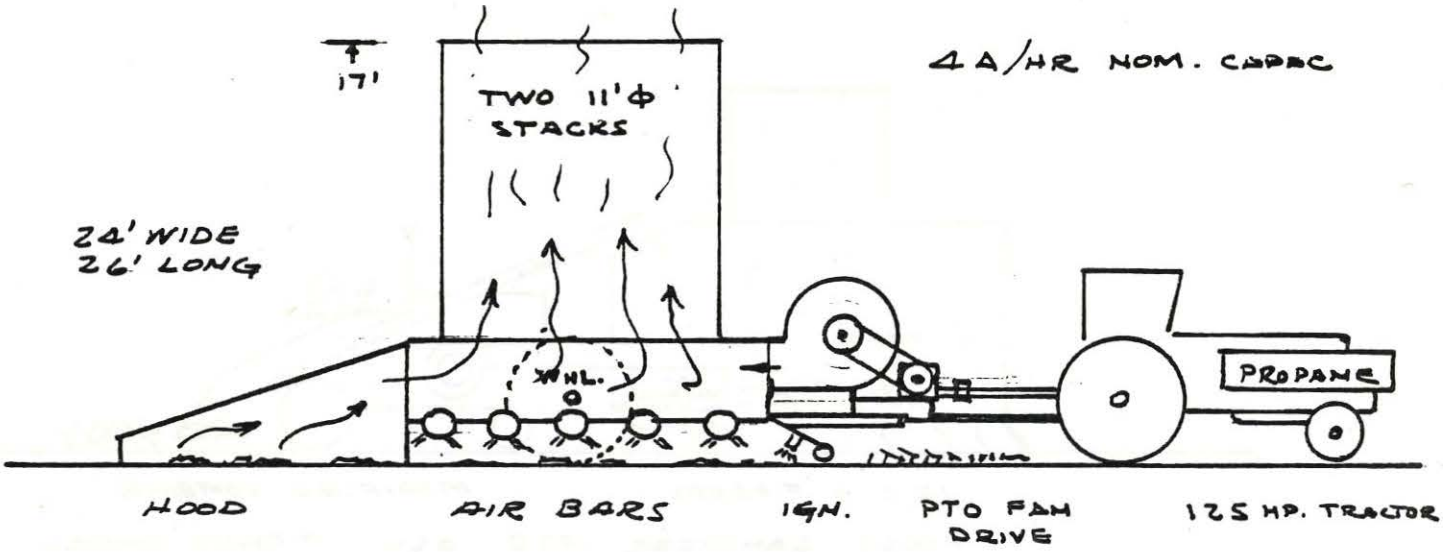
FIG 1



1971 SANITIZER, OSU AIR BAR MODEL

FIG. 2

15-25 # PART./TON

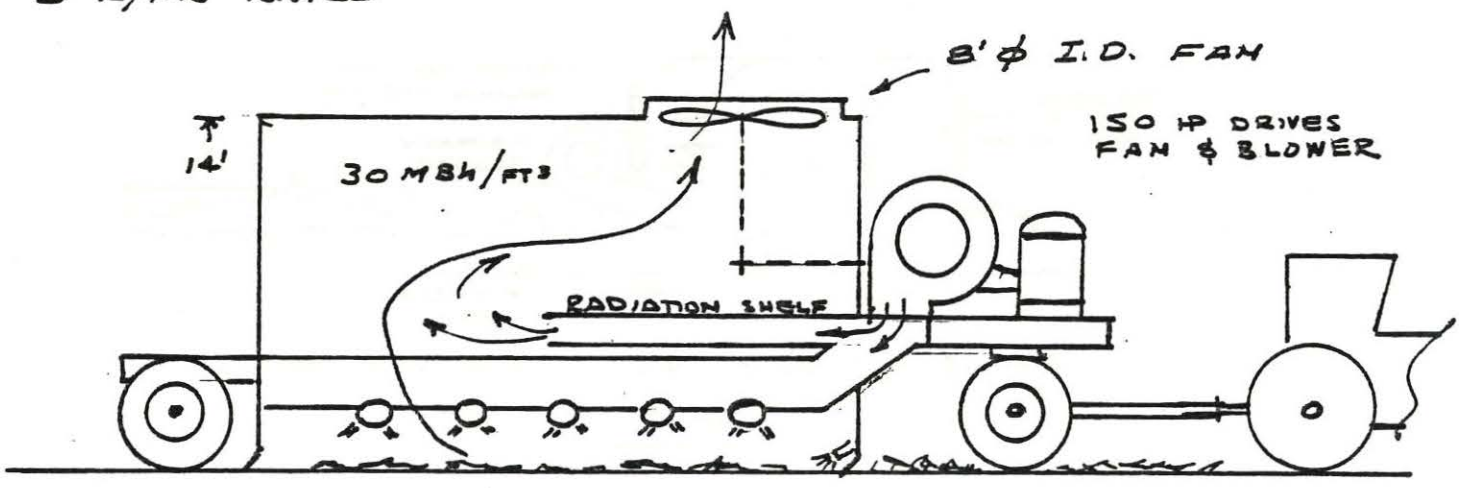


1972-74 FORCED DRAFT SANITIZER
DESIGNED BY OSU, BUILT REAR'S MFG.

FIG. 3

20-30 # PART./TON

3 A/HR RATED



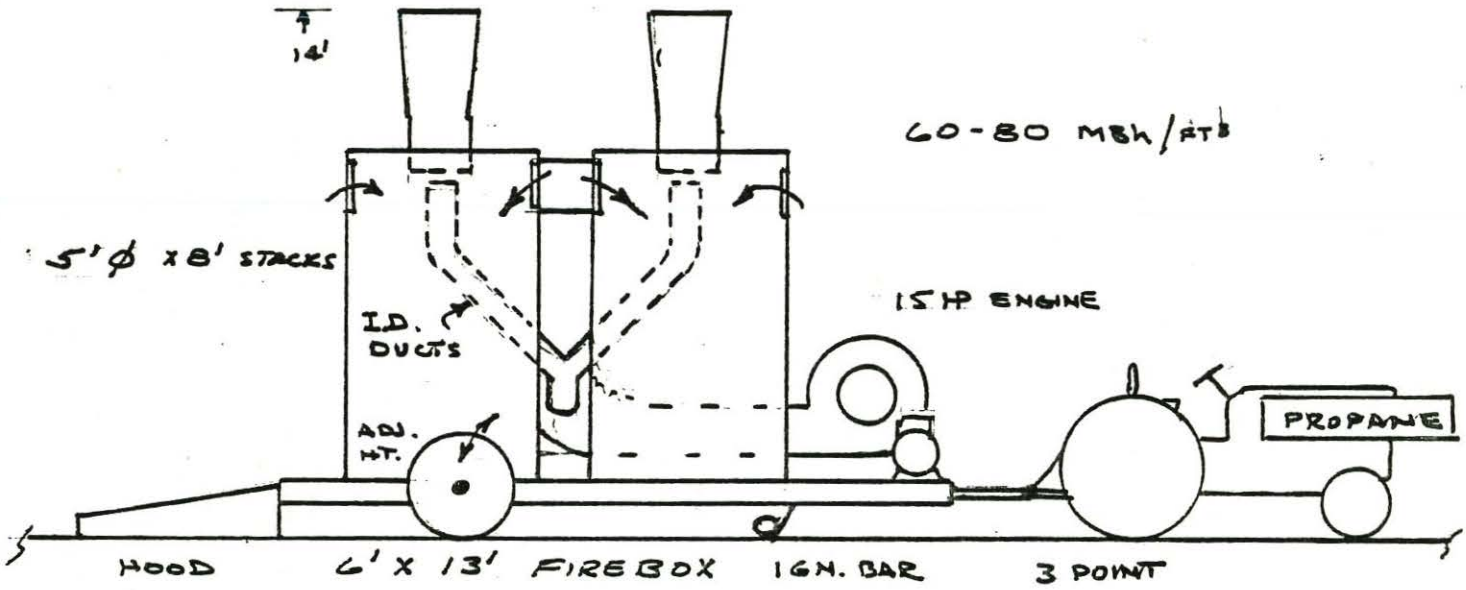
1972-74 INDUCED DRAFT
DES. & BUILT, TURBOCYCLE INC. '72
REDES. BY COMM. - BUILT BY ACME '74

FIG 4

3 – 10# / TON PARTIC.

1100°F

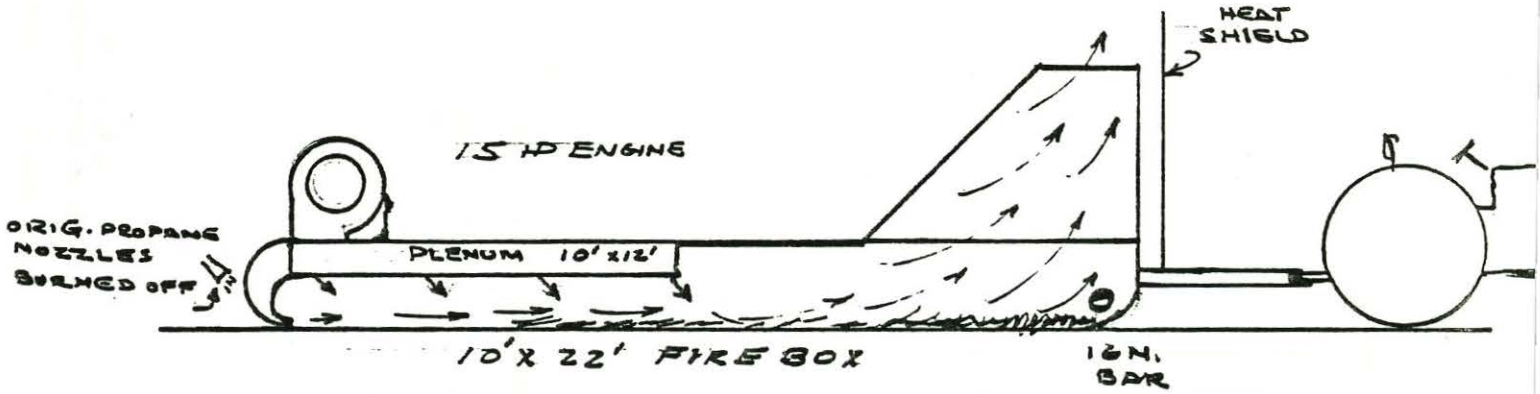
.75 #/MR



1974 ROTARY PATH PROTOTYPE (MILES)

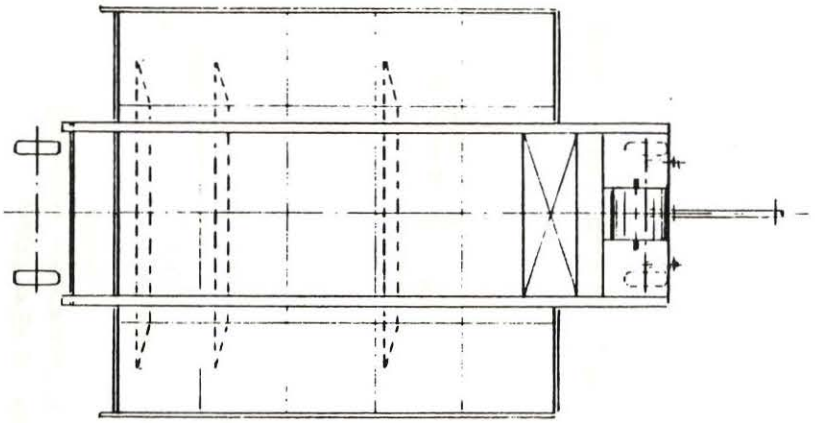
FIG. 5 SEE FIG 10

NO DATA – NO TIME

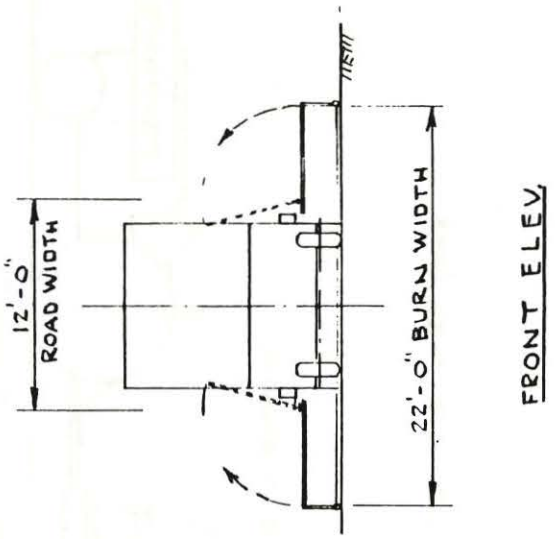


1974 INTERIM FLAMER (CAMRAN-MILES)
AS MODIFIED DURING SEASON

FIG 6



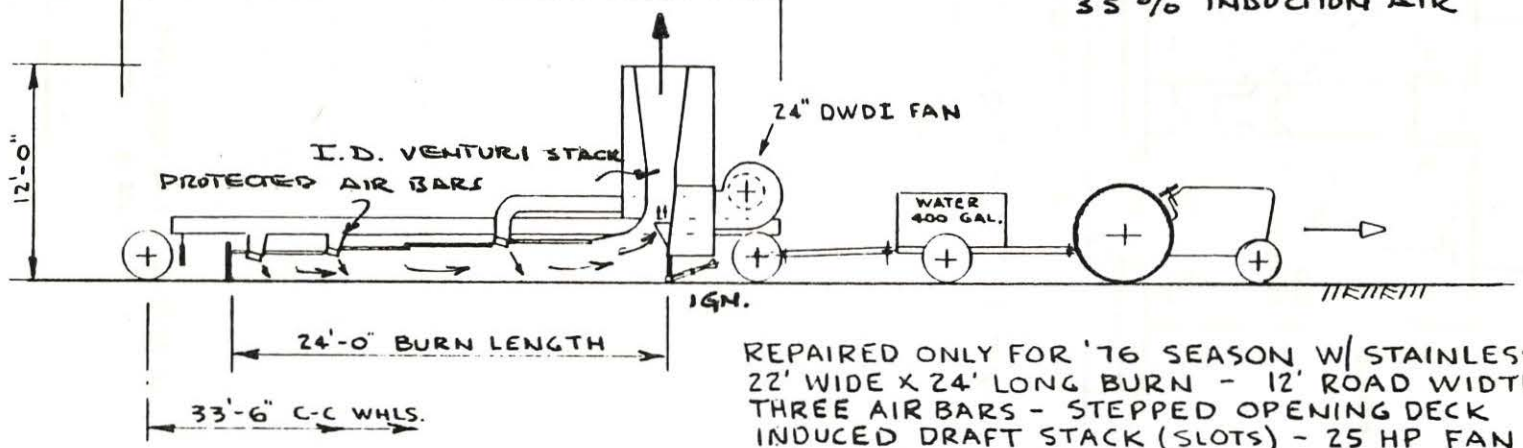
PLAN



FRONT ELEV.

40-50,000 CFM
10-20# PART./TON
80% OVER 100μ
4.5-6 % CO_2
700-800°F

90-110 MBh/FT³
35 % INDUCTION AIR

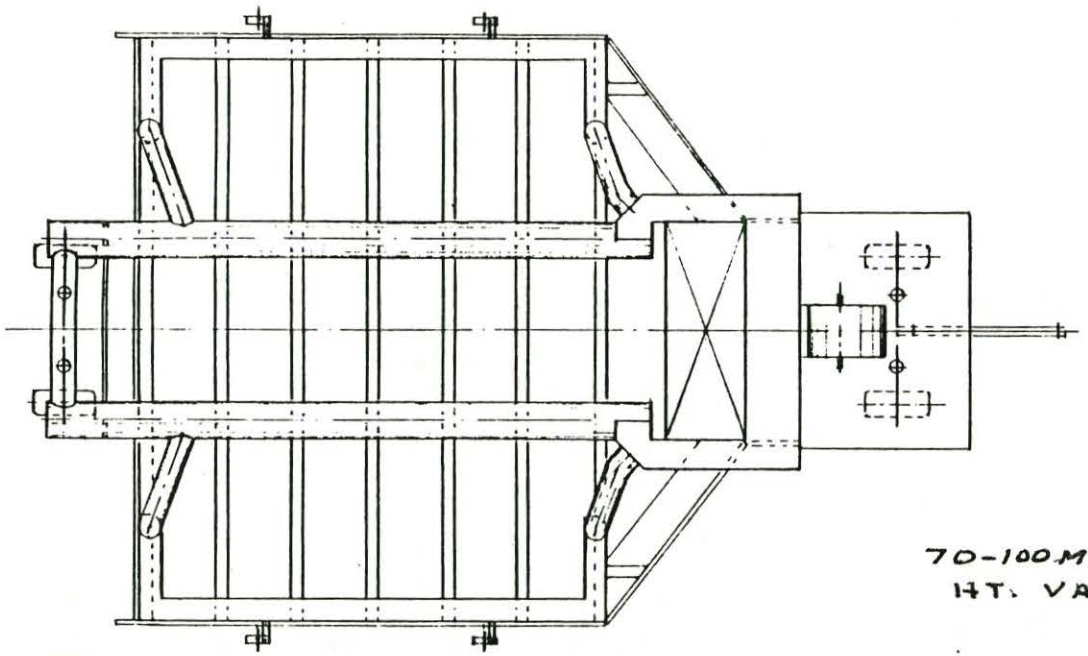


SIDE ELEV.

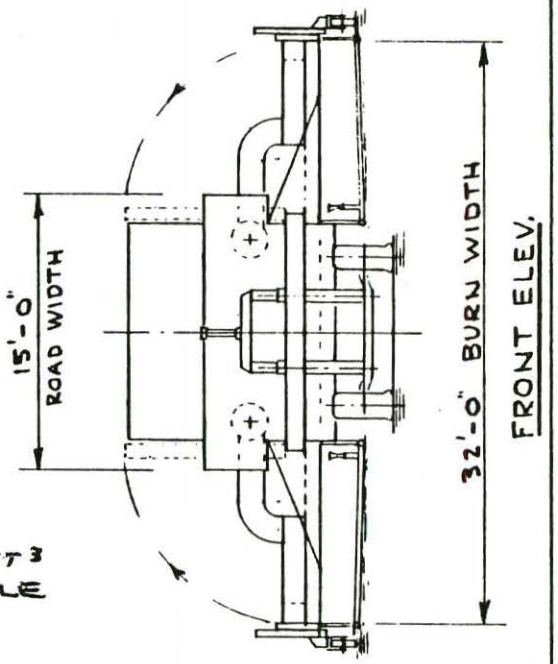
REPAIRED ONLY FOR '76 SEASON W/ STAINLESS DECK SKINS
22' WIDE X 24' LONG BURN - 12' ROAD WIDTH
THREE AIR BARS - STEPPED OPENING DECK
INDUCED DRAFT STACK (SLOTS) - 25 HP FAN
ARTICULATED STEERING
NOMINAL CAPACITY 3A/HR W/ STRAW REMOVED
WEIGHT 9200# DRAWBAR PULL 1200#

THOMAS R. MILES CONSULTING ENGINEER P. O. Box 216 Beaverton, Ore. 97005 Phone 503 292-0107	OREGON FIELD SANITATION COMMITTEE - SALEM, OREGON	
	R.L.B. JULY '76	FIELD SANITIZER 75-03 "DRAGON FLY" MODEL AS MODIFIED '76

FIG. 7



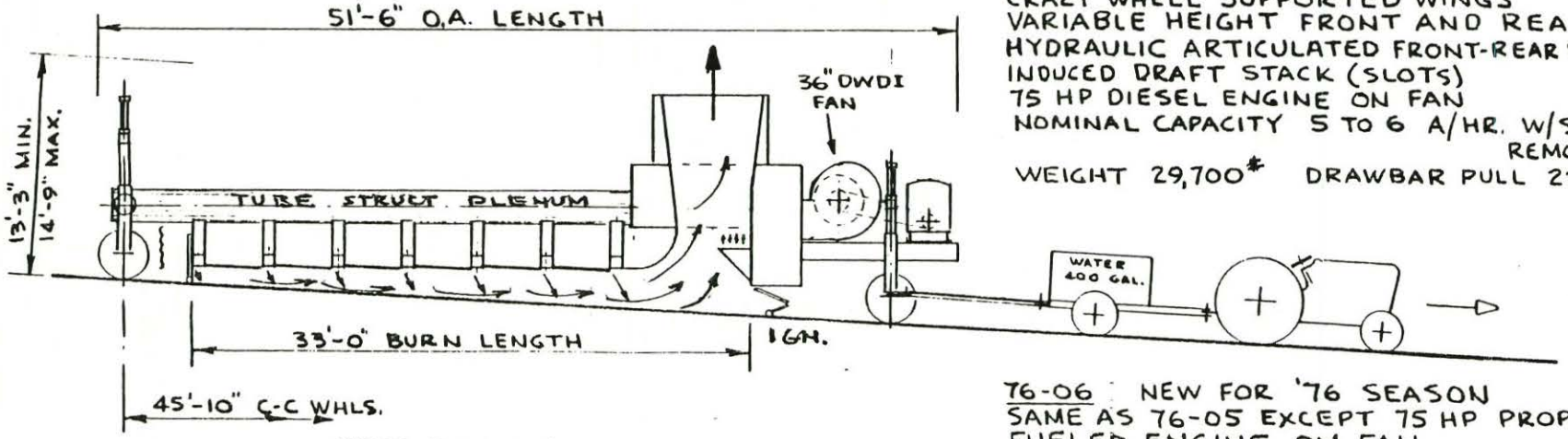
PLAN



FRONT ELEV.

70-100 MBh/FT³
HT. VARIABLE

90-100,000 CFM
10-20 # PART./TON
80% OVER 100 H
600-800°F



SIDE ELEV.

76-05 NEW FOR '76 SEASON
32' WIDE X 33' LONG BURN - 15' ROAD WIDTH
SEVEN AIR BARS W/ CORRUGATED, VENTED DECK
"CRAZY WHEEL" SUPPORTED WINGS
VARIABLE HEIGHT FRONT AND REAR
HYDRAULIC ARTICULATED FRONT-REAR STEER'G
INDUCED DRAFT STACK (SLOTS)
75 HP DIESEL ENGINE ON FAN
NOMINAL CAPACITY 5 TO 6 A/HR. W/STRAW REMOVED
WEIGHT 29,700# DRAWBAR PULL 2250#

76-06 NEW FOR '76 SEASON
SAME AS 76-05 EXCEPT 75 HP PROPANE FUELED ENGINE ON FAN.

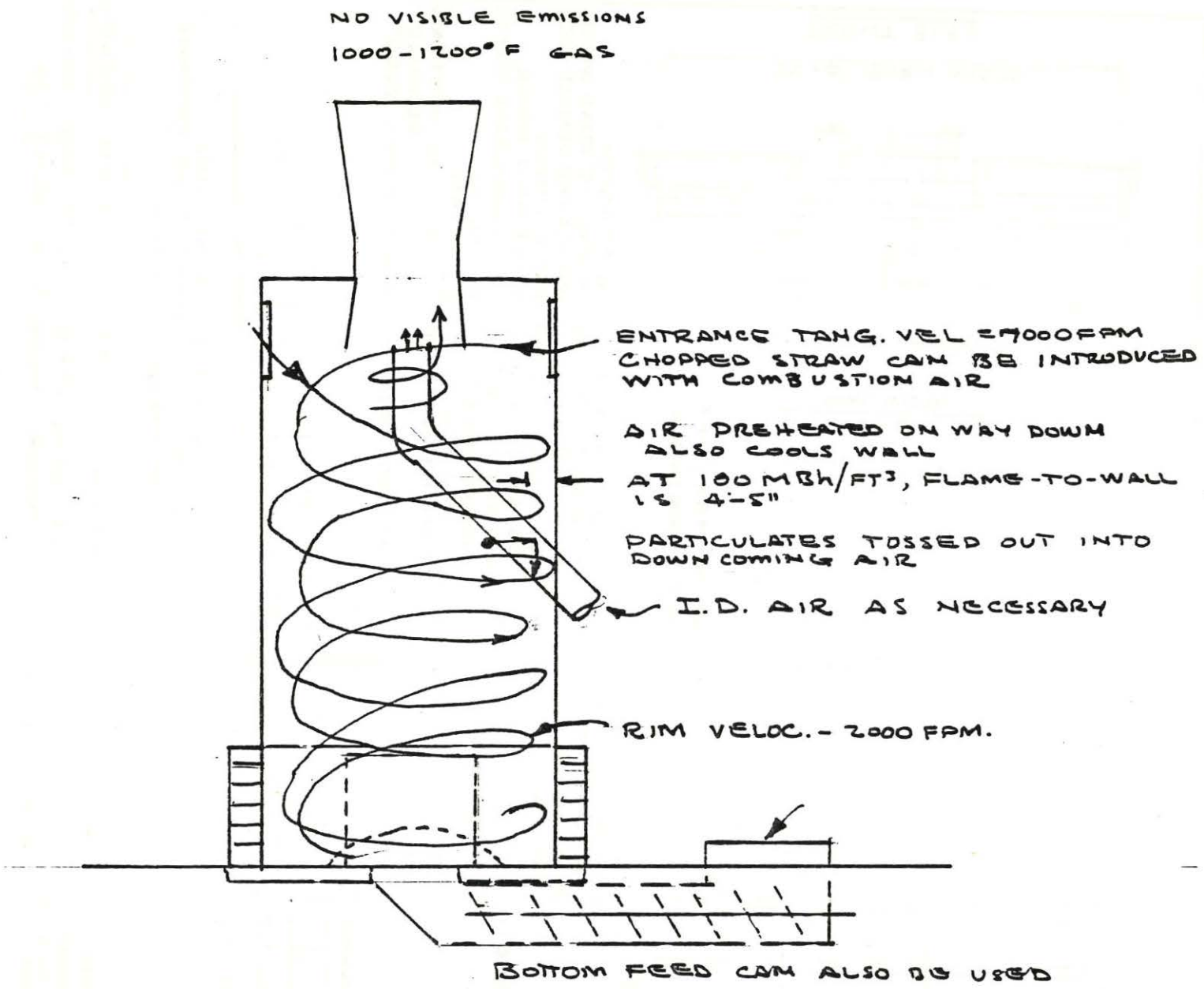
THOMAS R. MILES
CONSULTING ENGINEER
P. O. Box 216 Beaverton, Ore. 97005
Phone 503 292-0107

OREGON FIELD SANITATION COMMITTEE - SALEM, OREGON

R.L.B. JULY '76

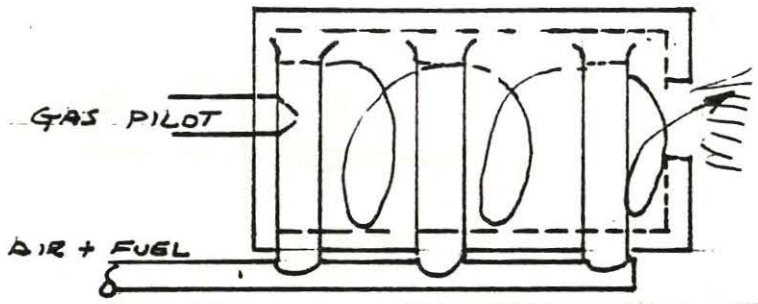
FIELD SANITIZERS 76-05 AND 76-06
"CONDOR" MODELS AS BUILT '76

FIG. 8



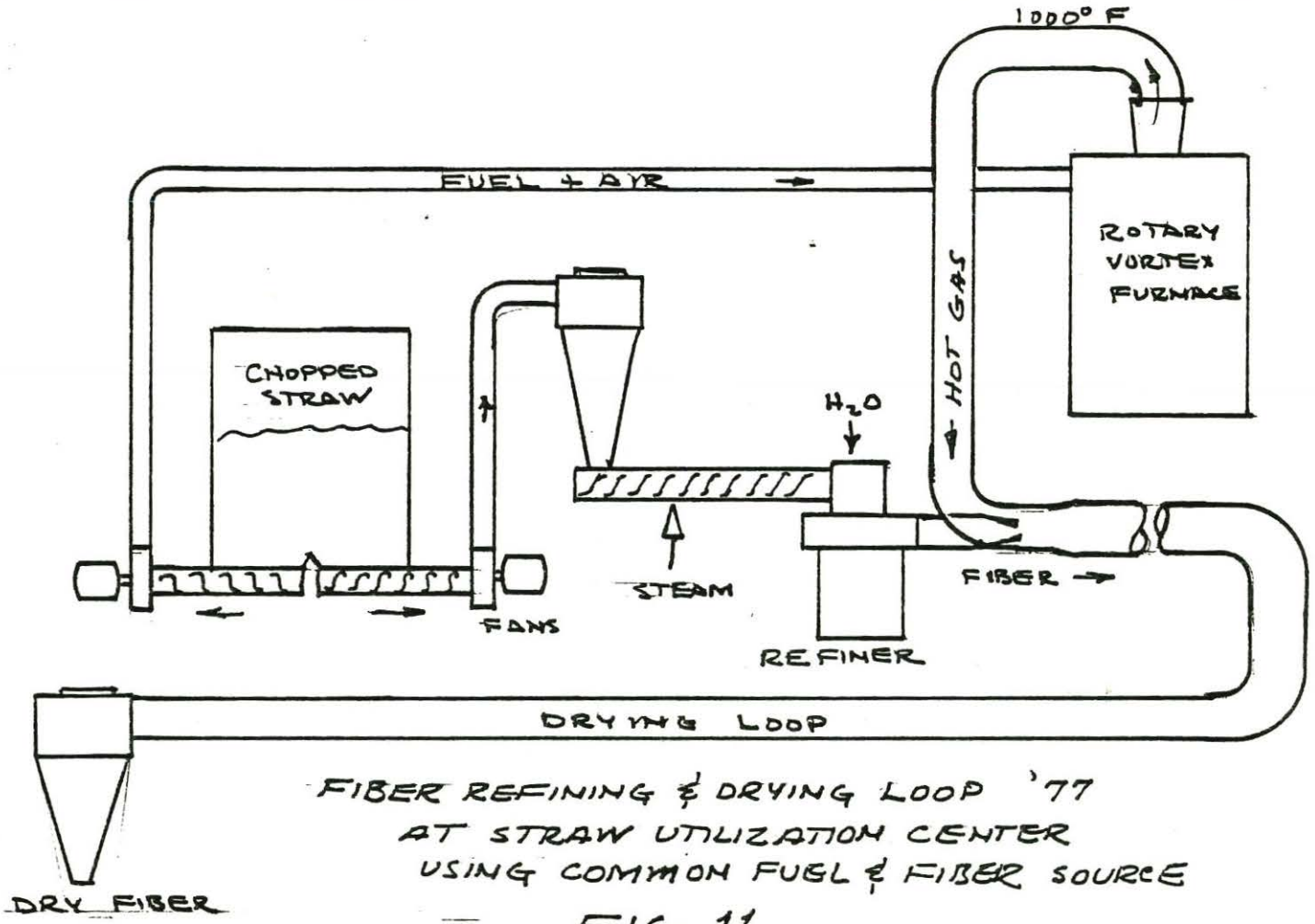
ORIGINAL 1974 ROTARY PATH SANITIZER ON STATIONARY SETTING AS HOT GAS SOURCE

FIG 10



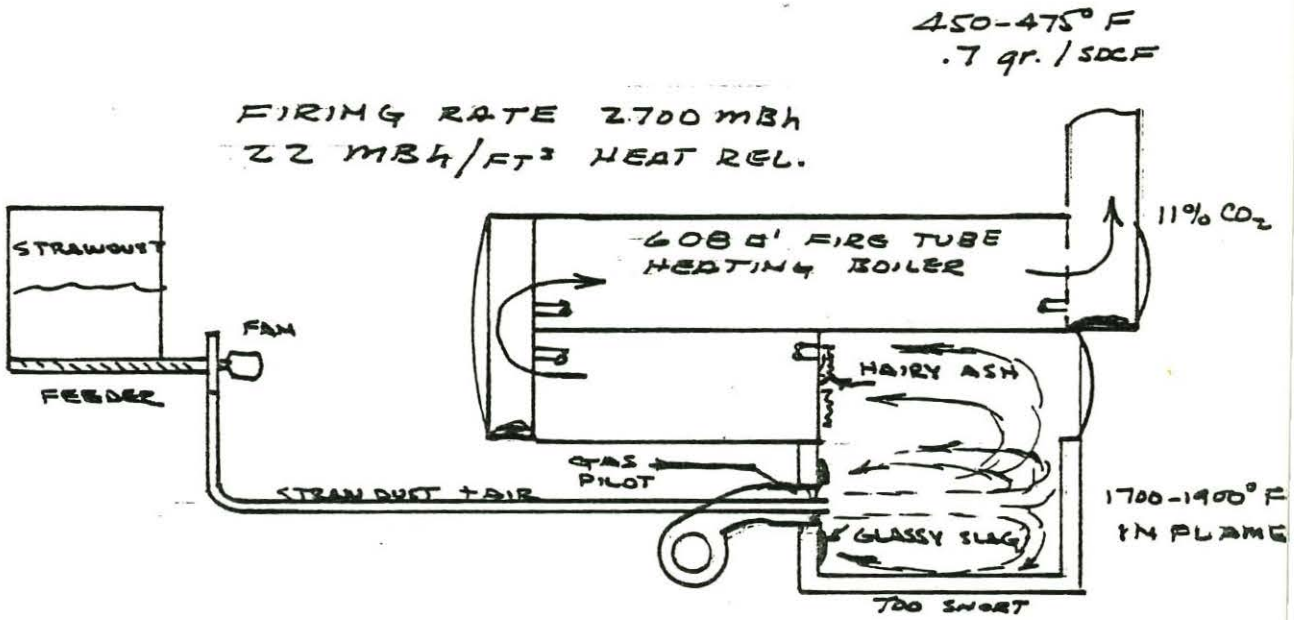
ENERGEX FURNACE

FIG. 9



FIBER REFINING & DRYING LOOP '77
AT STRAW UTILIZATION CENTER
USING COMMON FUEL & FIBER SOURCE

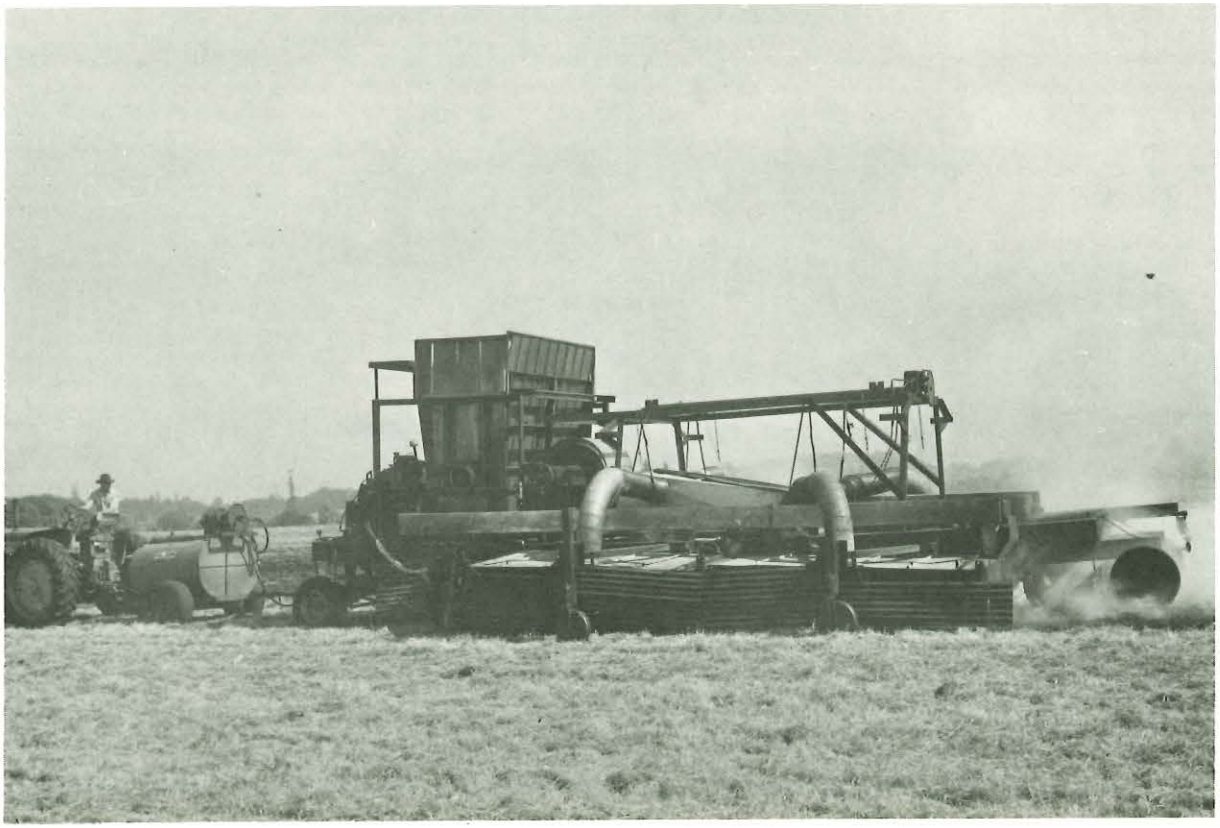
FIG. 11



BOILER FIRING TEST AT OSU 1976
SETTING TOO SHORT FOR SOLID FUELS

FIG 12

One of the three 1975 Dragonfly sanitizers, #75-03, burning a well-prepared Linn Perennial Ryegrass field at 3A/Hr in 1975.



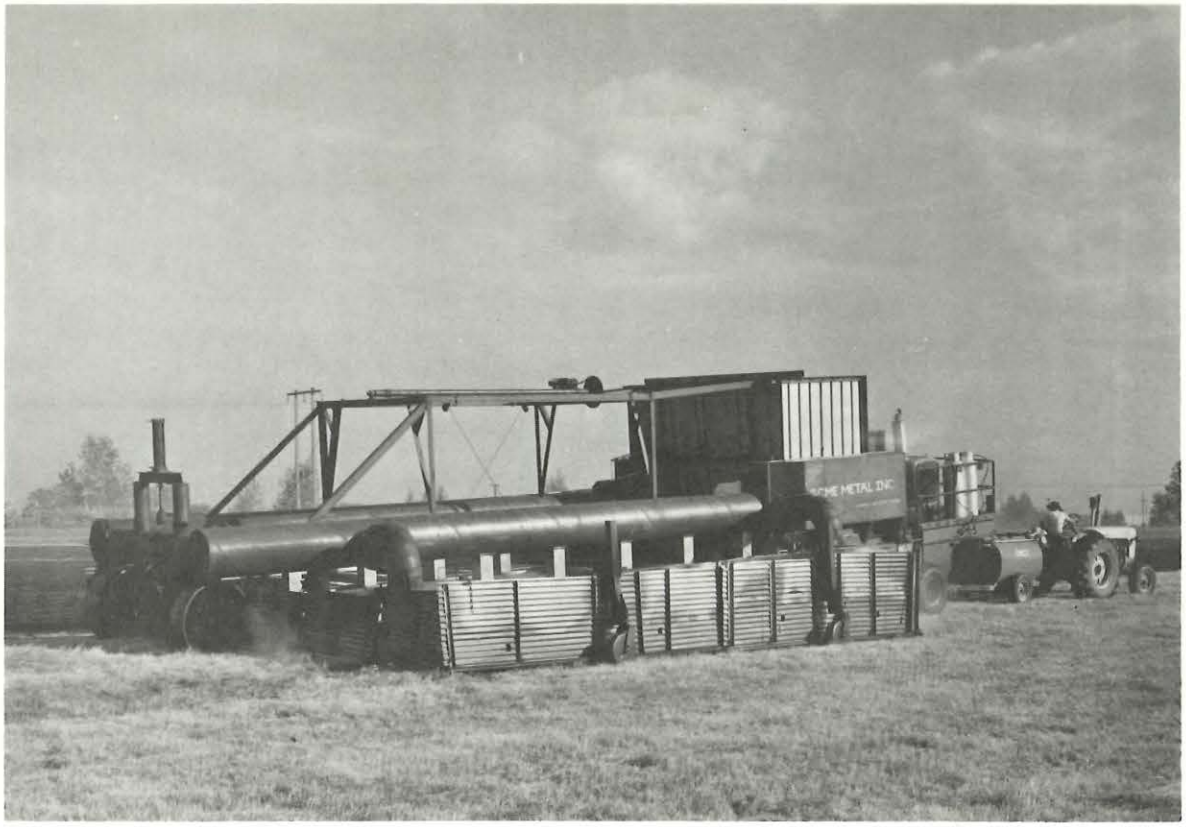
Sanitizer #75-01 (22' wide), modified by addition of deck-cooling Z plenums and fan and "crazy wheel" wing supports, burning a heavy growth perennial ryegrass in 1976.

Sanitizer #75-02 (24' wide), with multi-air-bar deck being stack-emission tested on perennial ryegrass field in 1976.

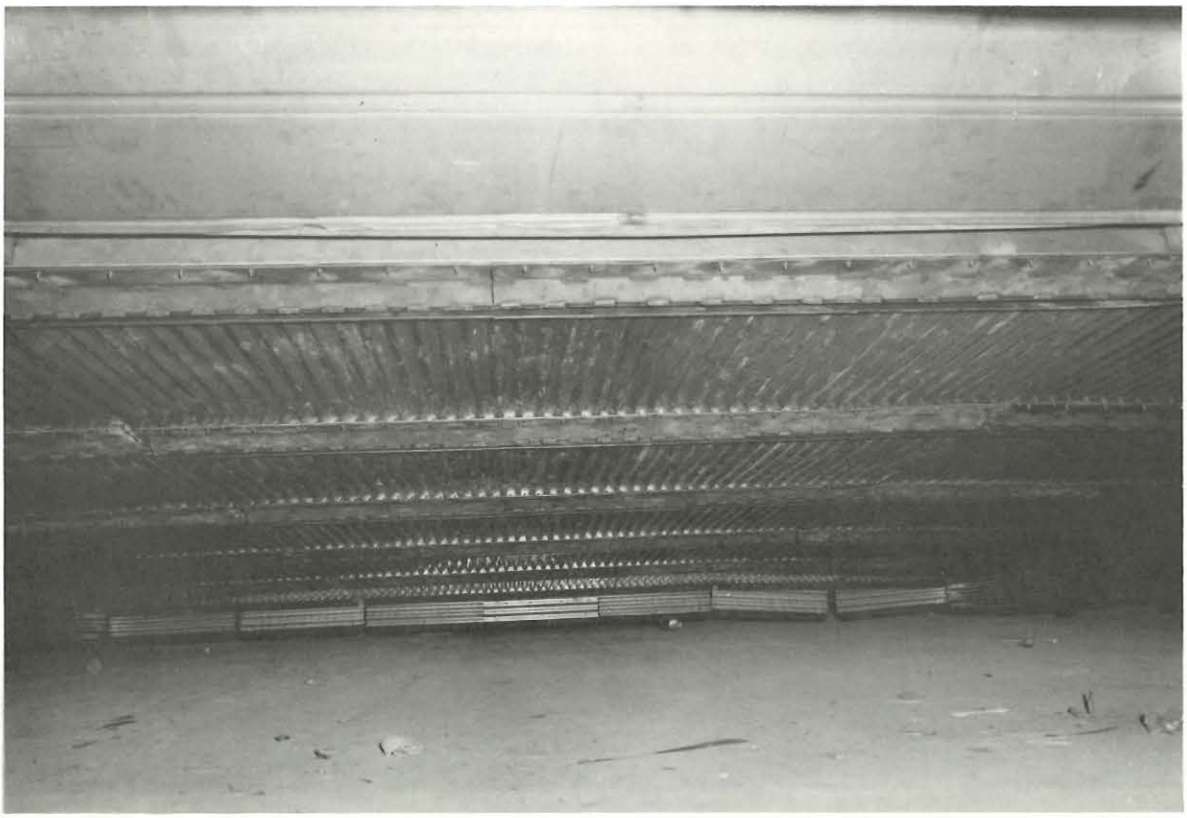
Sanitizer #75-03 (22' wide) with new s/s skins sanitizing a very well-prepared fine leaf perennial ryegrass field, averaging 4A/Hr for 36 Acres, in 1976.

Experimental Prototype #75-04 (10' wide) with revised deck test burning a 5.3 Tons/Acre wheat stubble field in 1976.

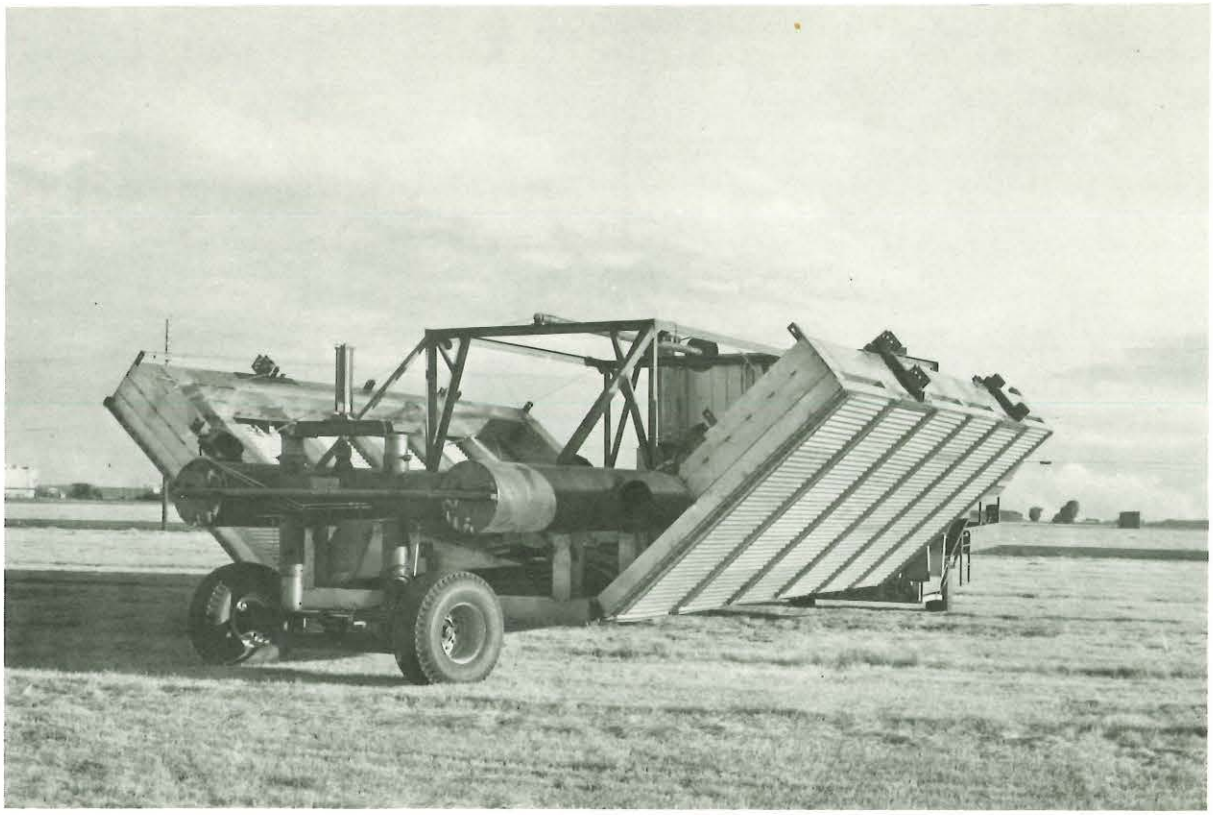
Chain drag which very substantially reduced after-burn on most grasses.



Sanitizer #76-05 (32' wide), one of the two new large "flat-land" models built for 1976 burning a well-prepared but high moisture bentgrass field.



Looking under the cooled-corrugated deck of #75-02 at the multi-air bars typical of #76-05 and #76-06 also.

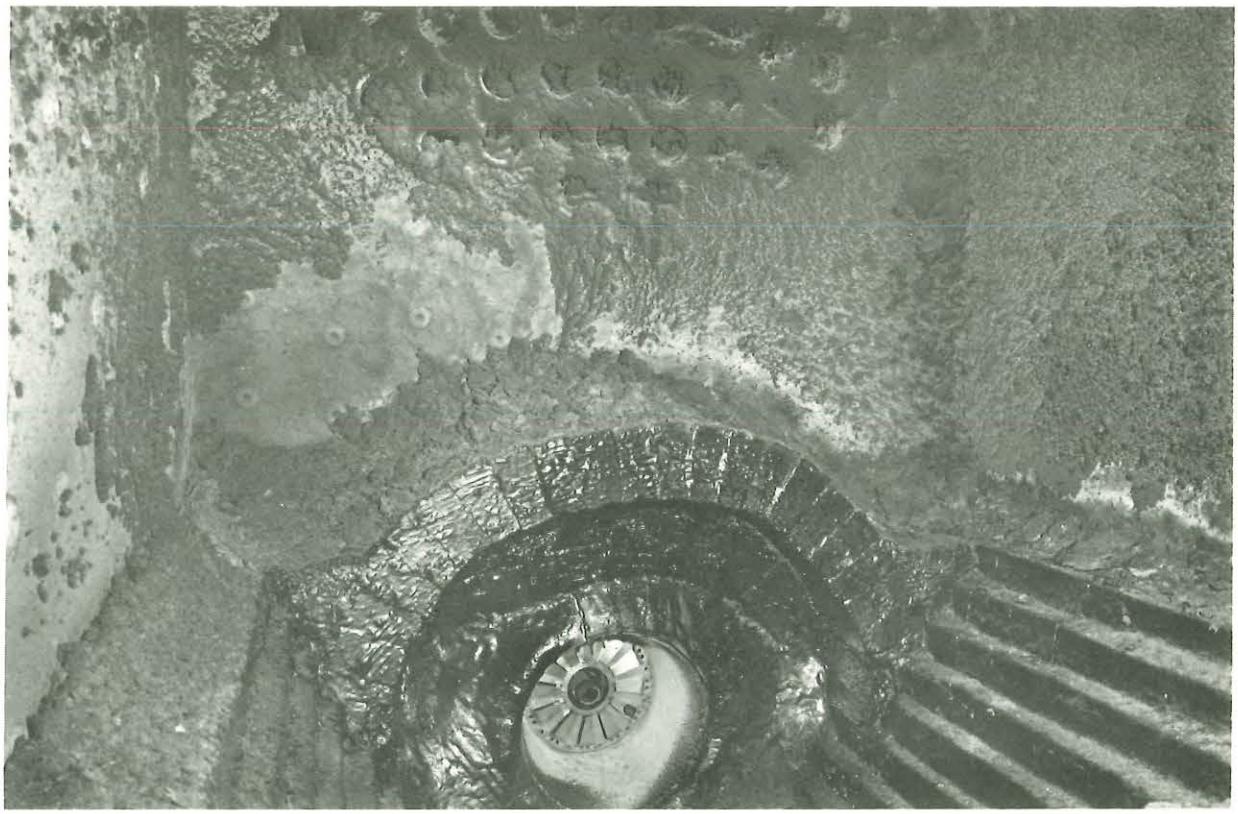


The 10' wide wings on #76-05 being lowered to provide a 32' burning width. Water-cooled steel wheels replace the rear tires used for road travel.

A rear view of the sanitizer ready for the road (15') showing variable height and hydraulic articulated steering mechanisms.

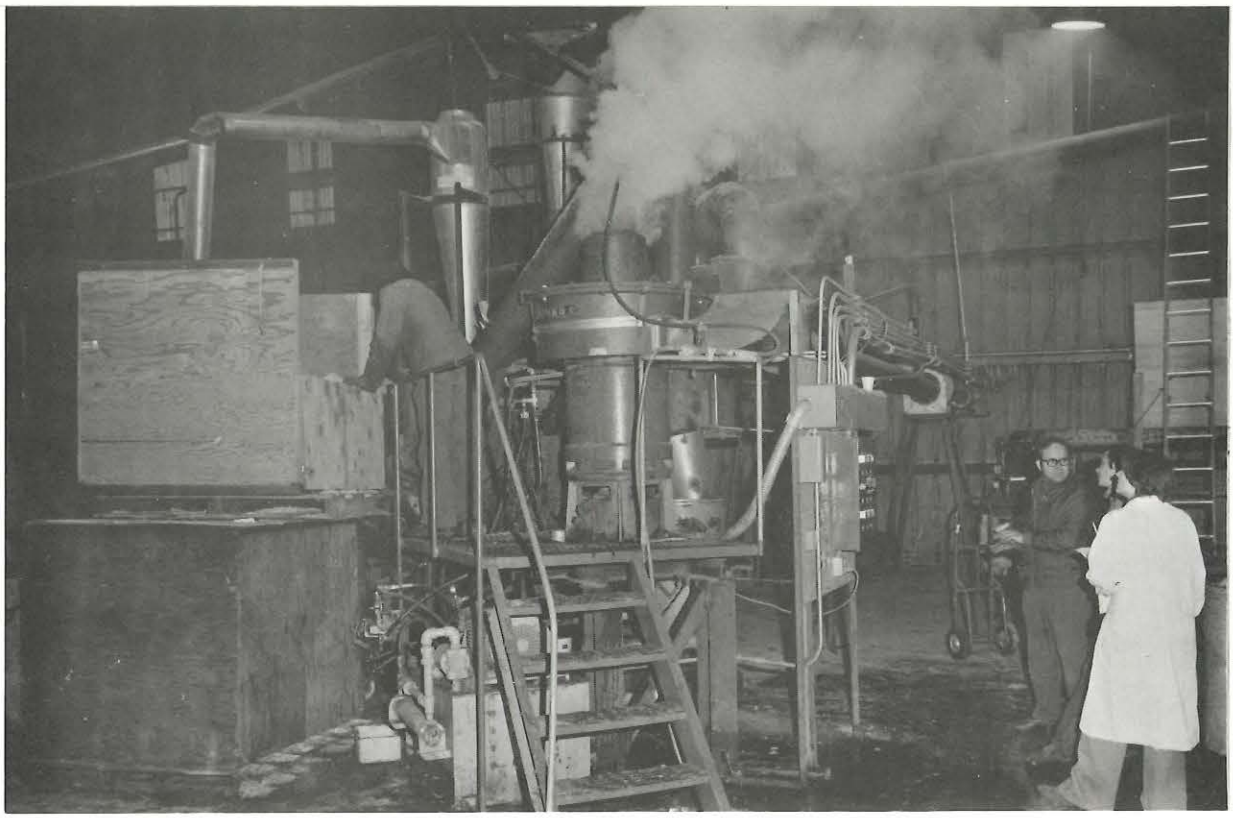
Everett Hunton operating his 2-stack 16'x40' sanitizer, one of three built by Rear's Mfg. Co. in 1975. Don Fisher owns and operates the other two.

Continuing Committee and OSU work on close or crew-cutting to remove stubble, virtually only alternate to field burning, Marvin Ringsdorf used 1976 model designed by Rears Mfg. Co.

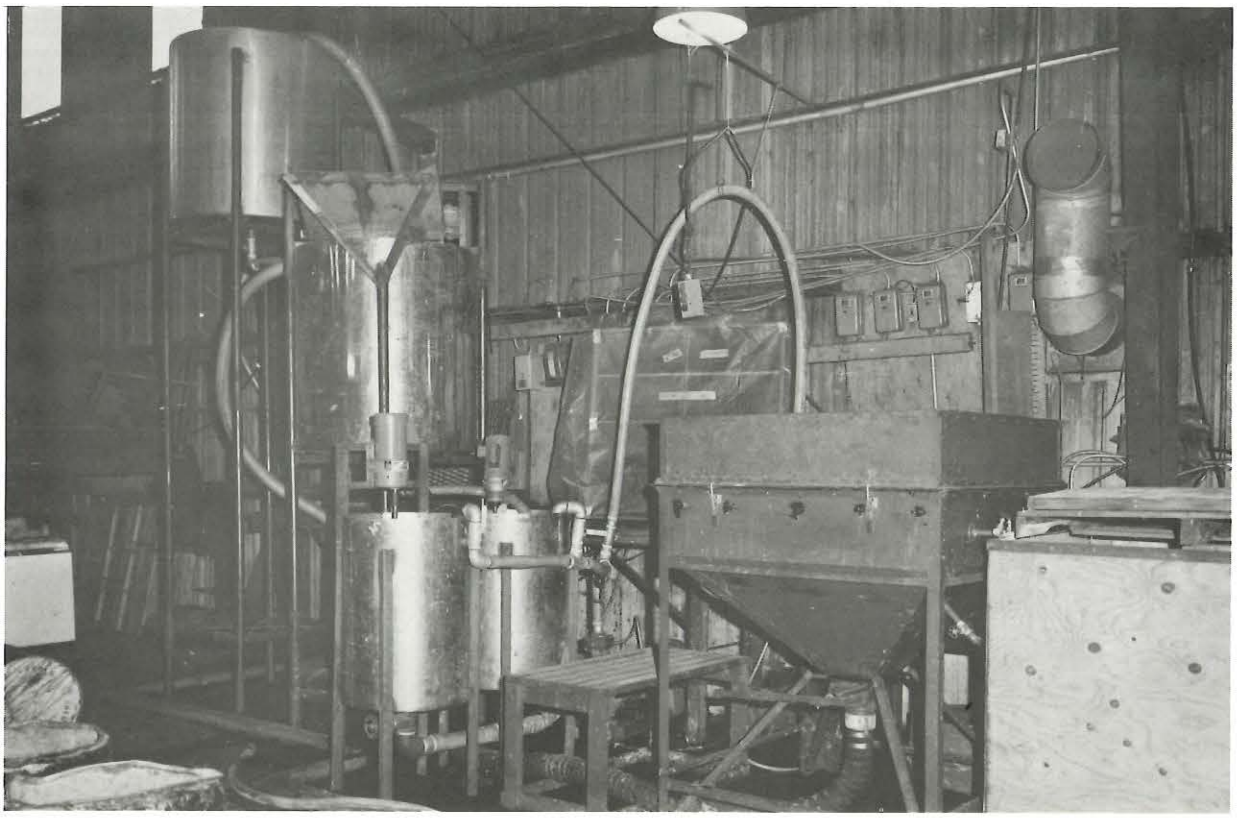


Combustion chamber of test boiler at OSU after burning strawdust. Note glossy black slag around firing openings below, fly ash accumulated at fire-tube openings above.

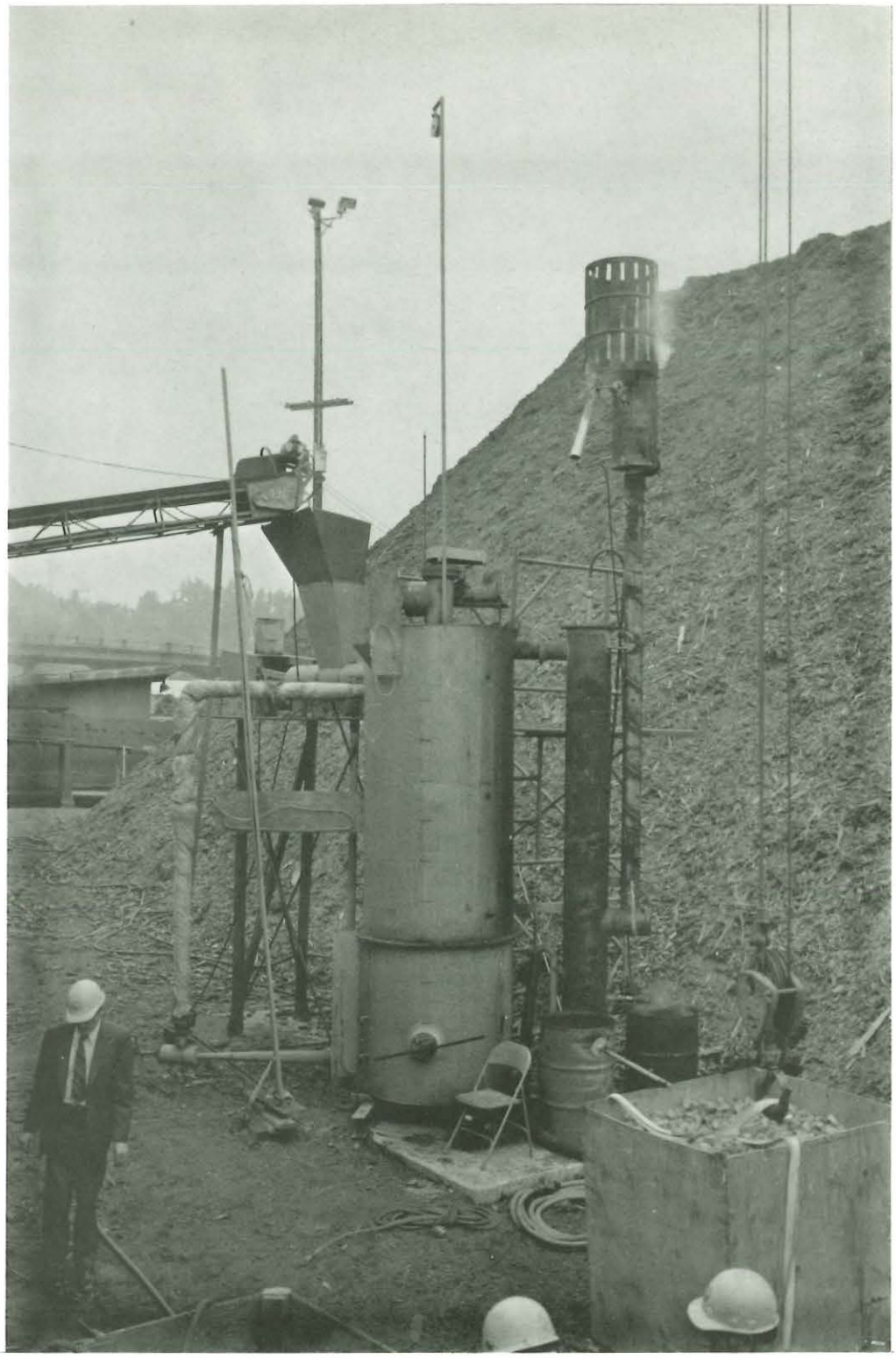
The rotating 28" disc of the Jones Vertifiner being used to defiberize straw. A matching stationary plate with center feed opening is mounted with .005" to .0010" clearance.



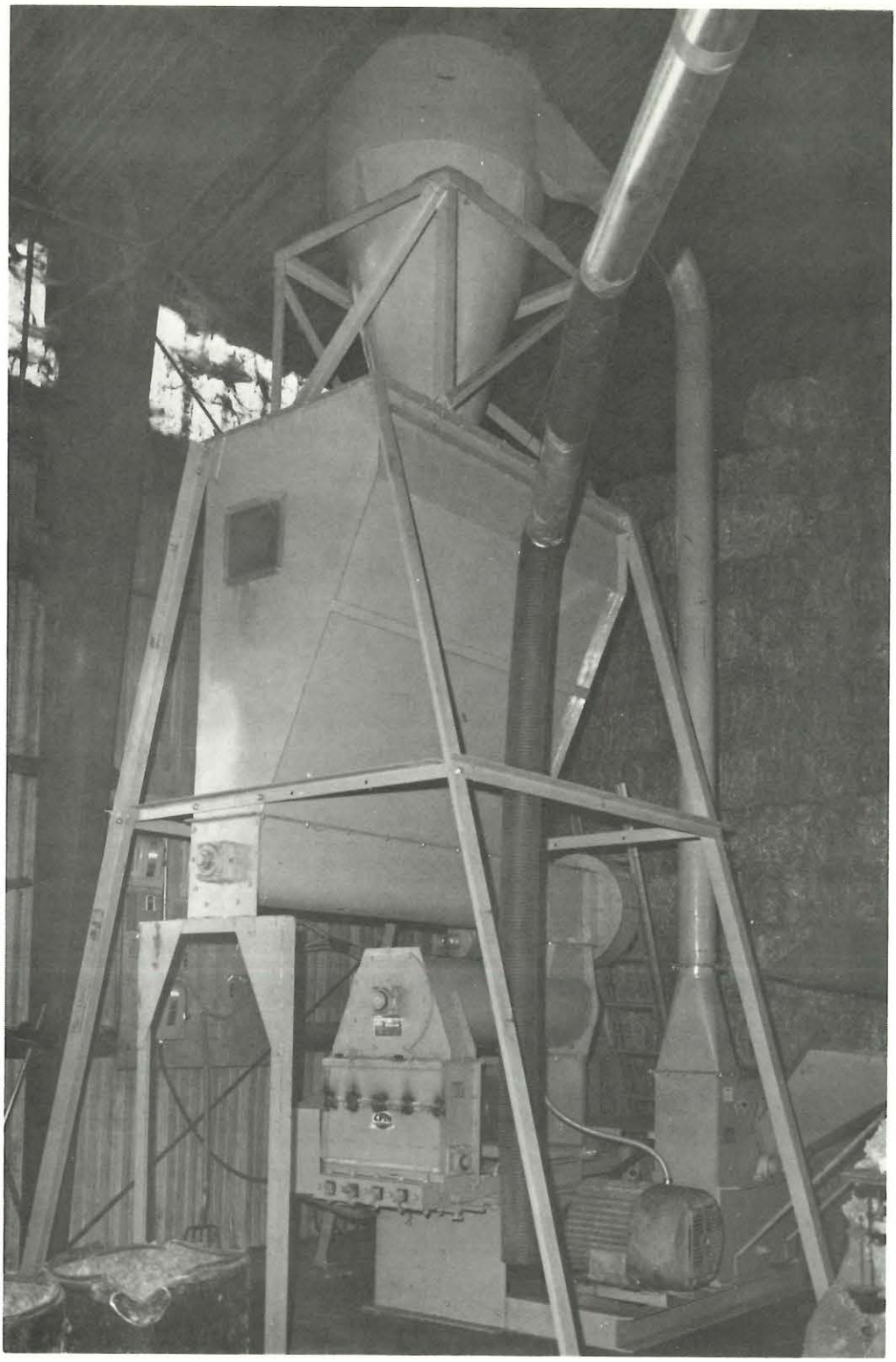
Presteamed straw being defiberized in the Committee's disc refiner pilot plant at Straw Center. Contiguous straw-fired fiber drying loop in background uses same straw as fuel.



Stock tanks, mixing, precipitating tanks and 4'x4' deckle mat-forming box at pilot plant produces sample resin bonded mats for overlay surfacing of plywood and other board products.



An experimental gasifier producing fuel gas from wood residues at the Eugene Water & Electric Board. Straw was tested in this unit with some success, but materials handling and low density posed problems. The Committee is working with several groups developing gasifiers for both fuel and eventually chemicals, methanol, ammonia and urea.



"CB" Cuber with integral hammermill, bin, meter and mixer used to produce medium density whole ration cubes from straw and grains, meals, etc., as well as other residues such as corn husklage, mint straw and hop vines. This unit is leased from California Pellet Mills.

CONSULTING ENGINEERS REPORT

TO THE

OREGON FIELD SANITATION COMMITTEE

COVERING 1975 & 1976 ACTIVITIES

by
Thomas R. Miles
Consulting Engineer

and
Associated Contributors

December 1976

NPC

COVER

A fine leaf perennial ryegrass field in the North Valley approximately two months after the right area had been machine sanitized and the left had not. Note the clean healthy rows without stubble or weeds.

All photos - T. R. Miles

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December 9, 1976

INTRODUCTION

In reporting the past two years' activities to the Oregon Field Sanitation Committee we are attempting to continue from the point the 1974 Consulting Engineers' Report left off. We have attempted to present a pertinent sample of the enormous amount of data, personal contacts world-wide, and communications that have accrued in the past 3 years, and invite inquiry if further data is wanted on a subject.

Our work with the Committee, and I speak for the more than 50 firms and individual people who have contributed as "staff" these past years, has been most uniquely interesting, even at times tumultuous, but always lively. We are older, and certainly wiser.

We would be remiss not to acknowledge the great interest of many concerned citizens of Oregon in helping to develop a solution and offering a wide variety of fascinating and imaginative ideas and suggestions.

Some are thoughtful and some bizarre but they are all important as evidence of sincere interest. Nearly all do not have the advantage of an intimate knowledge of the criteria that must be met. Few recognize that the straw has its own fuel value and does not need fossil fuel. To name a few that have come up repeatedly:

Use microwave. (A "Zapper" exists in Texas but does not meet agronomic or economic requirements.)

Pick up all the straw, and a thin soil layer, burn them and replace. (This is one we've all come up with, and it's been unsuccessfully tried.)

Use the straw to generate steam to power the machine (a good idea still) and to steam the plants (been tried, won't work and where do you get all the water?)

Wind machines, cloud seeding, huge balloon suspended flues, 1-acre steel covers with fans - and on and on - some are even patented. Most ideas are out of the question economically or use prodigious amounts of energy. Nevertheless we are always on the look-out for that one clincher and welcome all suggestions.

We should also acknowledge the continuous cooperation, assistance and encouragement that has been received from many sources including the people in the State's various departments, and most particularly the growers whose time we have occupied and whose lands we have invaded and patience we have tried.

REGISTERED PROFESSIONAL ENGINEER
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OREGON
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December 5, 1976

CONSULTING ENGINEERS' SYNOPSIS OF OUR WORK
for the
OREGON FIELD SANITATION COMMITTEE
during the 1975-76 Biennium

With particular reference to the questions posed by Senator Michael Thorne of the Legislative Committee on Trade and Economic Development regarding field sanitizers:

1) COMPARATIVE EFFECTIVENESS IN REDUCING POLLUTION

It requires 20 times the hours to sanitize a given field by machine as open field burning - 40 hours vs. 2 hours for a 100 acre field, for example. The total weights and characteristics of the emissions differ, however.

The sanitizers of 1975 and 1976 with their relatively high internal velocities and controlled combustion produce approximately 18# of solid particulates per ton of straw consumed (Odell).

Open field burning produces approximately 12#/Ton of a mixture of partially or completely burned particulates, and some 10#/Ton of unburned hydrocarbons (Boubel). This mixture is characterized by the yellowish opacity of open field smoke, evidence of incomplete combustion, and is obviously composed of mostly fine particles to rise and carry as it does, probably in the 1 to 5 micron range.

The sanitizer operates on stubble fields with the straw removed, leaving only 1.8 Tons/Acre (dry basis) of straw and thus producing 32#/Acre of emissions, of which over 80% are large (100 micron or more) and promptly fall back within 1000 feet or so of the machine. The remaining 20% are completely burned ash and have little or no odor or further reactivity nor can they be readily seen, except in the case of bluegrass's characteristic black smoke.

Aftersmoke behind the machines is being reduced and although probably will always be present to some extent can be made minimal.

Open field burning with all the straw on, 4 Tons/Acre, will produce some 48# of mixed particulates per acre but in a very short time, and usually with a tall dispersion plume.

Since both the sanitizers and crops are damaged by the excess heat from a full straw load, removal of the 2 Tons/Acre loose straw is necessary. Stackwagons are the most economic and provide some concentration and self-storing until either sold or burned. In any case the straw must be disposed of in the interim of finding markets.

We do not have quantitative data on emission from stack burning but experience has shown that they burn quite clean after about 15 minutes, and a suitable time to burn them can be chosen later in the year when their low level emissions are not objectionable.

In summary:

The machines will probably produce a lesser pollution load, and certainly of a larger particle, less smoky nature. However, it will be at a lower level and, although less visible, have a different type of effect. We're not sure.

The necessity of burning stacks until a straw market is found will reduce substantially the total gains in pollution made by the use of machines.

2) COMPARATIVE EFFECTIVENESS OF SANITIZING

The past two seasons, 1975 and 1976, have quite conclusively proven the machines do perform a good job of effectively sanitizing fields under nearly all conditions except fields with excessive straw or regrowth.

A dwell time of 10 to 12 seconds at temperatures over 250° F has been established by Dr. Youngberg as the minimum required to effectually sanitize and this is achieved by the machine. It has also been learned that 43 seconds at temperatures over 600° F over plants that are past their dormancy period and green and moist (70%) with regrowth can damage them, as seen in fields burned in October 1976.

3) RELIABILITY AND ECONOMIC FEASIBILITY

Reliability and economic feasibility remain as the two principle unsolved problems. Reliability of operation has been greatly increased but much remains to be done in refining and simplifying both operation and maintenance.

As much attention must be directed to support equipment. Several seasons of use of developmental machines by growers will be needed to come to a "production" sanitizer - or sanitizers.

It may even be well to stimulate use by some economic assistance in view of the present economics of machine operation.

As to economics, our personal experience this 1976 season has brought to our attention a related factor of personnel and management which deserves nearly "equal time" with economics.

The following presumes a "reliable, proven" machine is available, and is based upon 1976 dollar values.

Projecting from our 1976 season operating data, we can expect a machine to sanitize approximately 550 acres in a good weather season of 8 weeks, with a crew of two men working 54 hours per week. These are additional people hired for the season, and would cost approximately $5200 (with insurance, etc.).

The sanitizer, for example #75-03, will cost about $25,000 and will probably require an equal expenditure in repairs and replacement over 5 years.

Thus assuming a season cost of:

Labor	$ 5,200
Sanitizer & Repair	10,000
Tractor & Fire Rig (50%)	2,500
Fuel	1,000
Total season cost	$ 18,700

Cost per acre for 550 acres = $ 34.00/Acre

Obviously covering more or less acres is going to change the cost per acre. However, because of the inherent limitations of machine size, dwell time on the crop, waiting until harvest and straw removal is complete, and weather, we do not foresee the possibility of a substantial reduction in these costs.

The cost of the removal of the two tons of straw by the fastest disposal means (a stackwagon and later burning of stacks) is $8.20/Ton or 2 tons = $ 16.40/Acre

Projected Total Cost $ 50.40/Acre

If there was a breakeven market for baled straw, the cost of $15.00/Ton or $30.00/Acre for baling could be recovered and the net cost of sanitizing would be in the $30 to $40 range.

In addition the grower has the management problems associated with more equipment, the addition of 2 in the burner crew and 2 more in the straw removal crew - all at the time of harvest of his prime crop.

4) RECOMMENDATIONS

a) That great emphasis be placed on smoke management to abate the personal effects of open burning, while

b) Greater emphasis is placed on emissions and airshed studies and on Utilization in order to make it possible to not only offset straw removal costs but dispose of the straw and permit

c) Economic operation of field sanitizers whose development should continue in an orderly manner along with any agricultural crop or cultural alternatives, but

d) Without the seemingly complete dependence on the sanitizer as the sole solution.

Thos. R. Miles

December 9, 1976

Continuing the Synopsis of the 1975-76 Consulting Engineers Report to the Oregon Field Sanitation Committee

SANITIZERS

1975 Season

The promising "forward flame" principle conceived in late 1974 was incorporated into one narrow (10') and three wide (22') retractable wing "Dragonfly" models used in 1975 to sanitize 400 acres with some qualified success, even with the unusually wet season. Operational and durability-to-heat problems were not unexpectedly encountered.

Three cooled-plenum "flowing flame" machines were also built in 1975 by Rear's Mfg. Co. of Eugene, purchased and operated by growers who sanitized nearly 300 of their own acres.

Conclusions:

Sanitizing performance good, Operational features fair, Durability poor, Economics indicating operating costs higher than expected. Straw must be removed to prolong machine life, not overheat crops and to prevent spot fires. Good grower participation and cooperation with machines was experienced.

The wet season and inversion days contributed to only about 185,000 acres being open burned rather than the 234,000 acres allowed by SB 311.

1976 Season

One 1975 Dragonfly (22') was fitted with new stainless steel skins, otherwise no changes. Two were rebuilt with different decks, height adjustment and other changes. The 10' Prototype was also given a new type of deck. Two new large "flatland" machines (32') were built costing approximately $48,000 each, and designed to sanitize a nominal 6 acres/hour.

A late and wet season delayed seed harvests which, combined with late machine deliveries and difficulties with straw removal for dry baled straw that could be sold, held the total acreage sanitized to 1100 acres with the 6 machines. Breakdowns and repairs were surprisingly few and quickly fixed by the two service trucks. Air bar failures, the major repair problem of 1975, did not occur in 1976 until late, and on #75-03 only. The service trucks were equipped and manned by the Committee to serve all the machines in the Valley being operated by the Committee.

Early-made plans for field scheduling were completely disrupted by the frequent rains. Machine sanitizing without auxiliary fuel continued until October 20, long after abundant regrowth had started and some fields of fine leaf perennial ryegrasses were damaged, while others, Linn perennial and bentgrass, did not exhibit damage.

A small 6' x 12' Plot Burner was also designed, built and tested in early 1976, later used by Oregon State University.

Several test burns with full straw were conducted and confirmed as "too hot", with fire control also a problem. Night operation until midnight was successfully tried, with many "fire calls" by citizens.

"Straw Central" as an information center worked well. Movies, slides and stills were taken during the season.

Rear's models were used by Hunton Farms and Strome-Fisher Farms for 264 acres, with some changes in 1976 made by Rear's Mfg. Co.

Emissions tests indicate a greater percentage of layer particles as compared to open field burning, with faster fall-out. Data collected in 1976 indicates a need for more definitive study of open field burning emissions types and sizes. The Committee has helped fund LIRAQ model for the Willamette Valley Simulation Unit at Oregon State University being conducted by Charles Craig.

Conclusions:

Sanitizing performance considerably improved, refinements are needed for specific grasses and conditions. Operational features much improved, more attention to quality of support equipment needed. As expected, the two new large machines need to stay within a field-to-field area to realize their size advantage. All the machines worked, some better than others. #75-01 with the plenum deck did not perform as well as the others. #75-03 did very well, burning nearly 500 acres. #76-05 and -06 did almost too well in sanitizing regrowth fields and are ready for 1977 with minimum modifications, as well as are #75-02 and #75-03.

Afterburn has been reduced and visible stack emissions are at a minimum. Durability has also been improved but needs continued work, the deck cooling principle is most promising.

Cost projections indicate a range of $30.00 to $40.00/acre for sanitizing and an additional $17.00 to $30.00/acre for straw removal in stackwagons or bales. Further considering all factors we do not see any imminent way to substantially reduce these costs.

Disposal of unsold or damaged straw is a continuing problem. Additional crew requirements pose some new management problems.

Again, the wet season limited open burning to 165,253 acres instead of the 195,000 acres allowed by SB 311.

180 stacks made in 1975 were burned in 3 hours in November 1976, with some early smoke. Dense grouping improves burning rate greatly.

OTHER ALTERNATES

Aside from limited alternate crops there are only two potential alternates, other than the machines, to open field burning. Both involve as complete straw removal as possible.

60 acres on several crops of close or crew-cutting to remove all possible duff and straw was done in 1975, followed in 1976 by Mr. Ringsdorf close cutting 300 acres with a special machine built for him by Rear's Mfg. Co. Orchardgrass and tall fescue appear to be the only candidates for this treatment.

Chemical treatment is still in the offing but is not yet approved and is nearly as expensive as machine sanitizing.

After careful straw removal, flaming with a propane flamer commonly used in mint crops, for example, has served growers as an intermediate alternate method of sanitizing. The cost is $30/acre for fuel.

STRAW REMOVAL, STORAGE & TRANSPORT

We cannot emphasize strongly enough that all alternates to open field burning involve straw removal and sale or disposal. The only exception is incorporation which has proven unworkable for nearly all grass seed soils.

The stackwagon stacks remain the fastest method of removal, are self-storing but are bulky and to be used on farm or nearby, or burning as a last resort.

Any straw to be trucked should be as near 14#/cubic foot density as possible - more work is needed here in producing heavier bales to avoid additional cubing, compression etc. Bales must be in covered storage to hold quality, and should be handled in multi-bale units.

Straw mechanically chopped into a large pile has some applications if stored at use-site. All systems should provide for the most economic collection and storage to assure a 12 month supply.

Higher densities than 14#/CF are needed only for special purpose uses such as off-shore export 20#-38#/CF and rail 20#-27#/CF.

And feed-use straw must be put up dry and kept dry to avoid potential mycotoxins from molds and fungi.

Contrary to some popular thought, collection and storage are not a problem - if a bona fide continuing market exists at prices that will cover collection, storage and transport costs, $25 to $27.50/Ton for year-round supply.

Current work includes heavier bales, outside chopped storage and new collection systems monitoring.

UTILIZATION

We sponsored a World Straw Conference in May 1975 with some 370 attendees, over 150 from out of state and 40 from abroad. Thus was established an invaluable world-wide communications system which is very active and we've benefitted greatly. Two active straw processing - marketing organizations have been formed and have indicated progress in quality standards, selling straw and are ready to accept large year-round orders. It is estimated that approximately 60,000 tons of straw were sold each year in 1975 and in 1976.

Feedstuffs

A plant was built to produce the Committee-developed hydroxide cube for export, unfortunately burned in 1976 but continues to ship alfalfa+straw cubes. Two treated straw feeding trials at OSU are complete and two more are in progress - all Committee sponsored. A straw+supplement trial in Eastern Oregon was most successful.

Cubing tests with the new CB cuber continue and are promising for whole rations such as those including DPW, dried poultry waste, as a protein source abundantly available in the Willamette Valley.

A comprehensive study of straw nutrition values was completed at OSU and is a fine feeding reference. Cooperative efforts toward expanding feed markets are continuing with the Oregon Department of Agriculture.

Straw as a feed for beef and dairy cattle, horses, sheep and even worms is being pursued, but the total volume will probably never exceed 150,000 tons/year within the foreseeable future and will always be in intense competition with other feeds in the low price range.

Fiber

Our disc refining system at the Straw Center is working well and producing a new form of straw fiber that has already found uses as hydroseeding mulch, as a peat moss substitute and other horticultural uses, as insulation, as plywood overlays and as an improved feed. Industry has joined with us to help promote fiber uses and is helping support the Straw Center pilot plant. Our goal of a multiplicity of diversely marketable products from the same plant is nearer realization with fiber products.

Fuels

We have made a fire-log market survey, conducted explosibility tests on strawdust at OSU, where we test fired a boiler with strawdust, tried straw mixed with hog fuel at the U of O, fired a particleboard drier at Bohemia, fired an Energex furnace with strawdust and are currently drying the disc-refined fiber with a straw-fired furnace. Also we're completing a bale-burning furnace prototype for on-farm or industrial use in dehydrators, etc.

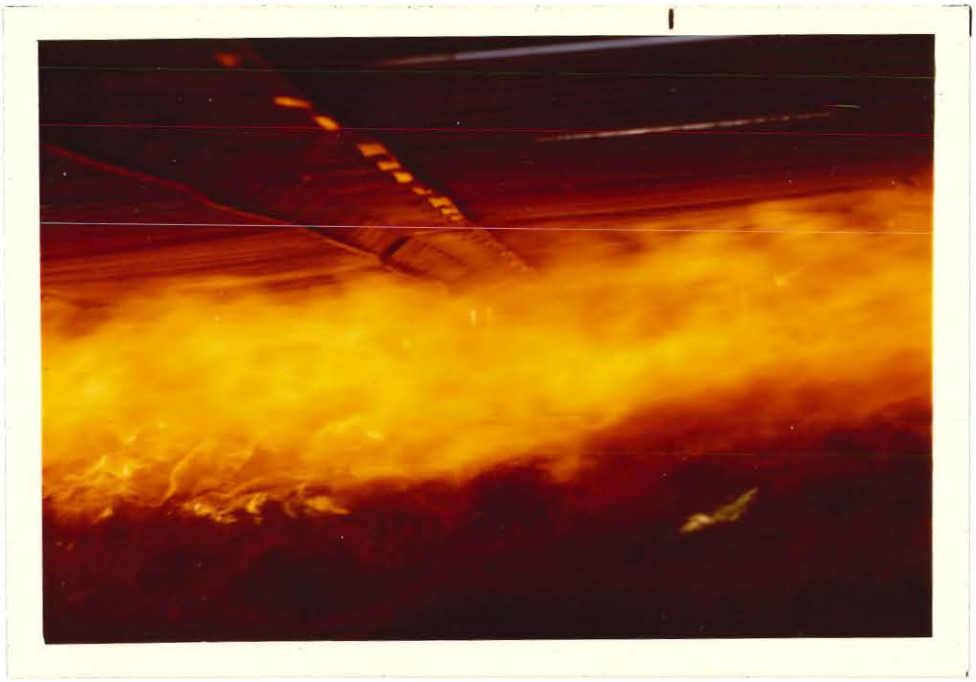
As fossil fuels costs rise, straw's value as a fuel will rise but not as rapidly. Straw requires slightly more ash collection equipment than wood waste when directly fired.

Chemical Feedstocks and Energy Resources

Pyrolytic gasification of straw and MSW, municipal solid waste, has been actively studied. Trials have been run by Garrett, Union Carbide, Battelle Northwest, EWEB, IDEA Corp., Cascade Recovery and others. A trial using straw is projected for the ERDA/Bureau of Mines test unit at Albany.

Materials-handling the fluffy material is a common problem but we may have a solution. If so, the market for a synthesis gas as fuel from straw, MSW, and/or wood waste is more attractive as natural gas is projected for $4.00/MMBTU by 1980, from the current $2.00/MMBTU. We are very active in working with others - General Motors, W. R. Grace Co., Reichhold Chemical Corp., University of Minnesota, OSU and Battelle in this field.

These gases can also be converted into methanol, ammonia and urea. We can produce sufficient fuel and fertilizer from the two tons of loose straw from one acre to farm and fertilize at least 5 acres of cropland - we only await the right economic circumstances and risk capital financiers.



The "Forward Flowing Flame" principle in action. Drawn from left to right by the induced draft stack (to right of above photo) the energy in the flame dehydrates and then ignites the oncoming stubble without the need for auxiliary fuel. Extra air is provided by the air bar shown above.

Testing stack and fugitive emissions on Sanitizer #75-02 operating in a heavy stubble perennial ryegrass field in 1976.

Sanitizer #75-01, with new plenums for 1976, briefly test-burning a very dry field of orchardgrass with all the straw left on (5.1 T/A). The excessive fuel (equiv. 500 g oil/A) would have damaged both machine and crop if continued.

Sanitizer #75-04 test burning a fescue field in 1976 with very poor straw removal. Note windrows of straw which create alternate hot strips on field, and reduce capacity.

Sanitizer #75-03 operating in 1975 in a bluegrass field with considerable regrowth and heavy thatch, resulting in excessive black smoke emissions. The black smoke is characteristic of bluegrass only but is not excessive in a "normal" year.

Sanitizer #75-03, with new stainless steel skins for 1976, operating in a well-prepared fine leaf perennial ryegrass field.

Sanitizer #76-05 on a well-prepared bentgrass field with regrowth caused by rain and delayed harvest and straw removal. Note uniform sanitizing in foreground.

Sanitizer #76-06 on heavily thatched bentgrass field that had not been burned for 3 years. The heavy aftersmoke is characteristic of large slow burning plant "crowns" resulting from infrequent burning and/or regrowth.

SANITIZERS

Chronological Review

In 1970 there was developed at the OSU Experiment Station the first full scale sanitizer, which picked up the loose straw, burned it on a grate over the burning stubble on the ground. Their 1971 model eliminated the grate and burned everything on the ground. Further changes in 1972 did not solve the problem of discharge of substantial quantities of burning particles.

A larger "AIR-BAR" forced draft machine 24' x 20' was built for the 1973 season and a "Turbo Cycle" induced draft machine 12' x 20' was built privately and purchased. Agronomic tests showed an improvement of crop of machine burned areas vs. open burning, but the machines had materials failures, breakdowns and a problem of burning damp or regrowth fields - as well as continuing to emit quantities of particulates, some aflame. These problems are not unusual in the early stages of a new development.

For 1974, four engineering firms were retained to attack the problem, F. Glen Odell, John Talbott, CamRan and T. R. Miles. We variously: redesigned and built a new "Turbo Cycle type" induced draft machine 12'x 30', revised the 1973 OSU forced draft machine 24' x 20' (both by Talbott), designed a very different Rotary Path counterflow vortex prototype (6' x 13') sanitizer (Miles) and a forward-flame propane "flamer" (Miles and CamRan) for use on too-green or too-wet fields. The forced draft and induced draft machines did not perform well, required too much horsepower (120 HP), and needed excessive propane. The Rotary worked very well (200 hours) with only 2 repair stints, had the least emissions yet, but did poorly on damp or green fields. The "flamer" immediately burned off its propane nozzles, but with some modification proved that the "forward flame" principle would burn greener or wetter fields without propane and was comparatively clean in emissions, as well as simple in concept. A total of approximately 180 acres was burned in 1974.

Thus in 1975 three identical burners 22' wide x 24' long with air-slot induced-draft stacks were designed (Miles) and built - (#75-01, -02, and -03) and dubbed "Dragonflies" since they folded their "wings" to a road width of 12'. A 10' wide prototype (#75-04) had been built early to experiment on.

They featured articulated steering, single skins and skirts for economy, improved ignition, and separated structure and hot skins. 400 acres of all species were burned in 1975 with the 3 machines - with frequent repairs mostly due to overheated skins and running gear. The smaller #75-04 was intermittently used with various modifications. Emissions and stack smoke were minimal, performance on green and wet fields quite good without auxiliary propane and maintenance was relatively simple. The average burning rate was 2.5 Acres/Hour on prepared dry fields.

Although burning fairly hot these machines did not burn-out stands and after adding water sprays on the rear steel wheels they withstood the heat of "overrunning" the fire - an understandable personnel reaction to go as fast as possible.

The negative pressure in the box created by the induced draft stack greatly reduced fire spread and maintained a rapid "flow" of the flame forward, dehydrating and igniting the oncoming stubble. Also it allowed the stubble to ignite at will rather than at a precise line (a problem with previous machines).

Rears Manufacturing Company of Eugene had been as impressed as we with the "flamer's" demonstration of the "forward flame" principle in 1974 and independently developed three machines for purchase in 1975 by growers Everett Hunton and Don Fisher, near Junction City. These sanitizers burned nearly 300 acres in 1975 - mostly perennial ryegrass.

The Rears units were unique with two tall gravity stacks, one fore and one aft, and a forced draft cooled plenum deck. Two-wheel center support makes them very maneuverable. Characteristically they burn fairly cool* and were used again by their owners in 1976.

Also in 1975, Mr. Earl Wing of Industrial Construction Company in Eugene built a prototype operating on the "Air Curtain" principle. Trials indicated fair performance on dry annual ryegrass but virtually no success on perennials with any regrowth and the pressurized box created seal problems we'd had before.

THE SANITIZERS OF 1976

With a bank of experience of some 17 machines and at least 5 small prototypes we knew about, over a period of 6 seasons (since 1970), we set about preparing for the '76 season.

A SANITIZER REVIEW was held with most of the growers and fabricators (40) involved in the 1975 season present. Virtually all of the details from this conference are included in this report in their appropriate places. The consensus was that the 1975 machines all did a creditable sanitizing job but were far from "operational" on an everyday basis. Greater maneuverability, better control of burn, more durability, reduced maintenance, greater capacity, better field preparation, virtually no possibility of burning with all straw without crop and machine damage, variable deck height needed, better crew training, less wind effect and many other items were recommended and discussed in a most cooperative way. Costs were briefly discussed and a figure of $28.00/Acre was agreed upon as a minimum projected cost to remove straw (Stackwagon) and operate the Sanitizers. The logistics of water, fuel, repair parts, maintenance facilities as well as additional personnel problems for the grower were considered.

A Definition and Specifications were then developed:

* Evaluation of Field Sanitizer Test Models - 1976. Table 2. by Harold W. Youngberg, Oregon State University

FIELD SANITIZERS - A DEFINITION & SPECIFICATIONS

Definition

A field sanitizer is a piece of agricultural equipment that reliably and economically flame cultivates grass seed or cereal stubbles without employing complex devices to achieve agronomically effective results - and operates safely with nominally skilled personnel within a reasonably wide range of fuel conditions.

Specifications

Sanitizing Performance

A. Will maintain ground temperatures in excess of 250°F (121°C) for 10 seconds or longer - but not burn out the particular crop.

B. Will combust or at least carbonize all the stubble desired according to crop and "roast" surface weed and grass seed.

C. Will accommodate a wide variation of field fuel conditions - from a minimum (3/4 Tons/Acre) of perennial stubble to approximately 3 Tons/Acre of dry straw and stubble, with nominal regrowth and varying humidity combinations - while sanitizing to an adequate agronomic standard, without burnout,

D. Provides mechanical disturbance means to disperse and sanitize piles of seed or debris.

E. Ideally, the machine should meet the above criteria with all the straw on the field, but the extra fuel is too hot for most crops and more rapidly destroys the machine.

Capacity

A. Meets its design sanitizing capacity in acres on: a "representative field" having a minimum stubble of 1 T/A (dry weight basis) at minimum average moisture content of 10% with: a 20% average stack opacity (Ringelmann 1), leakage not to exceed 20% of total emissions, no after smoke more than 25 yards behind the machine. (Above is the DEQ Standard and conditions.)

B. Under the above conditions a practical minimum acreage capacity would be 3 acres per hour. Since length controls the machine speed and width the acreage there is a practical maximum of size and therefore design capacity. Maneuverability requirements of the land and field sizes will control size and thus capacity.

C. It is reasonable to contemplate a large "flat land" machine that would cover approximately 6 "representative acres" per hour and be self-propelled - and eventually possibly be steam-powered from the burning stubble.

D. Unusual conditions such as very heavy stubble or loose straw, moderate to heavy regrowth, and high moisture will reduce the capacity and increase the smoke potential.

Operational Features

1. Maneuverability to meet design, terrain and road requirements.
2. Skirts or other parts do not "scrub" the ground.
3. Minimum propane for ignition only. Large propane capacity optional for some fields.
4. Reliable ignition system.
5. Reliable water spray system.
6. Usually self-contained power to avoid tractor interface problems.
7. Variable box height and air to accommodate varying fuel conditions.
8. Effective "after smoke" suppression.
9. Induced draft to maintain negative pressure in fire box and prevent fire spread.
10. As insensitive to wind and wind-direction as possible - requires a "tight" machine.
11. Does not throw sparks.
12. Allows high "operator abuse" without damage.
13. Interchangeability of parts and modules.
14. Design for ease of repair on farm.
15. Materials selection for both heat and corrosion over winter.
16. Very simple monitoring control requirement.
17. Minimum of particulate emissions, especially less than 100 microns.

Life Expectancy

1. Based on a 7-year amortization period (minimum depreciation schedule for farmers under Federal requirements) and a yearly use of approximately 200 hours we should expect the main frame, engine, fan, etc. to last that long with reasonable care, approximately 1500 hours, or approximately 4500 acres.

2. Those parts exposed to flame will necessarily be short-lived - but should stand up for at least two seasons.

3. Combining the above we can expect to spend an amount approximately equal to the original machine price in repairs over the 7 years.

Safety

1. The machines must be as safe to operate as possible - anticipating the possible day of one-man operation.

2. Steep hillside operation is one hazard that must be avoided by operator discretion, a 12% slope appears maximum.

3. They must conform to the various Federal and State codes such as OSHA, SAIF etc. as well as sound operational design.

4. Allowance for relief operators must be made for the boredom and perhaps lapsing into a doze that often results from operating a slow-moving unit over long periods.

5. In actuality, we probably will be able to eventually design a safer self-propelled machine than the tractor-drawn units of today, primarily because of the inherent hazards of a tractor.

SANITIZER OPERATING CONDITIONS AND VARIABLES

Two sets of circumstances regulate machine sanitizing. The first set does not involve variables but rather a set of firm conditions that must all be satisfied before one can start, and continue, each day:

1) Is the field harvested?
2) Has the straw been removed?
3) Is it seasonable to burn? i. e. too late in the season would damage the crop for the following year, or the plant.
4) What is the extent of regrowth? If there is some regrowth, is there enough dry straw (1 ton per acre) to provide basic fuel?
5) Is the field wet or dry, the day rainy, foggy, or clear?
6) Is the machine on the field and ready?
7) Is the accessory equipment there and ready? Fire rig, tractor, water supply.
8) Is the operating personnel available?
9) Does the wind velocity and direction make machine operation possible?
10) Has a permit been obtained?

Assuming that all of the above conditions are "GO", one can start to burn but is subject to those variables which, in combination, will determine the capacity or coverage of a sanitizer for the day, and for the season:

1) Stubble fuel load on the field, its condition and uniformity.
2) Moisture content - is it green regrowth or wet loose straw?
3) Extent of regrowth vs. dry loose straw (min. 1.5 T/A).
4) Specie of grass - age of perennial stand.
5) Size and shape of field.
6) Ditches, roughness of field, slops (12% max.).
7) Size and type of machine.
8) Maneuverability.
9) Burning available hours/day (e.g. October = 4-hour days).
10) Reliability of the machine.
11) Machine maintenance, fuel, lube, etc.
12) Reliability of support equipment.
13) Availability of water in proper quantity.
14) Productivity of crew.
15) Availability of repair personnel and parts.
16) Velocity and direction of wind.
17) Timing relative to crop (seed) harvest, and straw removal - the earlier the better.
18) Frequency of moving field-to-field.
19) Scheduling if more than one grower is to use machine.

THE 1975 and 1976 BURNING SEASONS

Both seasons were wetter than usual with 1976 the worst. In 1975 from July 15 to October 1 there were 21 days out of the 77 total, or 27%, that were too wet to use a machine, much less open burn. Of the 80 days in 1976 from July 12 to October 1, there were 33 days or 41% that were too wet.

Both summers were characterized with "nearly weekly" rains which drastically affected all aspects of grass seed harvest, straw collection and handling, and field burning of all types. August 1976 had approximately $3\frac{1}{2}$ inches of rain, nearly as much as 1968 which is considered to be the "worst summer ever."

To properly appreciate the effect of rains, a brief review of the grass seed harvest sequence is appropriate:

1) When ready, the grass seed crop is "swathed" or mowed and left in windrows to cure for 6 to 10 days. This timing is critical.

2) When "cured" the combine picks up the windrows and separates the seed from the straw. Again the important timing is for the seed crop. The straw is either
   a) left in a windrow for baling or other collection, or
   b) scattered uniformly over the fields in preparation for open field burning.

3) On the average, there is approximately 2 tons of loose straw and two tons of stubble left on each acre. Unless the loose straw and stubble are open field burned, the loose straw at least must be removed for
   a) open field burning with some heat-sensitive varieties;
   b) if burning by machine, to avoid excessive heat on the crop and rapid deterioration of the machine;
   c) eliminating a soggy growth-inhibiting and disease-harboring organic tangle, if it is not burned at all.

4) Windrowed loose straw is usually removed by being baled and the bales removed, or collected in stack wagons, then either stored roadside, stored under cover or shipped directly from the field, according to removal method and market.

5) For a limited number of years some straws can be cropped and "incorporated" by discing into certain soils. There are very definite agronomic dictations.

During the summer of 1976 it rained at least once on nearly every one of the above steps - but fortunately did not totally ruin the seed crop.

The various effects are:

1) Delayed initial harvest approximately 10 days.
2) Shattered some seed in windrows.
3) Started early regrowth even before combining.
4) Promoted mold growths in straw both before and after combining, with the result that some straw was a complete loss, most was affected to some extent, especially its palatability and thus its planned sale.
5) Progressively delayed harvest, hence combining, hence straw removal and/or open field burning.
6) Drastically reduced the number of available dry burning days, both open field and machine, after the seed was harvested; hence the total allowable acres could not be burned.
7) Kept regrowth healthy which created extra open field smoke and reduced machine rates to as little as one-half.
8) Has promoted disease and fungus growth on otherwise healthy crops, some of which can be sprayed but some, such as rust, will seriously affect next year's crop.
9) And finally it has had the usual effect of completely disrupting an orderly, productive harvest for the farmer - not to mention our machine sanitizing program.

By Labor Day weekend in 1976, many of the growers finally had completed the combining of the seeds, except for bentgrass and some fine leaf perennial ryegrasses.

A six-day rain in the second week of September virtually put a stop to both open and machine burning - even though many fields still had straw on them.

Machines #75-01 through -04 were used, between showers, by growers up to the 14th of October. The Committee operated #76-05 until October 19th and #76-06 until October 16, but both were working on extra heavy regrowth and risking plant damage so late in year, although the straw had just been removed. We did damage the last Hector field, Manhattan perennial ryegrass, quite severely.

After the combining, the straw could be removed, some of it already too wet or showing signs of mold, or too often turned to provide potential sale as feed grade. Then, weather and straw collecting permitting, the machines could operate on harvested fields, or if straw was scattered and dried, the fields could be open burned when quotas permitted.

A DESIGN SESSION with involved consultants resulted in a decision to further pursue the promising "forward flame" principle rather than dilute our time and efforts with attempting to develop brand new concepts.

Consequently we decided to utilize the still-sound frames, engines etc. of the 1975 Dragonflies and design a series of modifications to determine the best features and combinations. Also a larger machine was in the preliminary design stages - to be finalized after some field experience.

The salient features of each machine are described on the following drawings as well as in the Machine Logs under The Summer Program.

A PLOT BURNER embodying the cooled Z Plenum principle similar to Rear's design was built first and tried at the first opportunity in May. From those trials we incorporated this principle into #75-01 on a full scale and turned the Plot Burner over to OSU's Agronomy Department for their summer tests.

THE 1975 PROTOTYPE, #75-04, was converted to the newly conceived "Multi-Air-Bar" design with a corrugated deck and a hoped-for capacity to handle a full straw load.

#75-02 was converted to a full scale Multi-Air-Bar design, and jet eductors.

And #75-03 was refurbished with stainless steel skins in place of the chromized steel used in 1975, and slot eductors added. Otherwise it was a 1975 machine to be used as a control.

THE DESIGN OF #76-05's final details was held, pending trials of #75-04 which had the same deck design. After the successful trials the design was completed and out for bid along with

#76-06 was the same design as #76-05 except that it was propane powered instead of diesel.

Meanwhile, a SUMMER BURNING PROGRAM was developed based on our two previous years of experience, but with more machines. By starting to man and train the Program in early June a far better performance was realized than in 1975, with more data. The enclosed work sheets illustrate our activities.

Briefly, the Committee furnished:

a) The Sanitizer,
b) A water tank and pump,
c) A tractor driver - monitor,
d) Two roving service crews to repair the machines.

The cooperating grower furnished:

a) A tractor,
b) A fire control truck with tank and pump,
c) A fire control man.

Also the Committee:

a) established a "Straw Central" information service at the Straw Center,
b) hired several part-time retired County Agents to help arrange for fields, through the assistance of the Oregon Seed Council,
c) kept daily logs of all machines,
d) required the services of nearly 30 people for the peak summer demand on burner operations.

THE RESULTS OF THE SUMMER PROGRAM are best illustrated by the following sections which appear in the Appendix:

Log of Sanitizers - 1976 - Chart

Machine Availability - 1976

Machines in Operation - 1976

Field Information - 1976

Grass Crop Distribution

Description of Machines and Fields

Evaluation of Field Sanitizer Test Models - 1976
OSU - Agronomy Department

Ground Time-Temperature Plot

COMPARING THE SEASON'S EXPERIENCE with the foregoing "Definitions and Specifications", we find

Sanitizing Performance:

We met all but the "full straw load" specifications. Future machines should have easily variable-height decks to expand the fuel quality-vs-heat sensitive crop control problem, as well as aid regrowth loaded fields. See also Capacity - D.

Capacity:

The 1976 machines all would probably qualify under the DEQ Standards. And on the reference fields would meet or exceed 3 acres per hour for #75-01, -02, -03, as well as #76-05 and -06 meeting the 6 acre rate.

Operational:

We have not refined the maneuverability factors to the desired degree, even with articulated front-rear steering.

We have met items 2 thru 6, also 8 with the drag and of course 9. Wind sensitivity (10) is improved but not solved. Sparks (11) occur only with fine loose dry straw present. Judging from the infrequent repairs due to human error (12), we have greatly improved the operation and control (16) of the machines. Interchangeability (13) particularly of perishable parts was greatly improved as well as ease of repair (14).

Materials choice (15) is now not as important as protecting the hot elements as much as possible. And finally we're still checking out the type sizes of emissions. There is reason to believe that a majority (from the stack) are large enough to promptly drop to the ground. Further particle study is necessary on this.

Life Expectancy:

We have extended it appreciably from 1975 but still have reason to believe that an amount equal to the original cost would be expended in repairs over a 5 to 7 year period.

The way it is operated, and on what fields, regulates this entirely, viz. - we nearly melted #75-01 in 15 minutes on a full-straw-loaded orchardgrass field.

Safety:

The 1976 machines are actually safer than the tractor pulling them. The addition of the Pul Tank between tractor and burner and tractor PTO driven pump has drastically increased the fire safety situation.

SUMMARY COMPARISON OF 1976 MACHINES

The machines kept going surprisingly well even during the dampness and regrowth periods of both 1975 and 1976. This might be doubly important if the "unusual summers of '75 and '76" continue, as some weather cycle experts maintain.

In spite of late deliveries we were able to sanitize 41 fields totalling 1075 acres, with the majority of the growers expressing satisfaction at the quality of sanitizing performed.

A COMPARISON of the machines from our 1976 experience is simply:

#75-01 is too complex, does not work as well as the others.

#75-02 has promise if the rear is made adjustable.

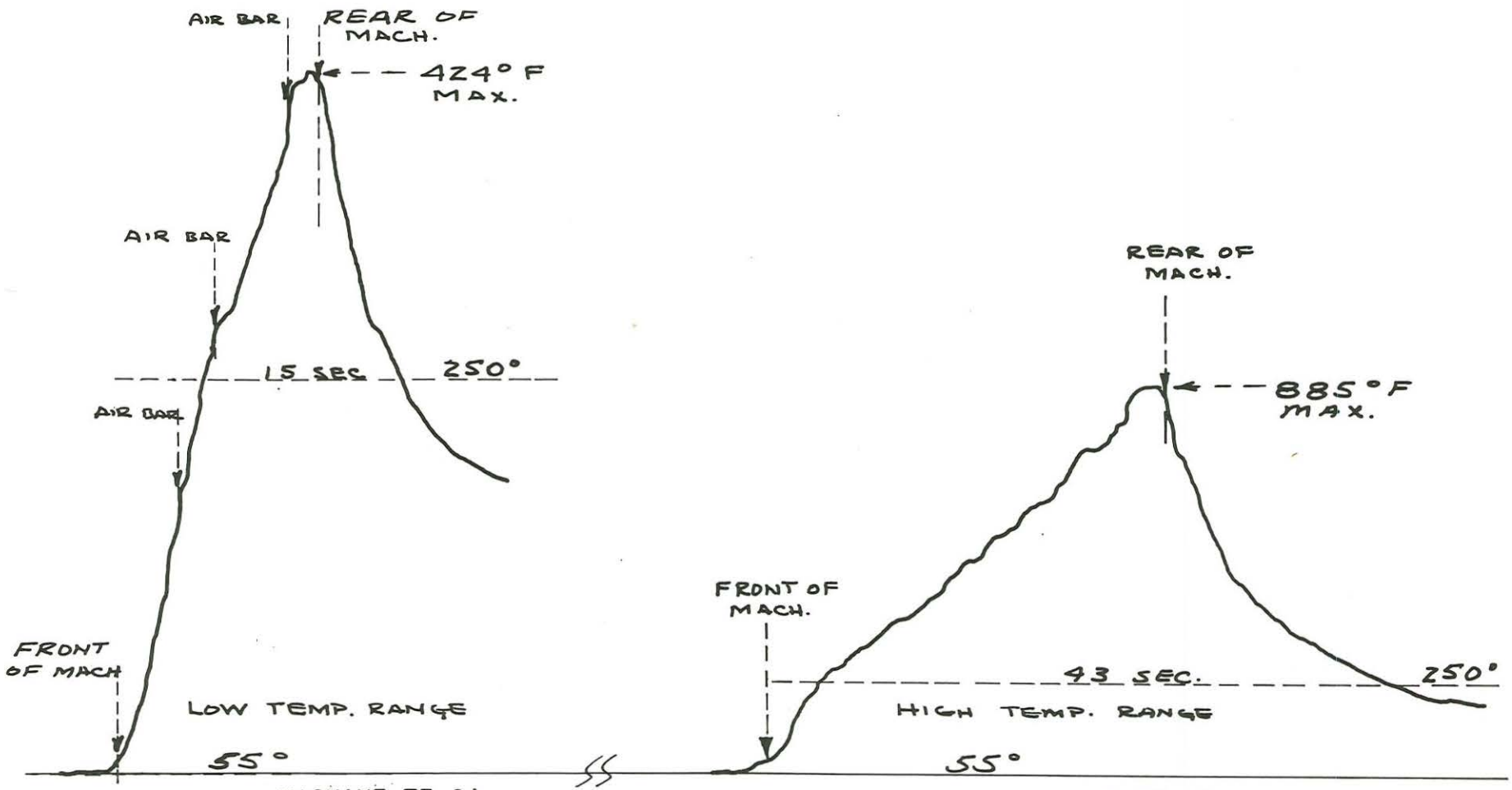
#75-03, with a few changes such as variable height, is the simplest and quite efficient design.

#75-04 is an experimental only frame, still.

#76-05 and -06 both performed well in the field, even under heavy regrowth conditions, and in one case -05 did too well, burning out a fair percentage of Hector's Manhattan perennial ryegrass field. At the same time -06 was doing well - and did not burn out - Ringsdorf's Linn perennial ryegrass field. See following graphs.

A patent on the forward flame principle and its variations has been applied for in the name of the State of Oregon.

All in all, we have met the majority of the points but are lacking in maneuverability, durability and economy of operation.



MACHINE 75-04
AUGUST 5, 1976
CITATION PERENNIAL RYEGRASS
2.6 T/A - 30% MOISTURE
APPROX. 1.2 T/A LOOSE & DRY
(15% MOISTURE)
SOME REGROWTH
MINIMUM AFTERBURN

MACHINE 76-05
OCTOBER 18, 1976
MANHATTAN PERENNIAL RYEGRASS
3.0 T/A - 48% MOISTURE
APPROX. 1.0 T/A LOOSE & DRY
HEAVY REGROWTH, CONSIDERABLE
AFTERBURN IN GREEN CROWNS
BURNED OUT SUBSTANTIAL AMOUNT

TYPICAL TIME-TEMPERATURE CURVES ON GROUND UNDER OPERATING BURNERS PASSING OVER THERMOCOUPLE AT GROUND LEVEL

FROM CHART TRACE -LAWSON

On the "Log of Sanitizers" chart there are unexplained blanks, mostly having to do with lapses in the schedule caused by rain or auxiliary equipment problems or the grower's crew. The following discussion of the Grower - and the Committee's Sanitizers is the result of personally becoming aware of and investigating the situation - even to filling in myself once in a while.

Probably one of the most significant results of the 1976 season's work is a realistic appraisal of the working relationship between the grower and the Committee and how to increase its effectiveness, gained from the intimate contact of supervising this season's program.

THE GROWER - AND THE SANITIZERS

First of all we must understand that a grower has to be very flexible and decisive on a weekly, daily and hourly basis. He can plan seasonally and weekly but in the end the accumulative effect of the weather (such as this year's intermittent rains), the day the crop is ready, machine breakdowns, personnel not showing up, his personal health, and such things as burning quotas suddenly released necessitate hourly decisions regarding personnel and machine assignment. Few can afford the extra tractor, the spare man. Most are already using their people and equipment for as many regular jobs as possible and have not included - or do not have - the extra tractor and the properly reliable fire rigs as well as the extra man to work with the Committee's man to operate the sanitizer and fire rig.

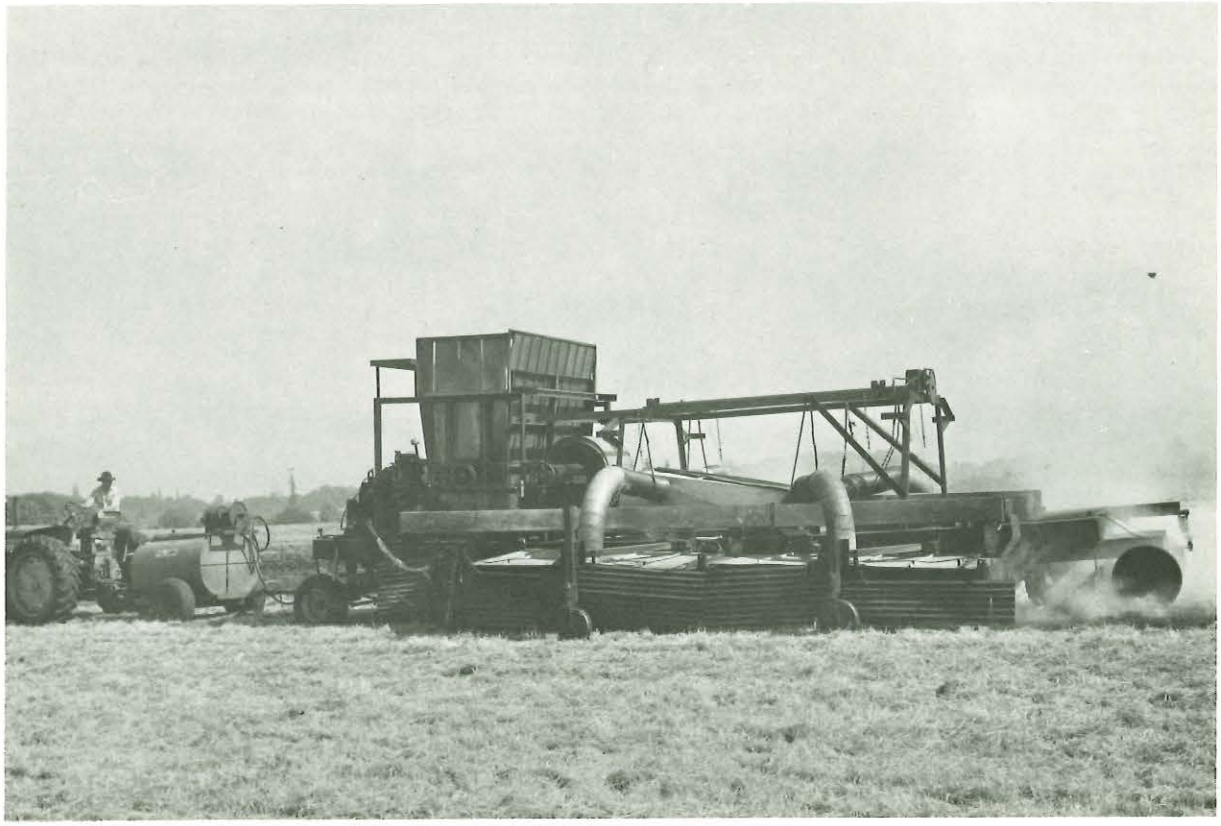
This summer, as never before, we've come to appreciate as outsiders the difficulties of blending into, of coordinating timing, men and equipment, and of not disrupting the prime effort of harvesting a seed crop. We are a separate group and even with both the grower and ourselves trying hard to work in concert, and to simulate his owning and operating a machine, we cannot get a true operational or economic picture of the results of integrating the straw removal and machine burning into his farm management.

The capacity of a combine is a good reference at approximately 600 to 700 acres per season - or approximately 20 acres/day, average. In addition, for machine sanitizing, to match this rate, a baler and operator, a truck and driver, a proven sanitizer with tractor and driver, and an auxiliary fire truck with driver are required. The impact of these additions on the management of the farm - aside from economics - is to add 4 more people and 3 or 4 more pieces of equipment with their attendant service and maintenance requirements which virtually adds a full time maintenance man during harvest - if one is available.

Since most farms utilize virtually all the family members, both male and female, during harvest, the above additional people have to be hired.

We are particularly aware of these daily equipment and people problems after this summer's experiences of having to rearrange our schedule of moving to a field because the straw was not removed in time due to earlier rain, or having to supply additional people because the grower's man is sick, or providing extra fire equipment because of mechanical problems - all in order to keep on burning.

One of the three 1975 Dragonfly sanitizers, #75-03, burning a well-prepared Linn Perennial Ryegrass field at 3A/Hr in 1975.



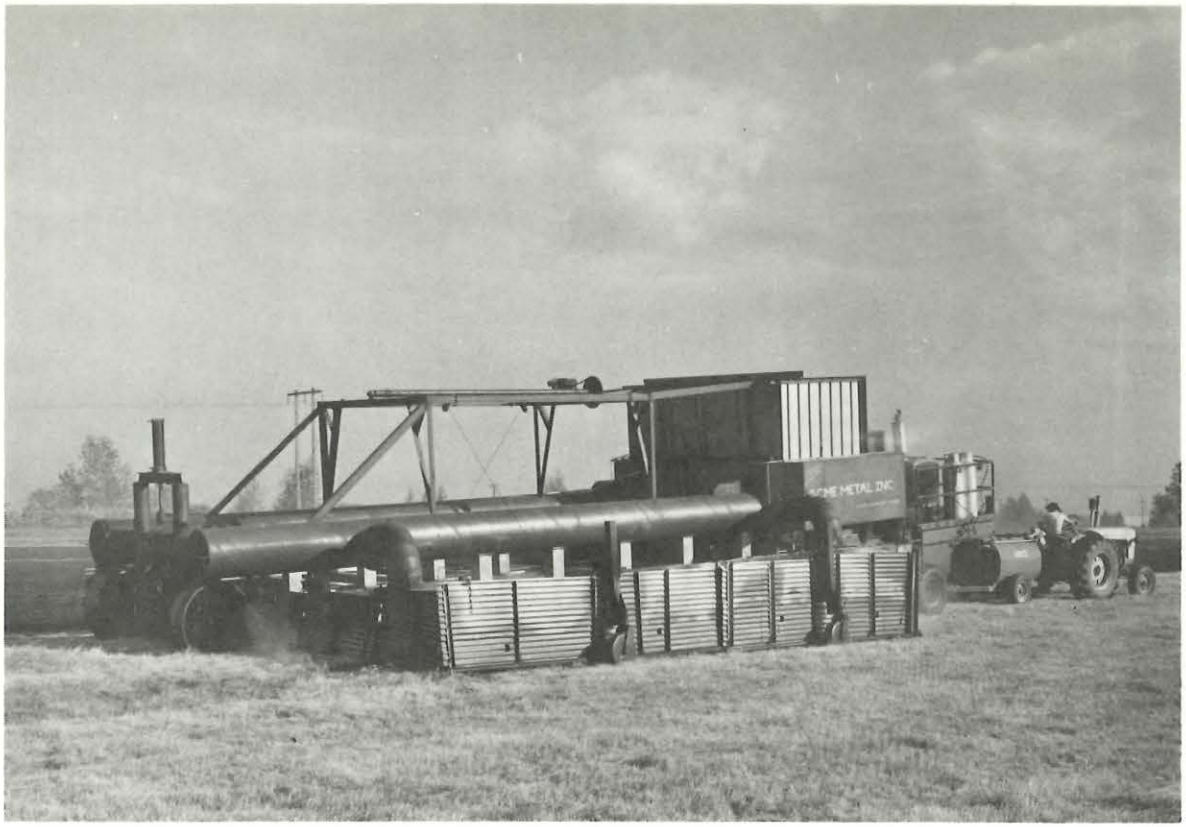
Sanitizer #75-01 (22' wide), modified by addition of deck-cooling Z plenums and fan and "crazy wheel" wing supports, burning a heavy growth perennial ryegrass in 1976.

Sanitizer #75-02 (24' wide), with multi-air-bar deck being stack-emission tested on perennial ryegrass field in 1976.

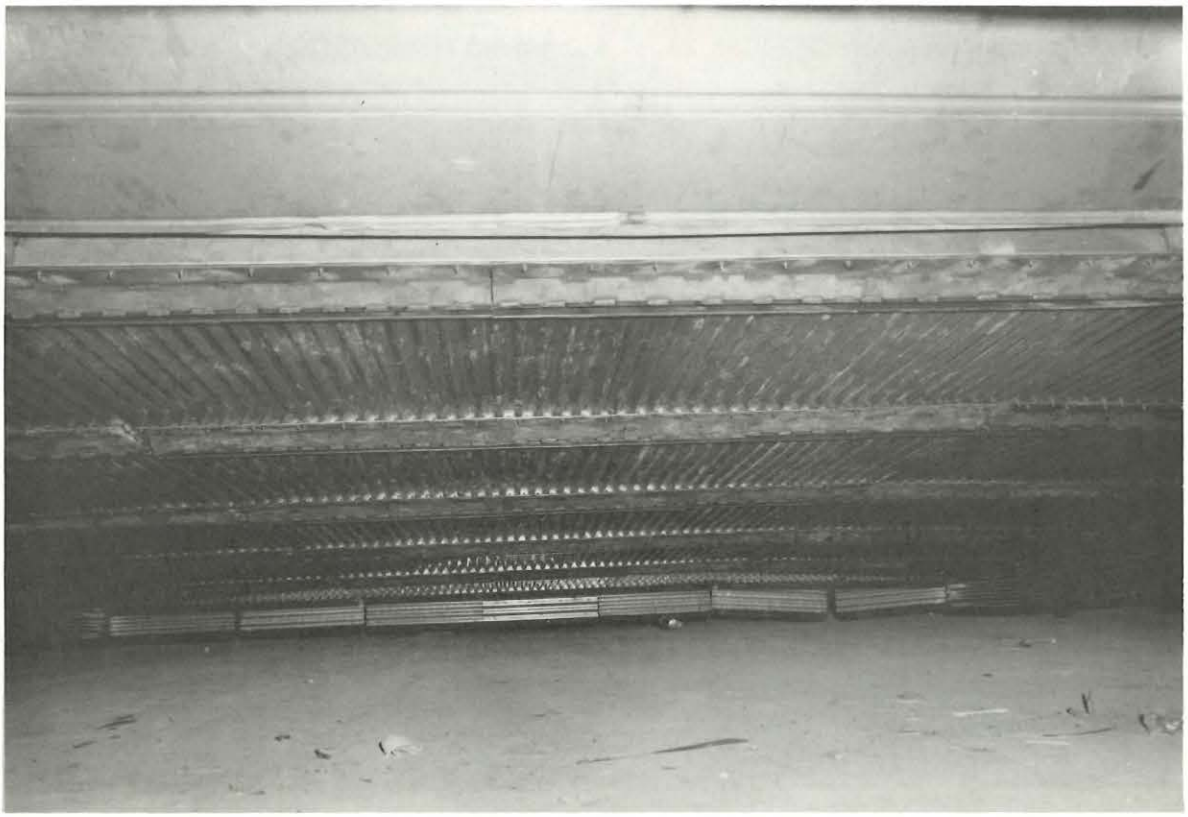
Sanitizer #75-03 (22' wide) with new s/s skins sanitizing a very well-prepared fine leaf perennial ryegrass field, averaging 4A/Hr for 36 Acres, in 1976.

Experimental Prototype #75-04 (10' wide) with revised deck test burning a 5.3 Tons/Acre wheat stubble field in 1976.

Chain drag which very substantially reduced after-burn on most grasses.



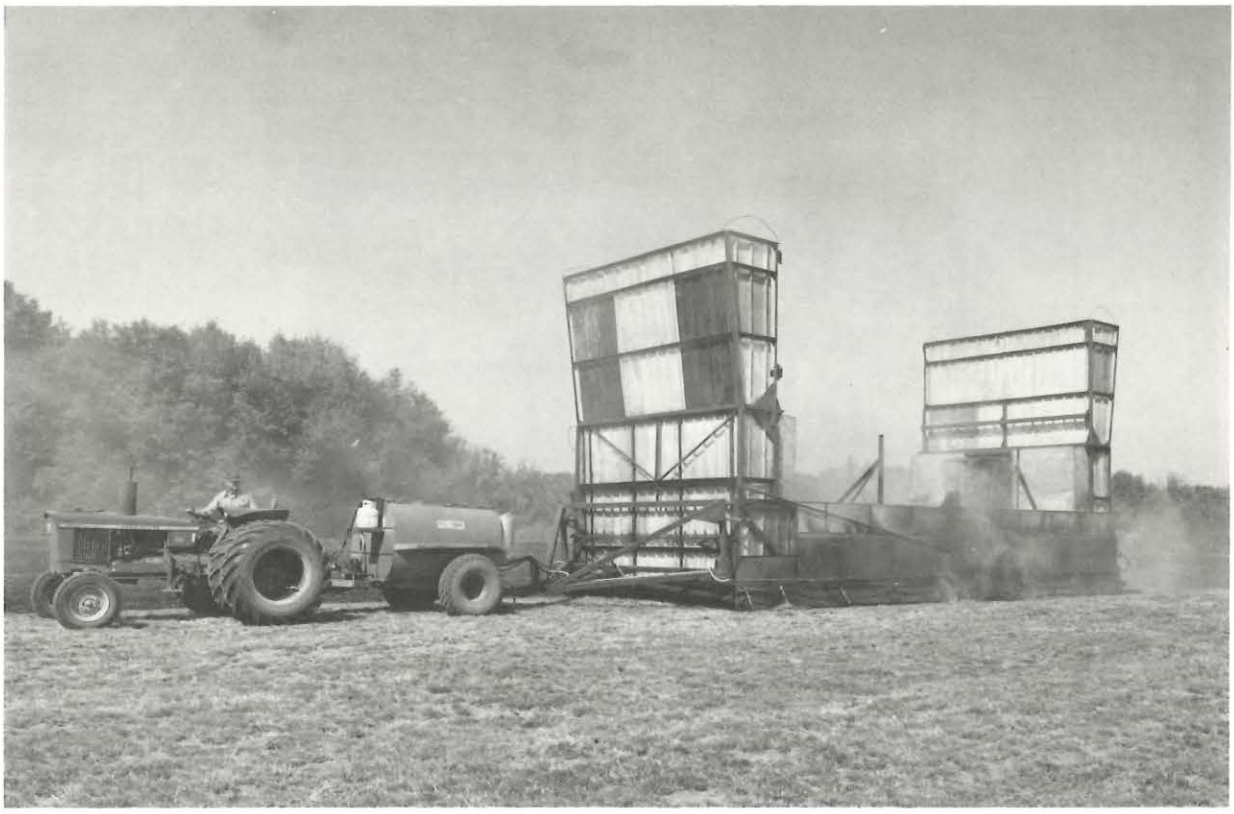
Sanitizer #76-05 (32' wide), one of the two new large "flat-land" models built for 1976 burning a well-prepared but high moisture bentgrass field.



Looking under the cooled-corrugated deck of #75-02 at the multi-air bars typical of #76-05 and #76-06 also.

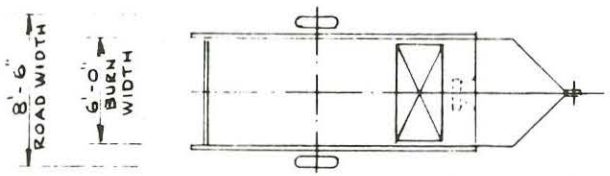
The 10' wide wings on #76-05 being lowered to provide a 32' burning width. Water-cooled steel wheels replace the rear tires used for road travel.

A rear view of the sanitizer ready for the road (15') showing variable height and hydraulic articulated steering mechanisms.



Everett Hunton operating his 2-stack 16'x40' sanitizer, one of three built by Rear's Mfg. Co. in 1975. Don Fisher owns and operates the other two.

Continuing Committee and OSU work on close or crew-cutting to remove stubble, virtually only alternate to field burning, Marvin Ringsdorf used 1976 model designed by Rears Mfg. Co.



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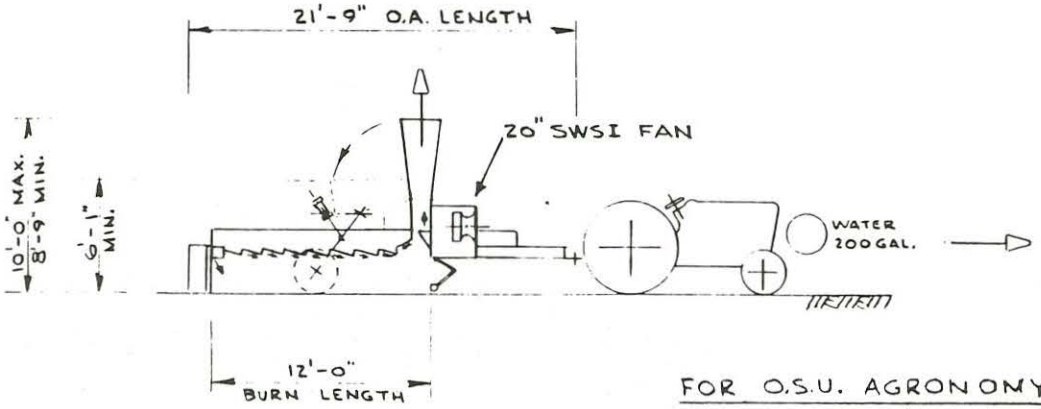


SIDE ELEV.

FOR O.S.U. AGRONOMY - NEW '76

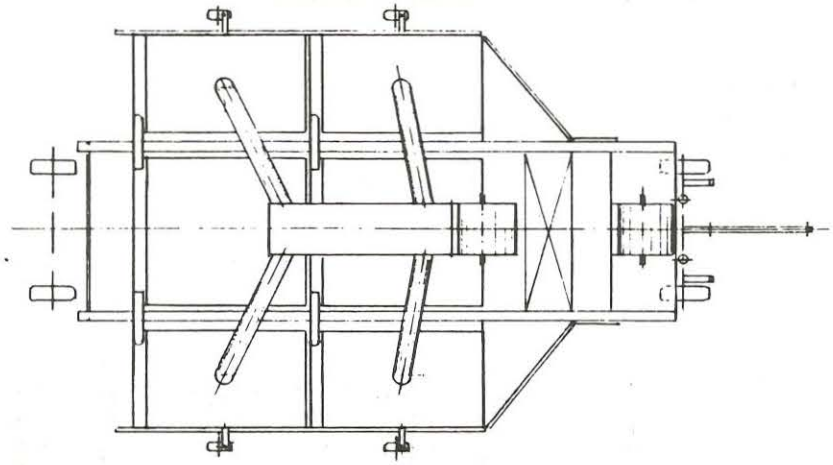
6' WIDE X 12' LONG BURN - 8'-6" ROAD WIDTH
INDUCED DRAFT STACK (SLOTS)
"Z" PLENUM DECK - ONE AIR BAR - 16 HP
VARIABLE HEIGHT AND ANGLE
WEIGHT 4300#

THOMAS R. MILES
CONSULTING ENGINEER
P. O. Box 216 Beaverton, Ore. 97005
Phone 503 292-0107

OREGON FIELD SANITATION COMMITTEE - SALEM, OREGON

R.L.B, JULY '76

FIELD SANITIZER 76-PL
"PLOT BURNER" MODEL AS BUILT '76



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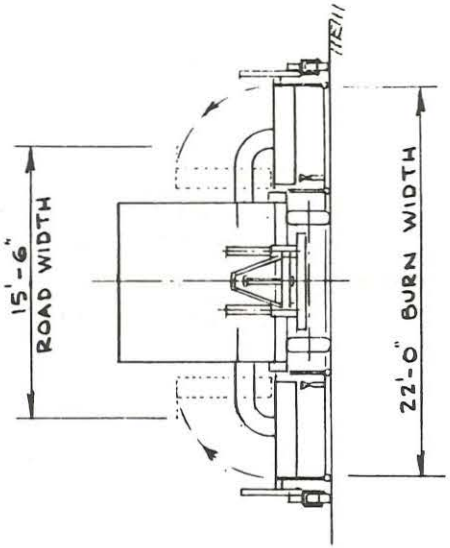

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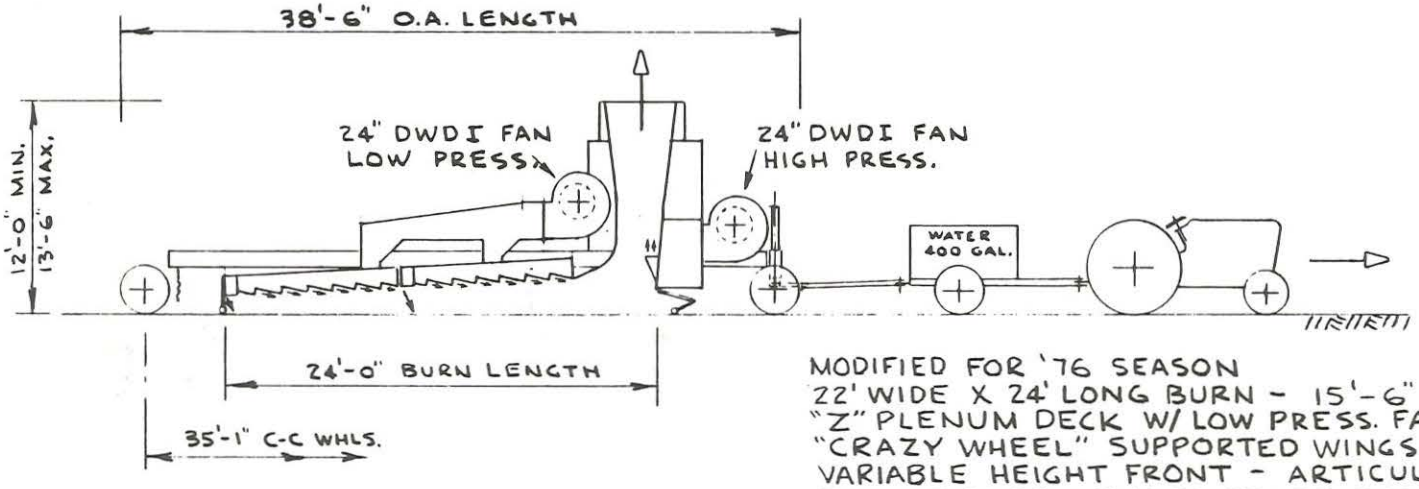

SIDE ELEV.

MODIFIED FOR '76 SEASON
22' WIDE X 24' LONG BURN - 15'-6" ROAD WIDTH
"Z" PLENUM DECK W/ LOW PRESS. FAN - 16 HP
"CRAZY WHEEL" SUPPORTED WINGS
VARIABLE HEIGHT FRONT - ARTICULATED STEERING
TWO AIR BARS - INDUCED DRAFT STACK (SLOTS) - 25 HP FAN
NOMINAL CAPACITY 3A/HR W/ STRAW REMOVED
WEIGHT 16,300# DRAWBAR PULL 1500#

THOMAS R. MILES
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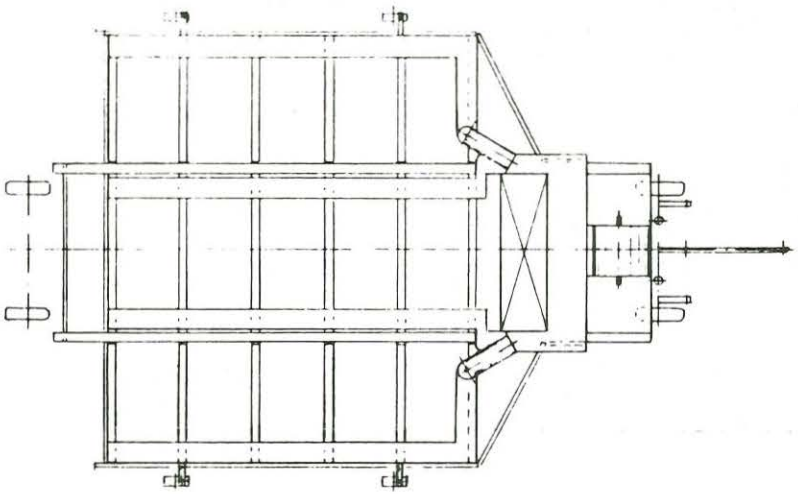
OREGON FIELD SANITATION COMMITTEE - SALEM, OREGON

R.L.B. JULY '76

FIELD SANITIZER 75-01
"DRAGON FLY" MODEL AS MODIFIED '76



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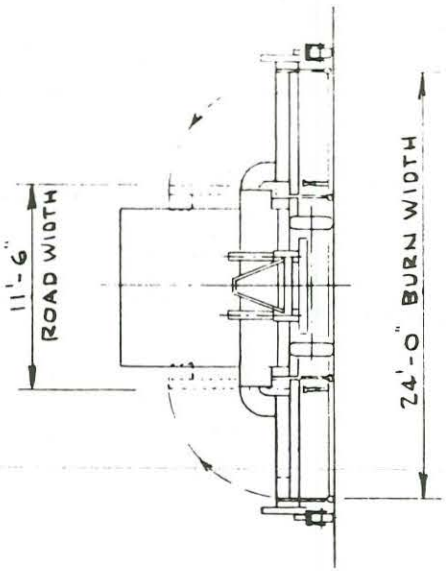

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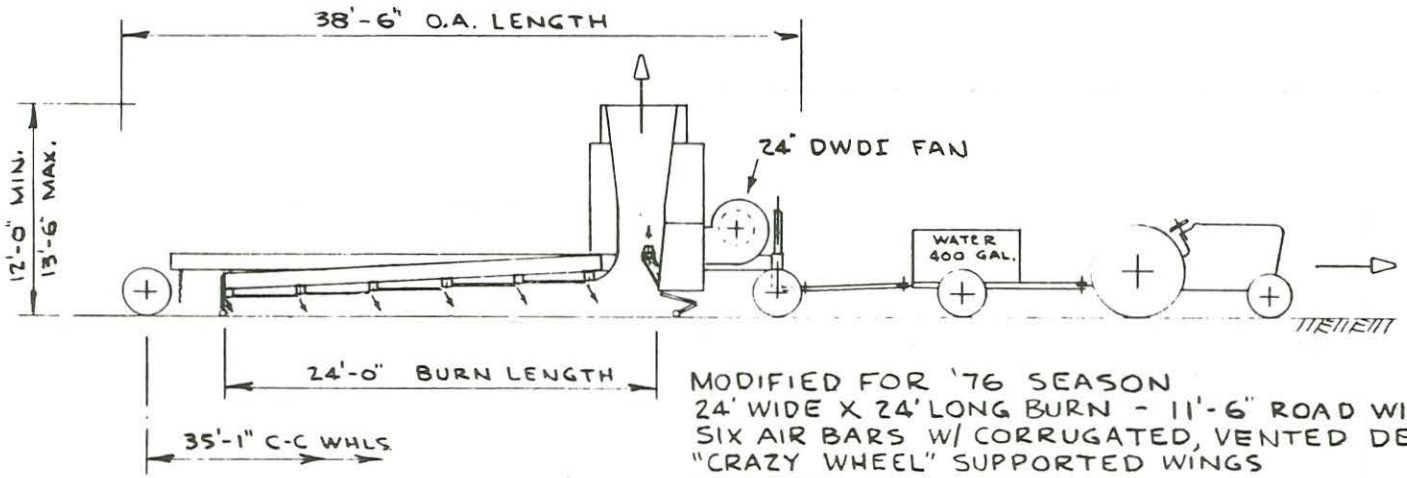

SIDE ELEV.

MODIFIED FOR '76 SEASON
24' WIDE X 24' LONG BURN - 11'-6" ROAD WIDTH
SIX AIR BARS W/ CORRUGATED, VENTED DECK
"CRAZY WHEEL" SUPPORTED WINGS
VARIABLE FRONT HEIGHT - ARTICULATED STEERING
INDUCED DRAFT STACK (JETS) - 25 HP ON FAN
NOMINAL CAPACITY 3.3 A/HR. W/ STRAW REMOVED
WEIGHT 13,700 # DRAWBAR PULL 1500#

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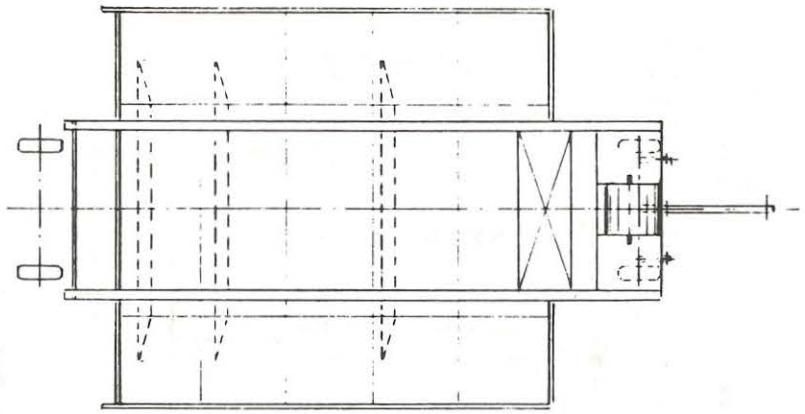
OREGON FIELD SANITATION COMMITTEE - SALEM, OREGON

R.L.B. JULY '76

FIELD SANITIZER 75-02
"DRAGON FLY" MODEL AS MODIFIED '76



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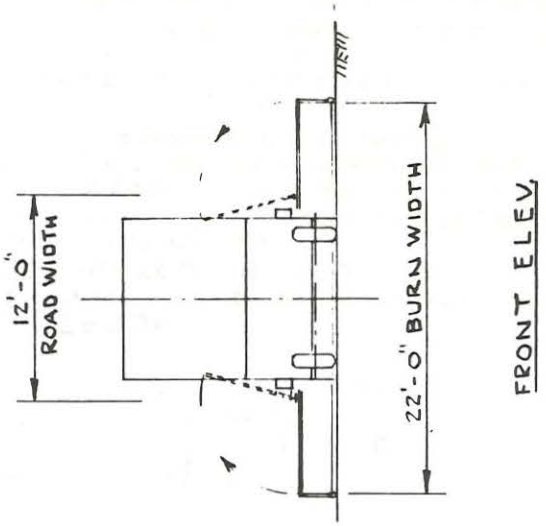

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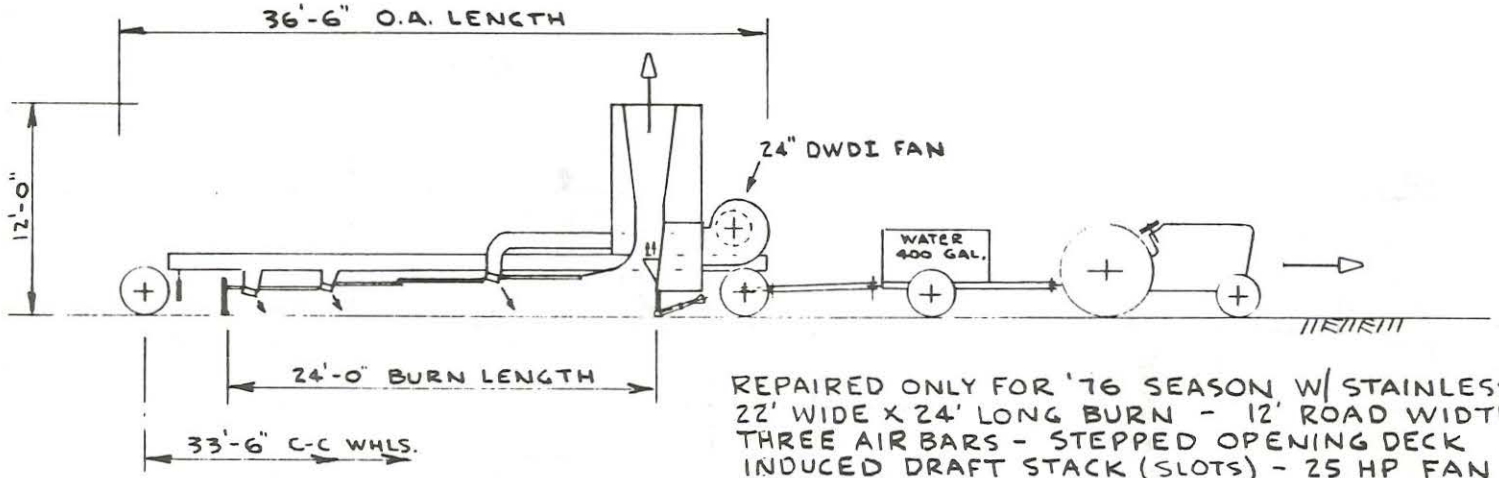

SIDE ELEV.

REPAIRED ONLY FOR '76 SEASON W/ STAINLESS DECK SKINS
22' WIDE X 24' LONG BURN - 12' ROAD WIDTH
THREE AIR BARS - STEPPED OPENING DECK
INDUCED DRAFT STACK (SLOTS) - 25 HP FAN
ARTICULATED STEERING
NOMINAL CAPACITY 3A/HR W/ STRAW REMOVED
WEIGHT 9200* DRAWBAR PULL 1200*

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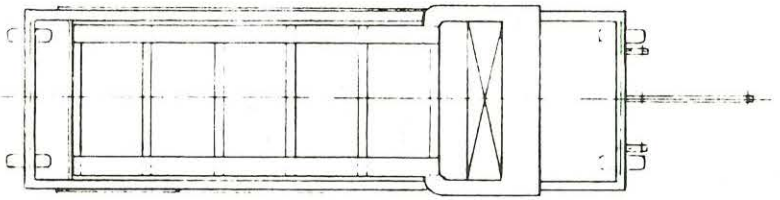
OREGON FIELD SANITATION COMMITTEE - SALEM, OREGON

R.L.B. JULY '76

FIELD SANITIZER 75-03
"DRAGON FLY" MODEL AS MODIFIED '76



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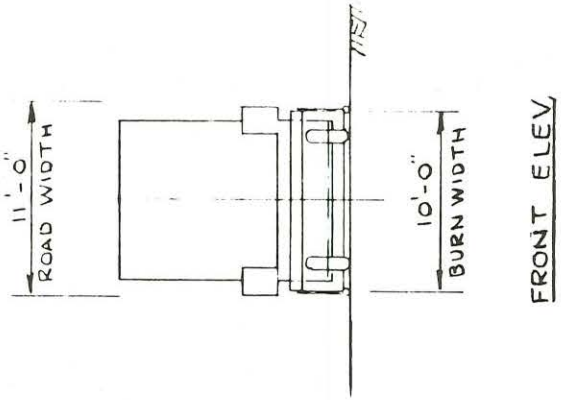
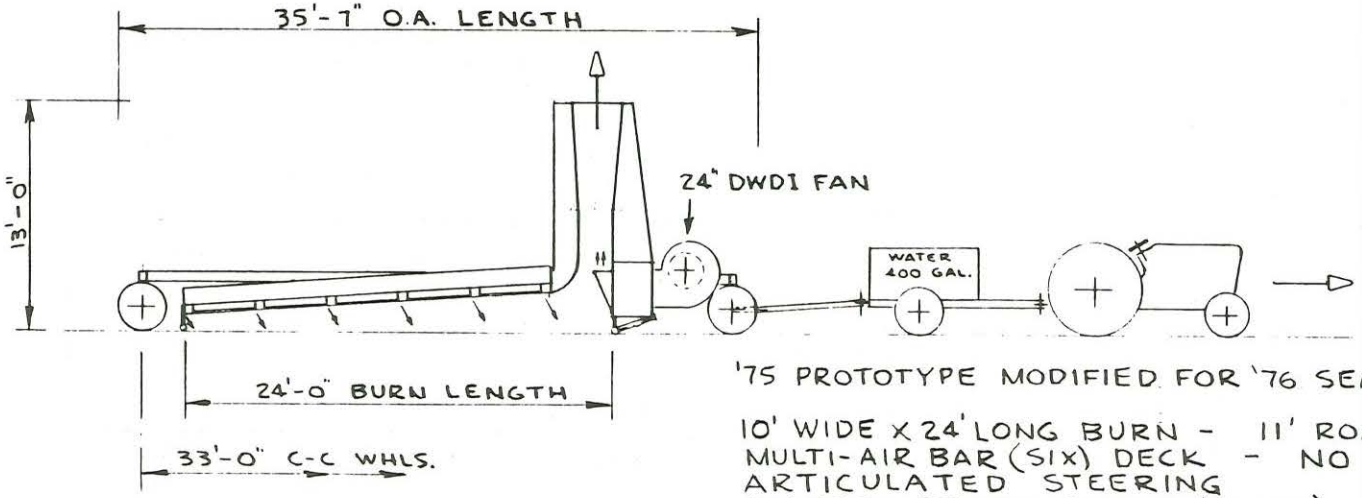


FRONT ELEV



SIDE ELEV.

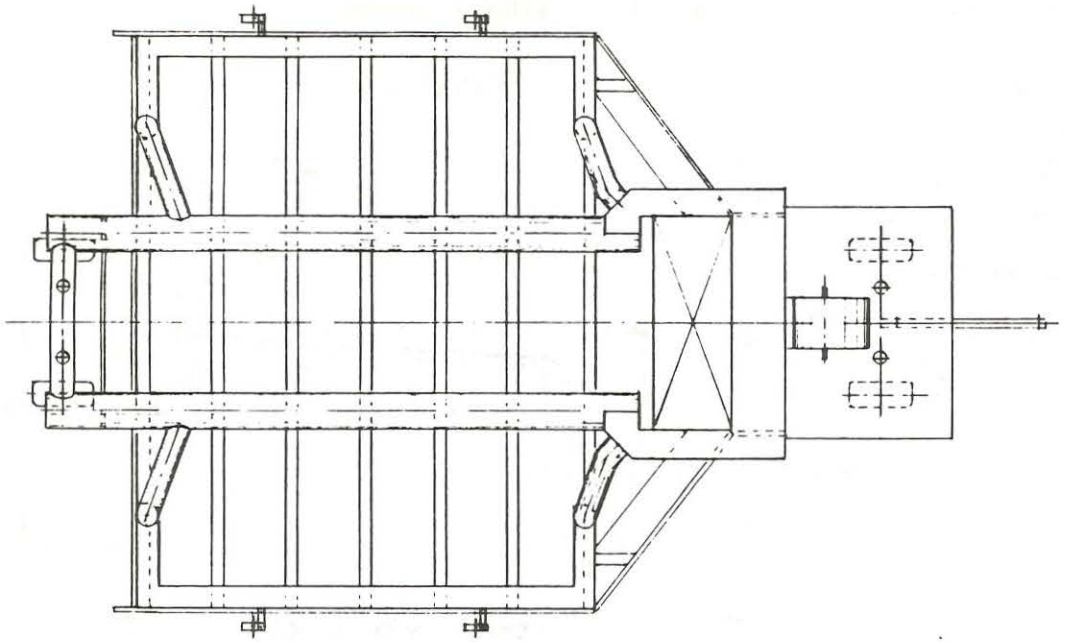
'75 PROTOTYPE MODIFIED FOR '76 SEASON TO MULTI-AIR BAR PROTYPE
10' WIDE X 24' LONG BURN - 11' ROAD WIDTH
MULTI-AIR BAR (SIX) DECK - NO WINGS
ARTICULATED STEERING
INDUCED DRAFT STACK (SLOTS) 25 HP ON FAN
NOMINAL CAPACITY 1.3 A/HR. W/ STRAW REMOVED
WEIGHT 7100 # DRAWBAR PULL 1000#

THOMAS R. MILES
CONSULTING ENGINEER
P. O. Box 216 Beaverton, Ore. 97005
Phone 503 292-0107

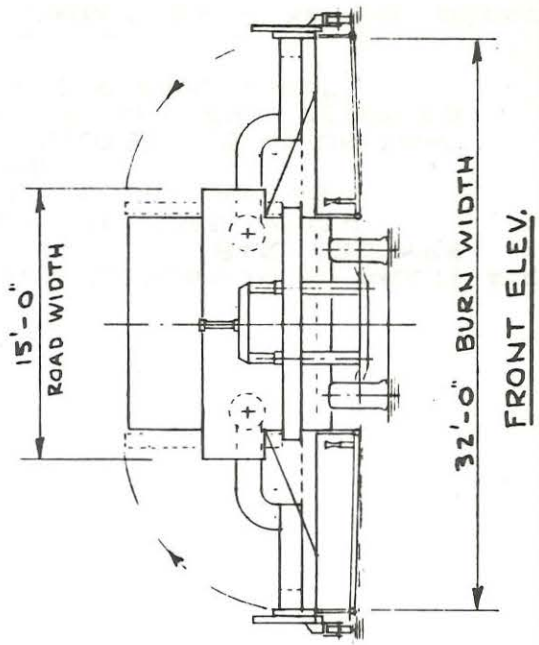
OREGON FIELD SANITATION COMMITTEE - SALEM, OREGON

R.L.B. JULY '76

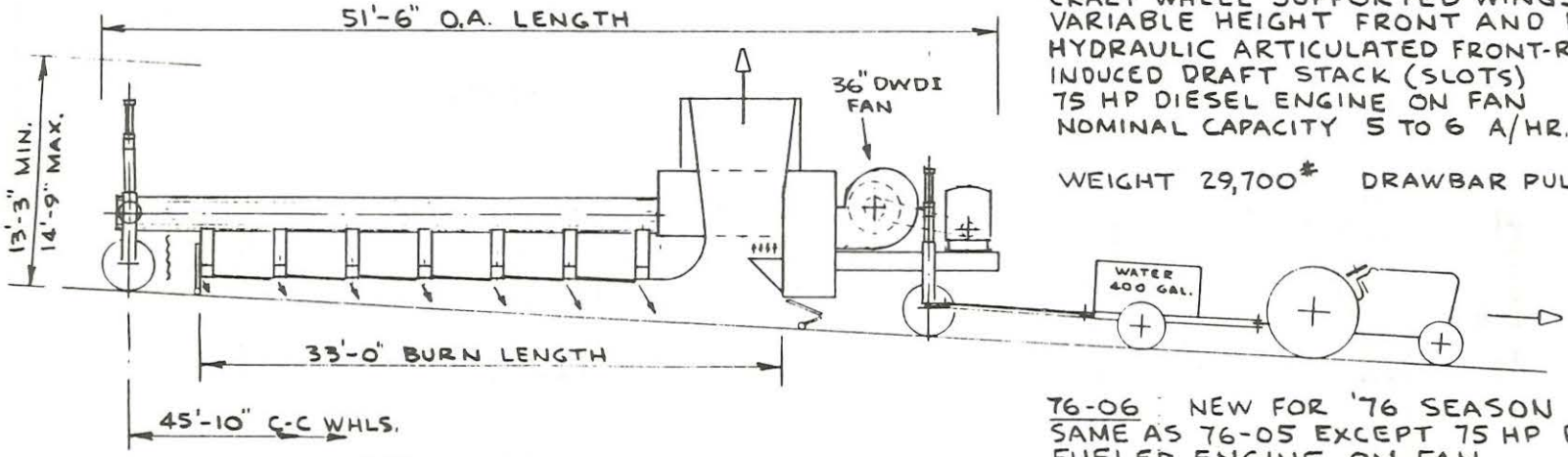
FIELD SANITIZER 75-04
"PROTOTYPE" MODEL AS MODIFIED '76



PLAN



FRONT ELEV.



SIDE ELEV.

76-05 NEW FOR '76 SEASON
32' WIDE X 33' LONG BURN - 15' ROAD WIDTH
SEVEN AIR BARS W/ CORRUGATED, VENTED DECK
"CRAZY WHEEL" SUPPORTED WINGS
VARIABLE HEIGHT FRONT AND REAR
HYDRAULIC ARTICULATED FRONT-REAR STEER'G
INDUCED DRAFT STACK (SLOTS)
75 HP DIESEL ENGINE ON FAN
NOMINAL CAPACITY 5 TO 6 A/HR. W/STRAW REMOVED
WEIGHT 29,700# DRAWBAR PULL 2250#

76-06 NEW FOR '76 SEASON
SAME AS 76-05 EXCEPT 75 HP PROPANE FUELED ENGINE ON FAN.

THOMAS R. MILES
CONSULTING ENGINEER
P. O. Box 216 Beaverton, Ore. 97005
Phone 503 292-0107

OREGON FIELD SANITATION COMMITTEE - SALEM, OREGON

R.L.B. JULY '76

FIELD SANITIZERS 76-05 AND 76-06
"CONDOR" MODELS AS BUILT '76

LOG OF SANITIZERS 1976

Sanitizer #75-01
22' x 24'
1975 Model
Revised
Bid 6 25

Delivered
Mt. View
Farm 8/9
Monmouth

Wet

H. POPE, Mt. View
Tetraploid Ryegrass
45 Acres
1.9 T/A
24% M C
25 Hours
1.8 A/H
3.4 T/H

NK 200
Per. Rye.
50 A Field
3 A Burn
1.3 T/A
52% M C
3½ Hours
0.85 A/H
1.1 T/H

HECTOR
Manhattan
Per. Rye.
18½ Acres
2.4 T/A
53% M C
14½ Hours
1.2 A/H
3. T/H

ASHLING
Or.Grass
Full Straw
5 Acres
5.1 T/A
24% MC
.5 Hours
2 A/H
10.2T/H

Repairs

VanLEEUWEN
Orchard-
grass
27 Acres
3.8 T/A
26-34%MC
12 Hours
2.25 A/H
8.5 T/H

Wet

VanLEEUWEN
Pennfine
Per.Rye.
5 Acres
3.7 T/A
52%MC
5 Hours
1 A/H
3.7 T/H

ROSE
Manhattan
Per. Rye.
25 Acres
3.1 T/A
41%MC
13½ Hrs
1.85A/H
5.75T/H

ROSE
With 02 & 03

#75-01
Stored
Molalla

In Tandem

Sanitizer #75-02
24' x 24'
1975 Model
Revised
Bid 6/25

Delivered
Tangent
8/10

Wet

CONRAD
Full Straw
Annual Rye.
Ring-burn
5½ Acres
4 T/A
16% M C
9½ Hours
0.5 A/H
2.3 T/H

Fawn Tall Fescue
50 Acres
4.1 T/A
60-38%MC
50 Hours
1 A/H
4.1 T/H

JENKS
NK 100
Per.Rye.
20 Acres
2.2 T/A
39% M C
10 Hours
2 A/H
4.4 T/H

JENKS
NK 100
Per.Rye.
40 Acres
2.2 T/A
39% MC
14 Hours
2.8 A/H
6.3 T/H

Fescue
.2 A
2T/A
2 Hr
ø

Wet

Pennfine
Per.Rye.
5 Acres
3.7 T/A
52% M C
5 Hours
1 A/H
3.7 T/H

ROSE
With 01 & 03

#75-02
Stored
Molalla

Sanitizer #75-03
22' x 24'
1975 Model
With s/s Deck
Bid 5/10

Delivered
6/15 but
too rainy
for trial

HECTOR
Orchardgrass
Hay
10 Acre Field
2.2 Tons/Acre
45% Moisture
4 Hours Burn
2.5 Acres/Hour
5.5 Tons /Hour

Perennial
Ryegrass
32 Acres
0.75 T/A
25% M C
28 Hrs
1.5 A/H
0.85 T/H

Orchard-
grass
34 Acres
2.25 T/A
22% M C
30 Hours
1.13 A/H
2.5 T/H

DANNEN
Blue-
Grass
12 A
2.2T/A
19%MC
6 H
2. A/H
4.4T/H

DeCONINCK
Pennfine
Per.Ryeg.
40 Acres
2.2 T/A
37% M C
11 Hours
3.6 A/H
8.0 T/H

ROSE
Citation
Per. Rye.
70.5 Acres
3.2 Tons/A
34% M.C.
34½ Hours
2.0 A/H
6.5 T/H

Repair

WEISZ
Citation (2)
Per.Ryegrass
22 | 22 A
1.9 | 2.6 T/A
25% | 30% MC
14 | 9 Hours
1.6 | 2.4 A/H
3 | 6.3 T/H

OWRE
Manhattan
Per. Rye.
11 Acres
46 T/A
35% M C
7.5 Hrs
1.5 A/H
6.75 T/H

Blue-
grass
4 A
2.7T/A
37%MC
4 H
1 A/H
2.7T/H

Repair

Wet

OWRE
Man. Cit.
P.R. Per.
17 A
4.9T/A
47%MC
11 H
1.5A/H
7.6T/A

ø
too
wet

POHLSCHNEIDER
Merion
Bluegrass
46 Acres
1.9 T/A
41-48% MC
11 Hours
4.18 A/H
8.1 T/H

Merion
Bluegrass
36½ A
1.2 T/A
35% MC
30 H
1.8 A/H
3.5 T/H

POHL.
Newport
Bluegrass
36.5 A
1.2 T/A
35% MC
21½ H
1.7 A/H
2.7 T/H

ROSE
Repairs required,
made by grower then
machine in use by him

ROSE
With 01 & 02

#75-03
Stored
Molalla

#75-03&75-04
together
on field

In tandem

In Tandem

Sanitizer #75-04
10' x 24'
1975
Prototype
Revised

Delivered
6/30 to
North Valley
but no fields
harvested

NORMARC - 120 A
Gulf Annual Ryegr.
Test burn borders
Full Straw
8 Acres
6.5 T/A
13% MC
24 Hrs
0.3 A/H
2.2 T/H

Repairs

WEISZ
Fescue
20 Acres
2.0 T/A
22% M C
31 Hours
0.65 A/H
1.3 T/H

8A | 5A
1.9 | 2.6 T/A
25% | 30% MC
9H | 7 Hours
0.9 | 0.7 A/H
1.7 | 1.8 T/H

Wheat
13 A
5.3T/A
Wet
14½ H
0.9A/H
4.8T/H

6 A
4.6
35%
6 H
1A/H
4.6

16 A
2.7T/A
37%MC
19 H
0.85
2.27

POHLSCHNEIDER
Pennfine Perennial
Ryegrass - Could
not burn field due
to rain and wind.

.5 A
1.2 T/A
35% MC
1 Hour
0.5 A/H
0.6 T/H

FUNRUE
Bentgrass
3.5 Acres
4.7 T/A
47% M C
8 Hours
0.4 A/H
2. T/H

Continued in use by grower on bentgrasses

#75-04
Stored
Silverton

Daily record

First Seed Harvested 2 Weeks Late (July 18)

Last Seed Harvested (Bentgrass) (October 3)

DATE		Temp. Hi/Week	Lo/Week	Rainfall	Machine in Use	DEQ Quota North	DEQ Quota South
JULY 1				.30			
2			42				
3		78					
4	Su			.15			
5							
6		85			B		
7							
8			52	.56			
9							
10							
11	Su			.12			
12				t	B		
13			45	.05	B		
14					B		
15					B		
16		93			B		
17					B		
18	Su		43		B		
19					B	1N	2S
20					B		1S
21					B	1N	
22					B	1N	
23					B	1N	
24		86			B		
25	Su					1N	
26			47		B		
27					B		
28					B	1N	
29		89			B	2N	
30					B	1N	1S
31				t		1N	
AUGUST 1	Su				B		
2				t	B		
3				t	B		½S
4		82			B		
5					B	1N	
6			50	.10	B	1N	2S
7				.96		1N	1S
8	Su			.48		1N	
9				t			Issued, unused, wet
10							
11					B		
12		85	52	.01	B		
13				.02	B		
14				.10			
15	Su			.64			
16				.44			
17				.28			
18					B		
19					B	2N	9S
20				t		1N	1S
21			45			1N	
22	Su	80					2S
23					B		3S
24					B	1N	
25				.47			
26			44			2N	¼S
27					B	1N	
28					B		
29	Su						
30		90			B		
31					B		
SEPTEMBER 1					B		
2					B	1N	
3					B		
4					B		
5	Su La						3S
6				.25		1N	
7			40	t		2N	
8						2N	
9					B	¼N	
10					B		
11		89			B	1N	2S
12	Su			.30		1N	1S
13			46	.30		3N	2S
14				.57		1N	1S
15				t		1N	
16		79		.02			
17				t		1N	1S
18						1N	
19	Su					1N	
20					B	2N	2S
21		87			B	1N	1S
22				.01		1N	1S
23							
24			46		B		
25					B		
26	Su	82					
27					B		
28					B	1N	
29					B		
30					B		
OCTOBER 1			50				
2				.02		1N	1S
3	Su			t		1N	1S
4			37	.01	B	1N	1S
5				.01	B		
6					B		
7					B	1N	
8		81			B	1N	1S
9					B		
10	Su			.23			
11				.05			
12					B		
13		73	38		B		
14					B		
15					B		
16					B		
17	Su	69	32		B		
18					B		
19					B		
20					B		
21							
22							
23							
24	Su						
25		59	43	.45			

JULY AUGUST SEPTEMBER OCTOBER

Sanitizer #76-05
32' x 33'
New 1976
Bid 7/9

NICEWOOD
Bentgrass
40 Acres
2.5 T/A
52% M C
14 Hours
2.8 A/H
7. T/H

NICEWOOD
Bentgrass
68 Acres
3.2 T/A
46-49%MC
27½ Hrs
2.5 A/H
7.9 T/H

Repairs

Wet

HECTOR
Manhattan Perennial
Ryegrass
90 Acres
3. T/A
48% M C
24 Hours
3.75 A/H
11.25T/H

#76-05
Stored
Suver

Sanitizer #76-06
32' x 33'
New 1976
Bid 7/9

RINGSDORF
Linn Perennial
Ryegrass
48 Acres
2.2 T/A
46% M C
29 Hours
1.6 A/H
3.6 T/H

Repairs

VENELL
Highland
Bentgrass
43 Acres
5 T/A
31% M C
18 Hours
2.4 A/H
12 T/H

#76-06
Stored
Corvallis

THOMAS R. MILES
CONSULTING ENGINEER
P. O. Box 216 Beaverton, Ore. 97005
Phone 503 292-0107

OPERATION ECONOMICS

Early investigators established a target cost of sanitizing of $6.00/acre (1970). This estimate was changed to $10.50/acre in our 1974 report. During the past two years costs have risen greatly and we finally have some field operating data to use in again projecting costs.

The basis of calculating costs establishes the validity of the numbers. In the past most estimates, including ours, have been built "up" on an hourly cost basis. From our 1976 season experience we find a broader data base is more realistic and we can work "around" to an hourly rate if desired.

Since a farmer's season is a definite increment of time, input and output of effort and dollars, a season offers a more valid measure.

This 1976 season, and others, have taught us that the 8 weeks from July 15 to September 15 constitute a typical time season within which a normal year will allow seed harvest, straw removal and sanitizing. Weather, crew unavailability and regrowth make later operations only worthwhile in emergency years.

During the 8 week period this summer we averaged 31 hours per week of actual burning - or a total of 248 hours, which at 2.2 acres/hour would cover 550 acres in a season (1974's estimate 600 acres). This included down time for repairs, moving, weather.

Two men are required per machine, one tractor driver and one fire control driver. Working 6 days a week, 9 hours a day or 54 hours per week at $12.00/hour (including 15% SAIF, etc.) for the two totals $5184.00 for the season - call it $5200/year.

The sanitizers and water tank will cost about $25,000 next year (Model #75-03) and require an equal amount in repairs and replacement in 5 years use - or $10,000/year total.

Part time (50%) use of tractor and pick-up fire rig will amount to $2500/year, and fuel for tractor and pick-up $1000/year.

Labor	$ 5,200
Sanitizer & Maint.	10,000
Tractor & Fire Rig	2,500
Fuel	1,000
Total Season Cost	$18,700

or for a 1976 type season of 550 acres - $ 34.00/acre

Since the loose straw must be removed, an additional cost of $8.20/ton or $16.40/acre will operate a stackwagon and burn the stacks.

If a straw market exists, baling will cost $15.00/ton roadsided or $30.00/acre - but be recovered.

The above figures are for the 22' wide model but probably would also apply to the 32' models.

In any case, the ownership and maintenance costs appear to be over 50% of the total cost, since a machine may burn more acres in a season but it also burns out that much faster.

Whether this cost range is feasible for the grower is an individual decision on his part - but will be more readily received if the straw is salable even at collection cost.

The following letter was received from Mr. Don Fisher and represents his experience:

"During the past season Strome-Fisher Farm, Inc. used their Rears sixteen foot mobile field sanitizer to sanitize 85 acres of Manhattan Perennial Ryegrass. To cover these acres we spent 36 hours of operating time when the machine was ignited. During these 36 hours we were using three men all the time and sometimes four. Also three tractors, two sprayers and a tank truck were required. These hours do not include the time spent servicing the machine, making repairs and the many hours spent by people from Rears Manufacturing Company trying to improve the operation of the machine.

"It was our intention to use the machine on more acres but on the 20th of September I suddenly realized that due to the start of Community College we no longer had a crew adequate to operate the machine."

EMISSIONS

Although field sanitizers emit the same variety of air contaminants emitted by open field burning, only particulate matter, which creates both the visible nature of the smoke and provides most of its irritating properties other than odor, has been studied. Other pollutants, including hydrocarbons, carbon monoxide, and nitrogen oxides, are of secondary importance.

Emissions of particulate matter from the 1976 sanitizers were measured and found to be similar to those from 1974 and 1971 machines. Overall average emissions from burner stacks were measured at 18 lb/ton of fuel, or 32 lb/acre at an average fuel loading of 1.8 ton/acre.

Of the total stack emissions, an extensive analysis of particle size suggests that more than 90% are larger than 100 microns (0.10 mm) in particle size, and would typically fall to earth within a few hundred yards of the burner. We believe that less than 1% are smaller than 10 microns, which are small enough to travel as much as 20 miles under typical wind conditions.

In addition to emissions from smoke stacks, burners emit smoke from tops, sides, and smouldering grass behind the machine. Although efforts to measure this particulate matter by sampling techniques were not successful, extensive visual observations lead to our best judgment that these emissions can be roughly approximated as equal to stack emissions of particulate matter under 10 microns in particle size. Using the estimate of 1% of stack emissions smaller than 10 microns, this suggests a fugitive emission rate of 0.2 lb/ton or 0.3 lb/acre.

The combined stack and fugitive emissions for sanitizers are thus estimated to total 18.2 lb/ton or 32.3 lb/acre, while 10 micron particles are estimated at 0.4 lb/ton or 0.6 lb/acre.

Comparable test data obtained on open field burning by Prof. R.W. Boubel of OSU in 1967 and 1968 resulted in a measured average emission of 12 lb/ton of particulate matter, all under 10 microns in size, from fields containing an average of 4 tons/acre. Open field burning thus can be said to emit 48 lb/acre of particulate matter, all smaller than 10 microns in size.

It can thus be concluded that he use of sanitizers results in a reduction of total particulate emission, relative to open field burning, on a per-acre basis of 33%. The reduction in the critical small particles (under 10 microns) appears to be as great as 99%.

This is not to say, however, that the ambient air impact of sanitizer usage is 99% less than that of open field burning. It must be remembered that most open field fire emissions are released at high altitudes under controlled meteorological conditions designed to minimize impacts at ground level. Sanitizers, on the other hand, are intended for daily operation regardless of wind conditions (operational considerations aside), and emit smoke at low altitudes. Only by fairly sophisticated atmospheric dispersion modeling, getting underway at DEQ and OSU at this time, can the detailed impact of machine burning be assessed.

Visible emissions observations during 1976 lead to a conclusion that the 1976 sanitizers can comply with adopted DEQ emission standards dealing with visible smoke, with one exception. The requirement that leakage smoke not exceed 20% of the total visible emissions cannot be met, with it more typically comprising 30 to 50% of the total. Assuming the environmental advantage of sanitizers is sufficient to make their use desirable as a policy matter, it would be appropriate to suggest this particular clause of the DEQ rules be amended to accommodate the machine.

ALTERNATIVES

There has been a lack of understanding regarding "Alternatives" to open field burning. It has been discussed at length in prior reports and is again brought up repeatedly in this report. In order to clarify the various potential alternatives and to briefly evaluate them in terms of costs and results, the following chart has been prepared from the best information we have been able to develop.

It must be understood this simplified chart cannot include all of the fine points, nor can the cost figures be considered absolute. They are those experienced in 1976 or taken from OSU Extension publications prior to 1975. However, particularly for those not familiar with the growing of grass seed, it is intended to serve as a comparative guide to this complex subject.

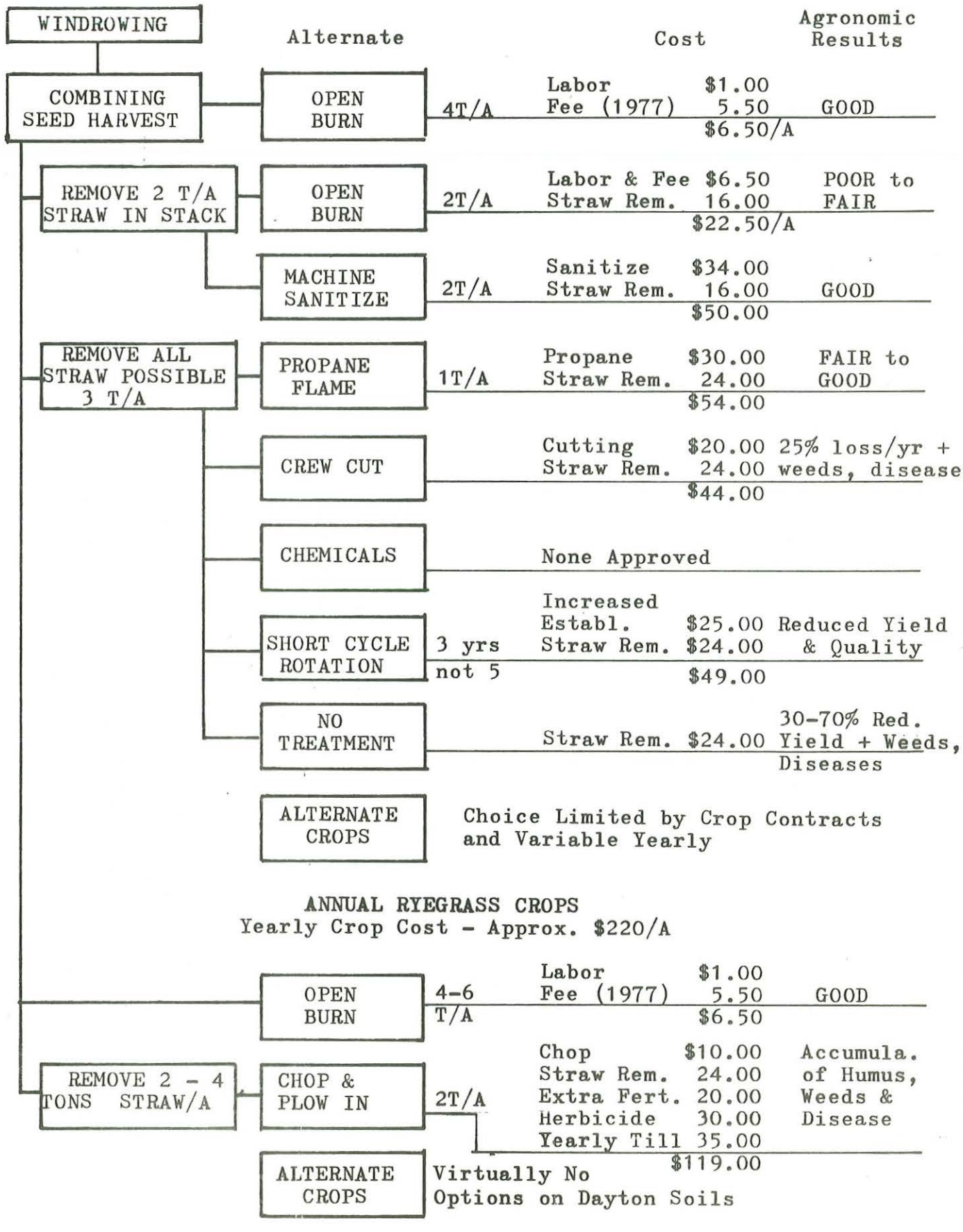
Establishments costs involve the complete cultivation, planting and fertilizing of a new stand of perennial grass which normally stays in for 5 years or more. The annual cost consists of the amortized cost of establishment and the yearly application of sprays, fertilizing and sanitizing - not including seed harvest or straw removal. A shorter period obviously increases the cost of the stand.

Again the chart does emphasize that in terms of present day experience,

> All known alternatives necessitate the removal of approximately 2 Tons/Acre of loose straw - and its utilization or disposal.

ALTERNATIVES TO OPEN FIELD BURNING

PERENNIAL GRASS SEED CROPS
Yearly Crop Cost - Approx. $220-315.00/A



ANNUAL RYEGRASS CROPS
Yearly Crop Cost - Approx. $220/A

STRAW REMOVAL, STORAGE AND TRANSPORT

DISPOSAL of straw residues is one of the principal functions of open field burning. Rapid removal of up to two tons of excess straw per acre following seed harvest is necessary for use of a flamer, mobile field sanitizer, or non-burning cultivation techniques.

Rapid and efficient clean-up of chaff, weed and volunteer seeds is imperative for non-burning attempts at field sanitation. The Committee has tested mechanical removal systems which can aid alternatives to open field burning.

STRAW REMOVAL SYSTEMS include bales, package systems and bulk systems intended for delivery to market or processing; and bulk systems for fieldside burning, or storage for on-farm feed or mulch. These methods and equipment must meet criteria of good field clean-up, rapid removal, maximum shipping density, easy storage and handling, depending on use and destination.

Conventional, high density, round and package baling systems, forage harvesting systems including package bales, stackwagons and field choppers, chaff collecting techniques and a total harvest ("Hot Shot") system have been tested by the Committee.

The Table below summarizes average densities and field rates for some of these systems. The three-wire and high density bales are the most useful available systems but animal feeders would prefer twine or plastic to wire; rapid loading and handling systems are costly, and higher average densities (14#/c.f.) as compared to the conventional 7#-9#/C.F. bales, are required to reach minimum payload weights whenever truck hauling is involved.

Bale systems require auxiliary multi-bale-stack handling equipment such as bale stackers, and stack loaders at both ends of each haul, which is currently a problem at odd destinations. Freeman and New Holland stackwagons and "squeeze" and Steffen loaders have been useful.

As illustrated by the following comparison chart, the 3-wire bale is the most promising package for reaching the 14#-15#/c.f. range. We feel it wiser to work toward improving existing equipment than to strike off anew - especially with Freeman right here at hand - so we should encourage work on balers. Virtually all of the equipment in the Valley already involves balers of one sort or another.

PACKAGE BALE SYSTEMS used in forage harvesting in the Midwest have not been successful for grass straw residues. Most forage harvesting equipment has been developed for hay. Used on the lighter, stiffer straws, it will usually produce only .6 as much by weight as hay, viz. the "Rollastack". The round bale and Howard bigbale have low bulk densities, low field rates and do not integrate readily into grass straw markets, storage and transportation systems.

STRAW REMOVAL SYSTEMS

SYSTEM	DENSITY #/CF	PACKAGE SIZE #	AVERAGE FIELD RATE T/Hr	A/Hr
Standard Bale				
2-wire/twine	7 - 10	80	8 - 10	4 - 5
3-wire high density	12 - 15	120	8	4
Round Bale (7')	5.5	1200	3	1.5
Howard Bigbale	5	1000	11	5.5
Stackwagons (14')				
J.D. 200	2.5	2500	6 - 8	4
Rollastack (bentgrass)	3.5	3800	9	4.5
Field chop w/ Compression Wagon J.D. 5400 w/Keith Foster Compression Trailer	6	8800	4	2.5

A WHOLE HARVEST experiment using the round bale was tried in 1974 and found by us to be too tight for green hay-straw materials, resulting in as much as 140° F internal temperatures which was reflected in substantially reduced seed germinations. Also, the "unwinding" of the round bales into the stationary combine was very difficult. There is some promise in using the less dense stack wagon "loaf" for the Whole Harvest scheme, however.

STACKWAGONS have been useful in priority areas and flat fields where field burning is severely limited, for field-siding and self-storage. Field rates are similar to bale systems; densities are much lower, stacks are not readily handled, but store well. Stacking systems are designed for on-farm uses or close-by uses, 1 to 4 miles, or for incineration of straw.

A continuous field stacker was tried in 1976 (Rollastack) which had a slightly higher field rate but doubtful storage longevity. Mr. Gene Luscombe was interested enough to bring his newly developed Rollastack out from Armstrong, Iowa this season to try on our straw. His system of chopping, spreading and rolling while loading was promising but he was dismayed as we have been to find our stiff, light straw didn't pack or hold together as well as the hay he was used to. Anyway, we appreciate his efforts and active interest.

Generally, the fast field removal and self-storing characteristics of stacks are very attractive for certain on-farm or nearby (1-4 mile) uses or processing or disposal by incineration. This fall we have burned some 250 or more stacks put up in 1975 with a John Deere 200 and found them in good condition. Stack handling needs considerable attention and improvement but will prove worth it.

FIELD CHOPPING is another alternative for short haul delivery and field removal. A John Deere 5400 forage harvester has been used with Keith Foster compression trailers to supply chopped straw to pellet manufacturers during 1975 and 1976. The system requires two or more compression trailers and an extra truck to allow simultaneous chopping and hauling.

CHAFF RECOVERY equipment includes wagons or vacuum type trailers for use behind the combine. Although the material is useful for pelleting these systems do not contribute sufficiently to either field sanitation or rapid straw disposal and are not used extensively. The Haybuster chaff wagon, Chaffsaver, and Davis vacuum have been tried by the Committee. Of them all, the Chaffsaver appears to be the most practical in placing the chaff on top of the windrowed straw for efficient pick-up by balers or stackwagons with the straw.

STRAW STORAGE

STRAW STORAGE continues to be minimal in the Willamette Valley. Open storage of bales is used in summer while materials are being transported. Existing storage sheds are used for equipment as straw inventories are sold. Storage facilities cost approximately $3.00/square foot or $40.00/ton/year capacity, or $5.00/ton/year. Recently a grower in Suver constructed a $70,000 shed to store 2000 tons. Financing storage facilities is difficult for straw producers or handlers. Pollution abatement tax relief intended to encourage storage facilities has not been generally obtained. Most growers prefer sheds that can be used for a multitude of purposes such as equipment storage.

In some instances a combination of stacks for early use stored outside and covered bale storage for January-June use is practical.

OPEN STACK STORAGE of chopped straw proved practical during 1975 and 1976. A snow plow was used during 1976 to assist forming large outside stacks. Field rates are slower than conventional baling systems, investments are higher, and densities are one-third to one-half that required for a payload weight for transportation. Snow plow forming of 400-ton stacks for storage is inadequate because of high horsepower consumption and inadequate material control.

Although when it is put into a large smooth conical pile, chopped straw thatches and keeps well, it must not be disturbed on the surface for rain to penetrate and spoil a large area. This is a particular problem with today's thoughtless vandalism - and 'possums.

And in the final analysis it must be piled at its use point. One cannot afford to reload and haul this light material (3# - 4#/cubic foot) from a pile.

TRANSPORTATION

TRANSPORTATION of straw now is limited primarily to supplying pellet mills or feed users. Equipment is usually double 27' trailers owned by independent truckers or straw merchants. Minimum payload densities of 13#/c.f. are required for straw. Many are well below these densities. Maximum hauling for standard bales is approximately 250 miles. Truckers prefer rapid package loading equipment causing additional investment for straw handlers.
See FEEDS - Storage and Transportation.

STRAW UTILIZATION

THE COMMITTEE has the responsibility under the 1975 law to monitor and conduct programs for the development of feasible alternative methods for the utilization and disposal of straw residues generated by using alternatives to open field burning. The nature of these programs is partly determined by existing patterns of straw utilization, research conducted up to 1975 which identified market and technical feasibility of several products, and the need to find a market for straw to offset the added costs of straw removal and disposal. In March 1976 the Committee adopted the policy to give priority to the development of products which offer the most immediate outlets.

GRASS STRAW PROMOTION

THE PRIMARY EXISTING MARKET for straw is for roughage to feed cattle, dairy cows and horses. Up to 50,000 tons of straw have been sold each year to these markets in recent years. A second market is the use of straw as mulch for erosion control. This market has amounted to about 4,000 tons each year. During the past two years the consultants have sought to expand these markets by means of increased organization of growers and straw handlers, feeding trials using different forms and types of straw products at OSU and by volunteer farmers in the field, the development of commercial processing plants, direct promotion, and directed research.

A Straw Association composed of growers and straw merchants was established in 1975 called Agricultural Fibers Association. This has provided a regular forum for discussing methods, equipment and financing for straw removal, storage and transportation. A member company of this organization was also organized called Environmental Fibers, Inc. Through these organizations growers and straw merchants seek to avoid competing with eachother but instead to develop new methods and markets for straw sales and to meet the needs of market development. Members are active in using new methods for straw handling.

Each year for the past five years Committee-sponsored feeding trials have been carried out at Oregon State University using 25-85% grass straw in rations for cattle, sheep, horses and dairy animals. Two other feeding trials were carried out in 1975-76 using straw with liquid supplements in Polk and Lake Counties. These trials have led to better knowledge of how to feed straw, afforded field exposure to grass straw and increased usage up to 1000 tons per year in these areas.

A MARKET FOR PROCESSED STRAW developed in Japan from more than five years of preparatory investigation, promotion and directed research following on Oregon Trade Mission. During 1975 the Committee was able to transfer the NaOH straw cubing technology it had developed at the Straw Utilization Center to a private company to satisfy this market. A production facility costing $300,000 was constructed to produce 10,000 tons per year of sodium hydroxide treated straw.

Production began in November 1975 and an equivalent amount of straw was purchased during the 1975 harvest season. Unfortunately the plant burned in June of 1976. But the exposure led to the exploration of markets in Hawaii, Japan and elsewhere. The owner's replacement facility is currently cubing straw with alfalfa for shipment to Japan.

DIRECT PROMOTION of grass straw for feed has been enhanced by the participation of the State Department of Agriculture's Department of Economic Development during the 1976 harvest season with the co-sponsorship of the Committee. Promotion of Oregon grass straw was carried to potential customers in major market areas of Eastern and Southern Oregon, Washington and Northern California, through over 600 direct interviews and 13,000 mailings. The effort has set the stage for long-term promotion and established short-term opportunities for a number of grass seed growers and straw merchants. The feed market has proven to be highly competitive, unstable and extremely variable in demand in areas such as Eastern Oregon where the competition is local hay or range feeding.

THE STRAW MERCHANT has been created by the necessity for rapid straw removal of grass straw residue. The short seed harvest season precludes extensive use of expensive and specialized straw removal equipment for a low value or worthless material. Straw removal opportunities and value are quickly reduced by intermittent rain. Straw removal cannot be currently covered by present costs of grass seed cultivation. Capital equipment and storage costs are inaccessible to many growers, and mechanical straw removal places additional management and personnel burdens on the grass seed grower. Straw merchants equipped to handle grass straw can make better profits on increasing hay production. They invariably must have a second business, hopefully using some of the same equipment, which accounts for at least one-half of their gross revenue. The straw season can usually be timed to blend into their primary revenue-producing work.

At this point we can conclude that there is a reasonable opportunity for a few well-backed straw merchants, if each has sufficient storage for at least one-half of his straw market, and diligently keeps in contact with, and expands, his markets throughout the year. The competitive edge he now needs is to be able to produce 15#/c.f. bales (twine preferably) for good truck rates and have mechanized handling at both ends. He must also select and care for his straw to maintain its quality.

GRASS STRAW QUALITY

EXISTING USES of grass straw demonstrate the importance of straw quality and availability. Straw quality is demanded by the feed markets which have used straw, as a low quality forage, as a substitute or extender for alfalfa or grass hay. The more palatable and nutritive grass straws have been selected for these markets, limiting marketing primarily to the fine leaf perennial grasses such as bluegrass, perennial ryegrass, tall fescue and bentgrass. Most of these grasses grow in the North Valley on medium to well-drained soils. The existing feed and mulch markets do not solve the disposal problem for the larger portions of grass seed straws on low quality soils from low margin crops.

Alternative uses such as mulch, fuel or fiber must be found for all other grasses, especially annual ryegrass, which constitute large acreages in the South Valley on poor soils where alternate crops cannot be cultivated, as shown in the table of Grass Straw Supply in the Willamette Valley.

STRAW QUALITY is largely dependent on three factors:

(a) if it has been rained on or not prior to baling, or

(b) preferably promptly baled behind the combine and

(c) how it is stored, especially after October 1 in a normal year.

Any straw in bales or piles that gets wet or is baled too wet is subject to mold growth and consequent potentially dangerous mycotoxins as well as an unpalatable "mustiness". These moldy straws can probably be used in feeds when treated with lye or sodium hydroxide. More likely they should be either composted or used in non-feed industrial applications such as fiber or fuel.

Deciding on palatability for direct feeding is a very subjective process but most straws with a showing of green and/or a clean odor are quite palatable.

Mention has been of Tansy ragwort being included in grass straw. The chance of Tansy ragwort being baled in straw from grass seed crops is virtually nil since the quality standards for grass seed preclude any weeds - certainly not Tansy ragwort. One caution, however, it is not commonly known that Groundsel contains the same alkaloid toxin as Tansy ragwort and is equally virulent. It is more likely to occur in alfalfa or meadow hay than grass straw.

Straw is a perishable material unless it is stored dry, under cover, where toxins, mold, volunteer seeds and other contaminants will not affect its quality, especially for feed uses.

A further complication is the possible residue of chemicals and pesticides on the straw which might prevent use in feeds. The straw merchant or grower must be aware of the history of a given field relative to the use of these materials.

GRASS STRAW AVAILABILITY

The following chart sets forth the acreages of grass and cereal crops for 1976. By using 2 tons of grass straw per acre and 2.5 tons of cereal straw per acre, the straw availability for a given area can be determined.

Using the summary figures only, this amounts to 200,000 tons of annual grass straw, and 150,000 tons of perennial grass straws in the South Valley, and approximately 84,000 tons of cereal straws. In the North Valley, annual grasses produce 23,000 tons of straw, 88,000 tons of perennial grass straws and 63,000 tons of cereal straws. These are loose, removable, available for use.

1976 Grass Straw Supply in the Willamette Valley

County	Annual	Perennial	Cereal	Total
		Acres		
South Valley				
Linn	81,693	53,231	24,820	159,752
Lane	7,862	15,840	6,727	30,429
Benton	10,510	8,700	2,168	20,748
subtotal	100,065	77,141	33,723	210,929
North Valley				
Marion	3,279	31,364	11,600	46,243
Polk	6,951	5,509	4,222	16,682
Yamhill	1,329	3,062	6,166	10,557
Clackamas	50	4,063	469	4,582
Washington		140	3,018	3,158
subtotal	11,609	44,138	25,475	81,222
Total	111,674	121,279	59,198	292,151

Source: Fire District Reports, 4-29-76; DEQ, Oregon

Approximately 112,000 acres of grass seed land were not open burned in 1975 and 130,000 acres in 1976. The 1975 Straw Removal Survey and the 1976 Fire District Reports indicate that the majority of straw in 1975 was chopped, and the land plowed or left idle and the remainder of the land went into crops such as the soil-exhausting and eroding wheat cultivation, mint, or sugar beet seed or other seed crops if contracts were available. Preferences indicated in the 1975 Survey indicate that annual crops were probably plowed and reseeded. Perennial crops were probably baled (30,000 acres) and not treated. Farmers will have higher costs and lower seed yields. Prevailing market conditions for wheat, 1976 sprouted wheat, increased acreage planted to hay in the Columbia Basin, the warm fall weather and depressed hay market, trend toward oversupply in mint cultivation would all indicate that: 1) less acreage will go to alternate crops, 2) less straw will be removed for lack of market for disposal, 3) increased burning fees will reduce open burning, and 4) more grass seed crops will be plowed under, rotated to other crops, or leases not renewed. Experience from recent years has indicated that actual straw removals will be determined by what the farmer can expect to sell and what the weather allows to be removed. In the absence of markets the farmer will not remove straw.

Apart from the reality of straw removals there is actual straw production of two removable tons per acre or 580,000 tons of grass and cereal straws on Willamette Valley land under cultivation. The 240,000 tons, approximately, produced from perennial crops are more than adequate to supply any conceivable future feed market. A significant problem is the disposal of the remaining 250,000 tons of annual and cereal straws, particularly annual ryegrass that cannot be disposed of directly or decomposed readily in the soil. We have seen undecomposed straw in "white soils" 4 years after plowing.

GRASS STRAW CONVERSIONS

RESEARCH AND DEVELOPMENT in straw utilization during recent years has demonstrated that for existing markets direct use of straw residues is more economic than processing. The following Table is a general description of conversion or processing alternatives that have been examined by the Consultants and others during the past five years. Direct uses, mechanical, biological and chemical conversions to a variety of products have demonstrated that the most accessible existing markets are direct uses for feed and fiber. Low market values limit conversion, packaging and marketing in feed and fuel applications. Fiber, and chemical applications of converted straw products may have longer range value for disposal.

ALL STRAW CONVERSION PROCESSES must be developed specifically for grass straw since there are no conversion facilities or existing commercial enterprises using other agricultural residues in the Willamette Valley. Every new process requires a new product, a new business, a new processing facility, capital investment of $30 to $50 per ton per year annual capacity, and additional investment in straw handling, storage and transportation equipment amounting to approximately $50/ton/year. If markets were available the disposal of 250,000 tons of straw per year would require new investments for straw storage and handling of $12.5 million and in processing facilities of over $7.5 million. Financing either removal equipment or processing facilities is currently the greatest obstacle to straw removal, storage or disposal. As a straw merchant recently commented: "If you can afford to be in the straw business, you can afford to be in a better business."

AGRICULTURAL RESIDUE CONVERSIONS

DIRECT USES	Feeds
	Fuels
	Mulches
MECHANICAL CONVERSIONS	Feeds
	Building Products
	Horticultural Products
	Fuels
	Fibers
BIOLOGICAL CONVERSIONS	Ensiling
	Composting
	SCP - Single Cell Protein
	Fermentation
	Enzymatic Conversions
	Methanation
CHEMICAL CONVERSIONS	Pyrolysis to CO and H_2
	Synthesis to Methanol or Ammonia
	Hydrolysis to Glucose, etc.
	Hydrolysis to Furfural
	Synthesis to Plastics, etc.

STRAW UTILIZATION CENTER

STRAW AND STRAW PRODUCTS are unfamiliar resources for most markets requiring changes and innovations in process technologies, material utilization and capital investments. They also carry a social and psychological impact. The technical feasibility of a product or process may be secondary to marketing and product development. The Committee and its consultants have used worldwide communication, and pilot plant demonstrations of products and processes to ease the transition or accessibility to new products and markets. This approach has led to the search for simple processes which lead to a variety of independent products and markets. The Straw Utilization Center has been a center for this demonstration and testing, a vehicle for the transfer of technology and commercial integration of directed research.

THE STRAW CENTER is an unique integrated facility employing equipment and processes for feed, fiber and fuel applications. An inventory of 150 tons of baled straw is used for producing sample materials and products. The economic and commercial practicability of processes is tested in leased or built prototype equipment. Growers can use the Center to try their particular residues in cubers, a fiber refiner, fiber dryer, baler and straw burning furnace. And others should be informed of this opportunity. This equipment is part of ongoing research programs and is used to supply demonstration samples, feeding trials, industrial scale tests, and to optimize process variables not encountered in laboratory research. Projects are coordinated with collaborating research consultants and institutions, and private firms developing straw products or processes of apparent commercial viability.

MATERIALS AND PROCESSES tested and developed at the Straw Center have included: the pilot plant NaOH-treated straw cubing facility for developing straw cubes for shipment to Japan; samples for feeding trials and marketing cubed products; ground straw and auxiliary equipment for carrying out a plant scale fuel trial using ground straw at Oregon State University; a fiber refining and fiber overlay mat forming for fiber and building products.

CURRENT PROJECTS at the Straw Center include the production of straw cubes and straw rations for feeding trials; sample straw fiber for hydroseeding, molding, horticultural uses and building products; development of a straw burning farm furnace for on-farm heating and drying applications.

Following is an estimate of the potential initial market impact of straw utilization projects currently being carried out at the Straw Center. Each product or process is being closely coordinated with a potential producer and end-user. Both end-users and producers are participating in the market search, and product development stage of these products.

In two instances, private corporations are subsidizing work at the Center in place of setting up their own pilot plants. Both projects are hand-in-glove with current Committee projects and will contribute toward them.

INITIAL PRODUCTION SCALE FOR PRODUCTS BEING DEVELOPED AT THE STRAW UTILIZATION CENTER

Market		Products	Production Unit (tons/year)
FEED	CB Cuber	Range Cube Dairy Feed	5,000
FUEL	Farm Furnace	Heat, Steam	1,000
	Industrial Use	Heat, Steam	7,000
FIBER	Straw Pulp	Hydroseeding Mulch Insulation Board Soil Conditioner Moulding Fiber Products Oil Slick Removal	10,000
	Other Fiber	Horticultural Industrial Fillers	3,000
	Other Potential	Uses Being Developed Long-Range	
FEED		High Protein Feeds SCP Yeast Fermentation	
FIBER		Paper Production	250,000
FUEL		Gasification/Pyrolysis	250,000 w/wood or solid waste
CHEMICAL		Xylitol, Ammonia, Methanol, Urea	

FEEDING STRAW

FEED MARKETS are selective; the nutritional requirements for animal performance and body weight in beef and milk production, the winter maintenance rations, the location of animal producing areas, the low nutritive values of grass straws and the increasing supply (2.5 million tons) of high quality alfalfa hay in Oregon limit the potential for straw consumed as animal feed.

Grass straw harvested after seed production is lower than most legume hays in both protein and energy digestibility, as shown in Table 1 and Table 4 of the accompanying report: A Study of the Nutritive Value of Oregon Grass Straws, by Harold Youngberg and Lester Vough, 7/76. The main use for grass straws is as roughage, to extend or supplement hay inventories. It is used with supplemental feed additives and concentrates, and in combination with other dry forages such as alfalfa or grass hay.

The economic role of grass straw in a highly variable feed market is restricted to maintenance ration as a substitute for hay in wintering beef cattle, dry dairy cows, and horses. For this it has found markets in feed pellets, feedlot and range feed. It also has sold overseas and domestically where drought or other product demand patterns create a scarcity of alternative roughage feeds.

"FEEDING STRAW" is the title of a compendium of data we've collected and are organizing into a separate booklet. It includes the OSU data as well as other sources and is being reviewed by two consulting animal nutritionists.

FEED MARKETS FOR STRAW

MARKETS FOR FEED are highly variable. A single market will fluctuate annually. As a low quality forage grass straws must compete with high energy, high yield special forage crops such as alfalfa, grass hay, corn silage and other agricultural residues. During the 1976 harvest season demand was affected primarily by the weather. Rain damaged both hay and straw by leaching nutrients from the unbaled material, adding moisture-causing mold and leaving straw brittle and less palatable. It prevented baling of large quantities of straw. Rain sprouted some seed wheat which brought tons of low cost energy to feed markets. The warm late Fall has allowed range feeders more pasturage and has depressed dry forage sales. Much of the slow increase in the demand for hay will be taken up by alfalfa from over 40,000 acres of new cropland in the Columbia Basin.

Straw markets are supplied by a relatively small number of straw merchants and grass seed growers. Undetermined quantities of straw are used directly on local farms. Grass straw is baled and shipped to Eastern and Southern Oregon, Washington and California. Straw handlers supplying these markets have increased storage capacity to serve these markets. Their sales have developed slowly and they benefit from consumer confidence in the quality of straw shipped by individual suppliers. Low quality straw is not shipped and good quality material is provided to build markets. A few "junk dealers" do supply poor quality weedy straw or hay and are a concern of the straw and hay organizations.

EXTERNAL MARKETS have not had continuous or lasting impact on grass straw sales. A Japanese market for 10,000 tons per year developed from five or six years of promotion. An Oregon Trade Mission first discovered tentative interest in Japan. Sample bales and containers were sent. Private funding enabled the Committee in 1973 to send an investigator to Japan. Years of product and process development resulted in attempts to deliver a "superbale" and cubed straw to the market. The superbale found market resistance to untreated straw because of potential impurities. In 1975 a contract with a Japanese firm allowed a treated-straw process developed by the Committee to be employed in a new facility. The plant has since burned and has been replaced by a semi-portable unit combining straw and alfalfa for shipment to the same market area. Interest from Hawaii has not yet developed into an identifiable opportunity. In general, offshore markets are more demanding, require greater densities than bales and are difficult to maintain in communications and service.

STORAGE AND TRANSPORTATION OF STRAW FOR FEED

FEED GRADE STRAW is perishable and requires storage and transportation to the market areas. Covered storage has increased slightly in the Valley but financing is the primary obstacle. Shed storage costs approximately $3/sq. ft. or $30/ton, 1976 construction cost.

TRANSPORTATION of straw requires minimum bulk densities for shipment by truck, rail or overseas by container. The accompanying Table illustrates the densities required for a payload weight. Standard bales (80#) or bulk package systems are 7#/cubic foot or less. Maximum economic hauling distances using these systems are now approximately 200 miles. Minimum payload densities for truck are 14#/c.f. Straw densities must therefore be increased either in the field or in a separate operation. The resultant bale or package must be manageable downstream in the distribution and feed system by either man or special handling systems.

BULK DENSITY AND TRANSPORT ALTERNATIVES FOR STRAW PRODUCTS

Size	Volume Cubic Ft.	Payload #	Minimum Bulk Density for Payload #/C.F.
Truck			
(2) 27' Flat Bed	2,000	55,000	14
(2) 27' Dry Box	1,771	55,000	16
40' Flat Bed	3,200	52,000	16
40' Dry Box	2,650	50,000	19
Rail			
50'	4,960	100,000	20
40'	3,750	100,000	27
Container (offshore)			
40'	2,000	44,000	22
20'	1,050	40,000	38
Product Densities with Grass Straw			
Standard Bale			7
Freeman Hi-density			14
CB Cuber - 90% straw			16
40% straw			19
Osborn Gear Cuber			18
Cublock			45
Pellets			30

SEVERAL SPECIAL DENSIFICATION SYSTEMS for feed products have been developed by the Committee, straw merchants and grass seed growers. They are neither widespread nor simple. Economics and mechanics of use are marginal. One Freeman high-density baler is being used commercially to produce 25-ton payloads. No more are being anticipated. Field cubing of grass straw has so far proven impractical and unsuccessful. Stationary cubing involves separate transport to a processing facility with reshipping and the economics are marginal. The CB cuber, Osborn gear cuber and cublock maker and pellets are all in this category and all require some form of binder.

ADDITIONAL PROBLEMS related to transportation include the preferences of truckers for high-speed loading, intrastate disputes regarding the transportation of agricultural residues, fear of weeds and diseases, interstate resistance at truck scales and inspections regardless of accepted state laws, variable load height limits, and the usual problem of a backhaul, preferably a similar agricultural commodity.

DIRECTED RESEARCH AND PROMOTION OF THE USE OF STRAW FOR FEED

THE COMMITTEE has and is continuing to promote the sale of straw through feed markets by direct promotion, feeding trials and demonstrations in market areas, development of mechanical and biological conversion technologies.

THE DEPARTMENT OF AGRICULTURE's department for Economic Development in Oregon assisted the Committee during the 1976 harvest by direct promotion of grass straw in market areas. This program established some baseline activities for feed market promotion and resulted in increased short-term market opportunities for some grass seed growers.

Straw quality, densification, use of twine instead of wire, rapid handling, weather, weed and pesticide problems and preference for certain grass straws are all emphasized in their report. The program established that a continued promotion would be beneficial to the distribution of straw to feed markets.

A NUTRITIVE VALUE STUDY of the various Oregon grass straws was sponsored by the Committee and completed in 1976. It has helped to establish the range of values for the variety of grass straws. Analyses were carried out simultaneously by investigators at OSU, Purdue and USDA at Albany, California. The report is included herewith.

Feeding trials have been carried out by the Department of Animal Science at OSU for each of the last five years. These have shown that grass straw can be used effectively in sheep, cattle, dairy and horse rations. These trials have provided Extension agents with additional knowledge regarding the appropriate use of grass straw. A summary is included herewith.

Feeding trials in market areas were undertaken in 1975-76 for the Committee. Trials using straw and liquid feed supplements were carried out in Polk and Lake Counties. These trials have demonstrated to cattlemen that straw can be used successfully with a feed supplement to obtain substantial savings and increased intake on maintenance feeds. Feeding straw requires intensive management, two feedings per day, bunk feeders, and supplemental nutrition. The trial in Lake County was estimated to have increased grass straw consumption there by several hundred tons. Additional feeding trials in market areas are recommended. Also the suggestion of transporting cows to feedlots in the Willamette Valley should be investigated, and demonstrated if feasible.

PROCESSING STRAW FOR FEED

Direct feeding of straw is the most economic and simplest form. Due to the lack of nearby animals and the need for shipping and preserving straw, the Committee has expended extensive research on feed processes to increase straw uses. This has been occasioned by the need for increased densification, and the opportunity for increased nutritional values. It is clear from both experimental and commercial experience that in order to be economically justified processed straw products must also reduce the economics of feeding and handling straw at the use point. Pellets are an example of this. Whole ration dairy cubes have been shown to reduce the man-hours in feeding straw through bulk and mechanical handling.

There are approximately 15 pellet mills in the Willamette Valley many of which use grass seed cleanings and some straw. There is one existing commercial straw cubing facility.

Access to domestic and overseas markets stimulated interest in cubing straw. Field cubing was proven inadequate. Cubing processes tried at the Straw Center include three commercial cubing machines and a variety of cubing processes, shown in the accompanying sketch. Sodium hydroxide was used as a lubricant and binder in the process developed for shipping treated straw to Japan. Increased digestibility of the product was a benefit of the system. Although the process was adequate for delivery to Japan it did not prove economic for delivery to domestic markets. A simpler process employing a lower horsepower and eliminating the drying step is currently being successfully used at the Straw Center for feeding trials. Commercial viability is pending the construction of a higher production model by the manufacturer.

STRAW FIBER from fiber processes has proven to be useful in increasing the bulk density of cubed whole rations using 30% straw. Addition of 8% wet fiber to the ration increases bulk density 15%, from 16# to 19#/c.f. The increase in digestible fiber is not significant. Another byproduct from refining is the molasses from soluble sugars released through refining. These two discoveries suggest the integration of feed and fiber processing in a production facility.

BIOLOGICAL AND CHEMICAL PROCESSING of straw has not yet proven economic. The Committee has assisted private and public projects to develop high protein feeds from straw. Semi-solid fermentation of yeast using straw as a substrate produces a viable feed product but the process is not yet economic. However, we are continuing to work with Dr. Anderson at OSU who is completing an NSF Research Grant on the process. Grinding of straw and addition of nutrients in a commercial process is also being developed with the Committee but impact on the disposal of straw cannot be anticipated.

Finally, it is technically feasible to produce a non-cariegenic sweetener for human use called xylitol from straw which contains about 18% of this sugar. However, the product requires sophisticated technology and probably will be developed from lower cost sugar cane residues in the Gulf coast.

Grass straw has been combined with other agricultural residues but the results are not measurably significant. Ensiling of cannery wastes and combination with straws is done in California commercially but has not been attempted on a large scale with grass straw. What has been done by Nulab in small laboratory amounts looks promising.

MISCELLANEOUS USES

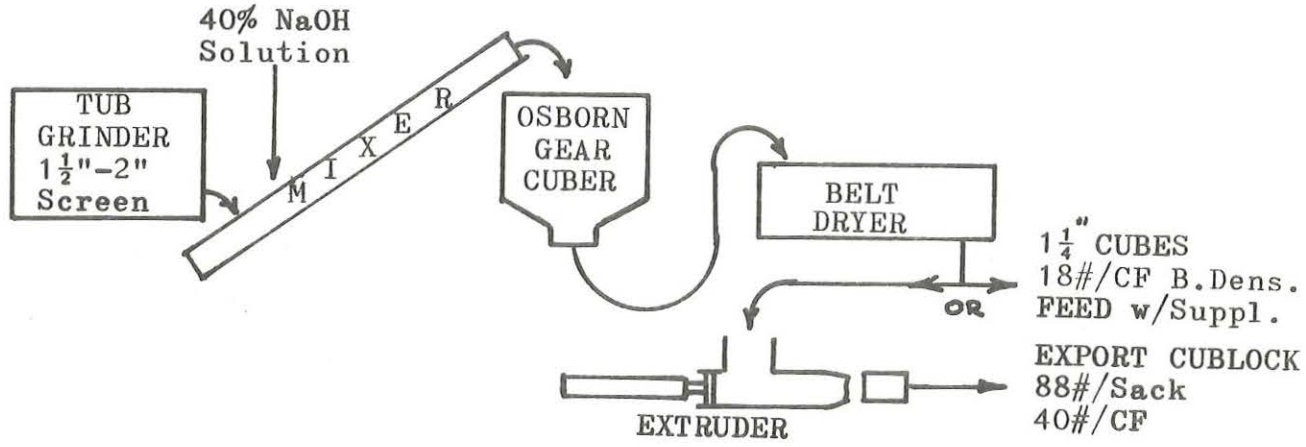
Straw has long been used world-wide as a growing base either in bales or composted for the growing of mushrooms. Wheat straw is extensively used for composting at West Foods in Salem.

Ground straw has developed into a preferred mulch for growing worms - vermiculture - in the Valley. Although not a large market, it illustrates the "no stone unturned" efforts being expended by the Committee.

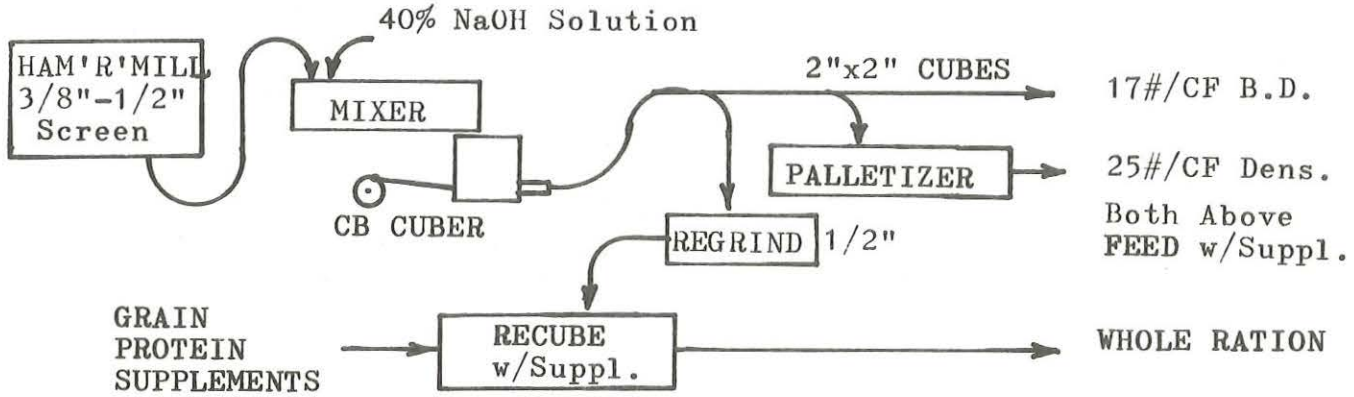
COMMITTEE SYSTEMS DEVELOPED TO PRODUCE NaOH-TREATED STRAW

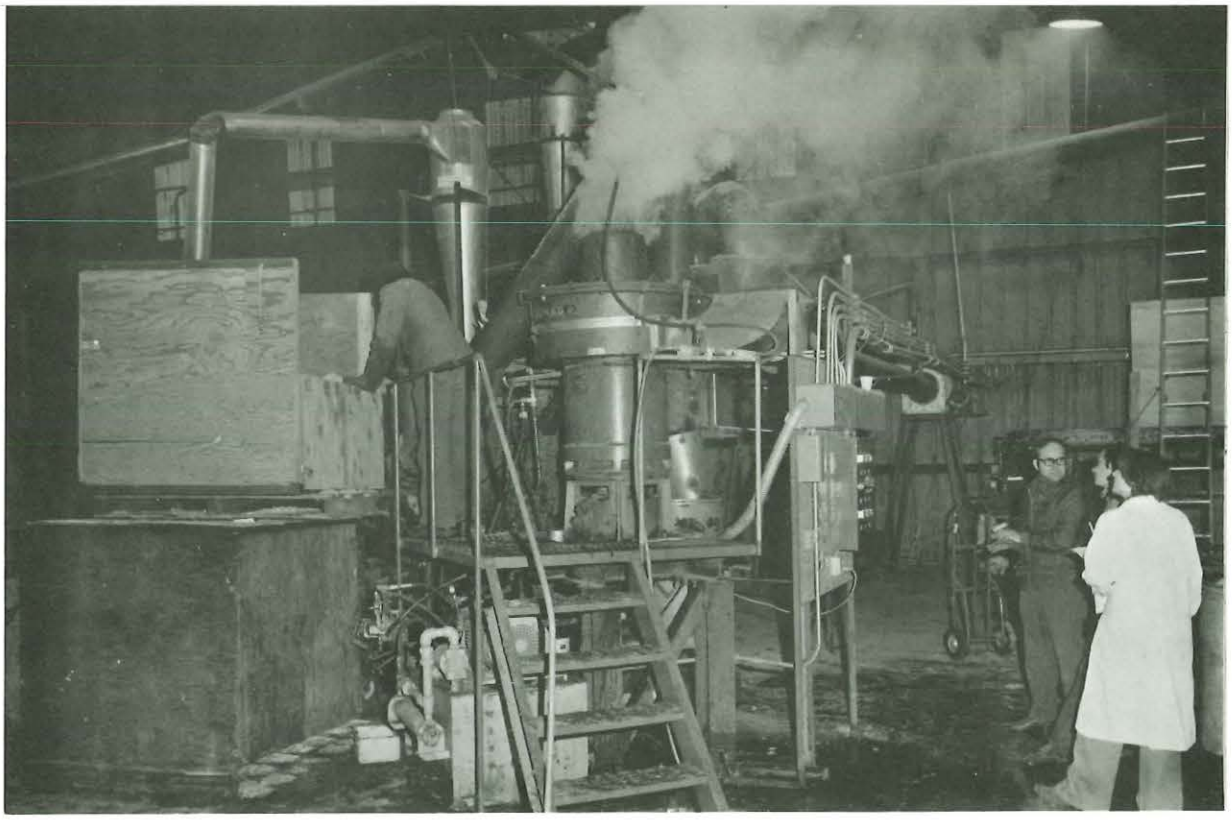
The NaOH (Sodium Hydroxide) is used to provide bonding in the cubers and improve mold-resistance in straw as well as considerably increasing digestibility to approximately 50% DMB.

A) Long Fiber (1"-2") NaOH-Treated Cubes and Cublocks for Export - 1974

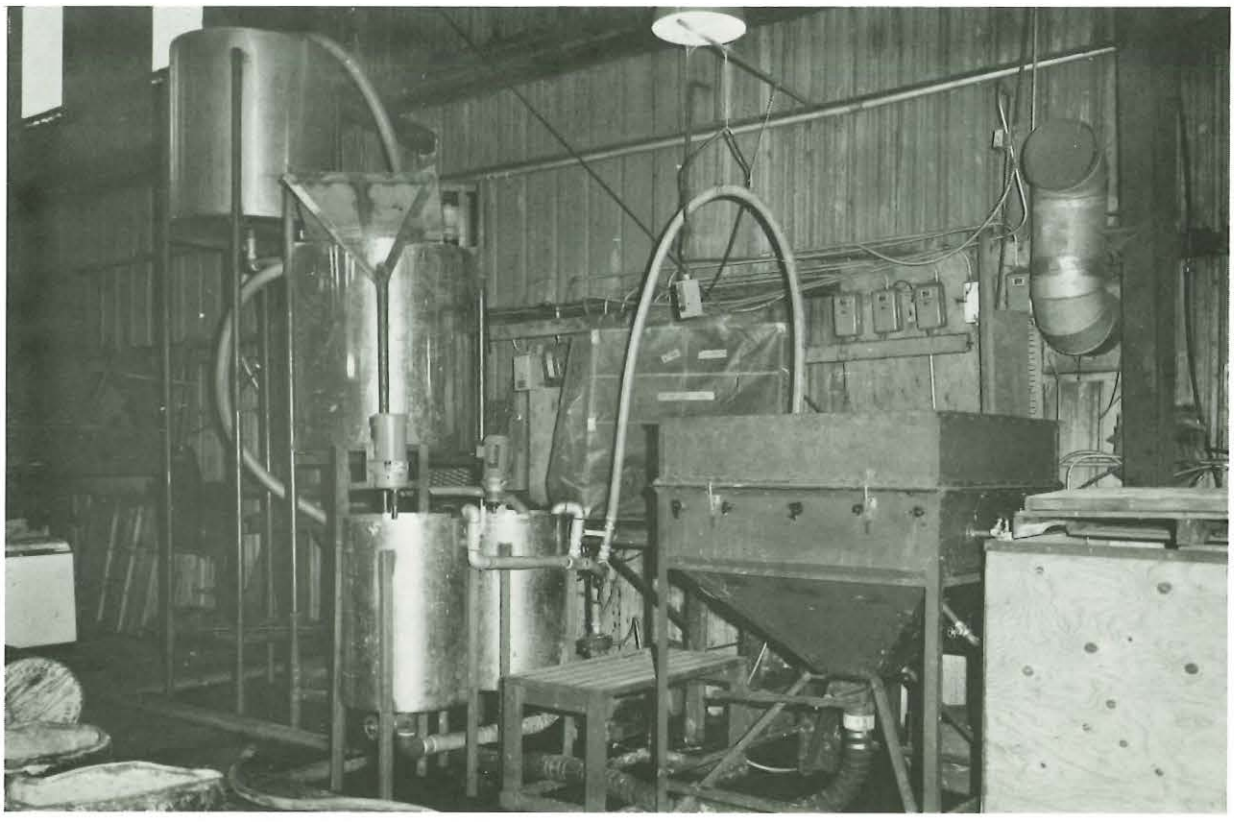


B) Medium Fiber (3/8"-1/2") NaOH-Treated Cubes and Whole Rations - w/CPM "CB" Cuber - 1976

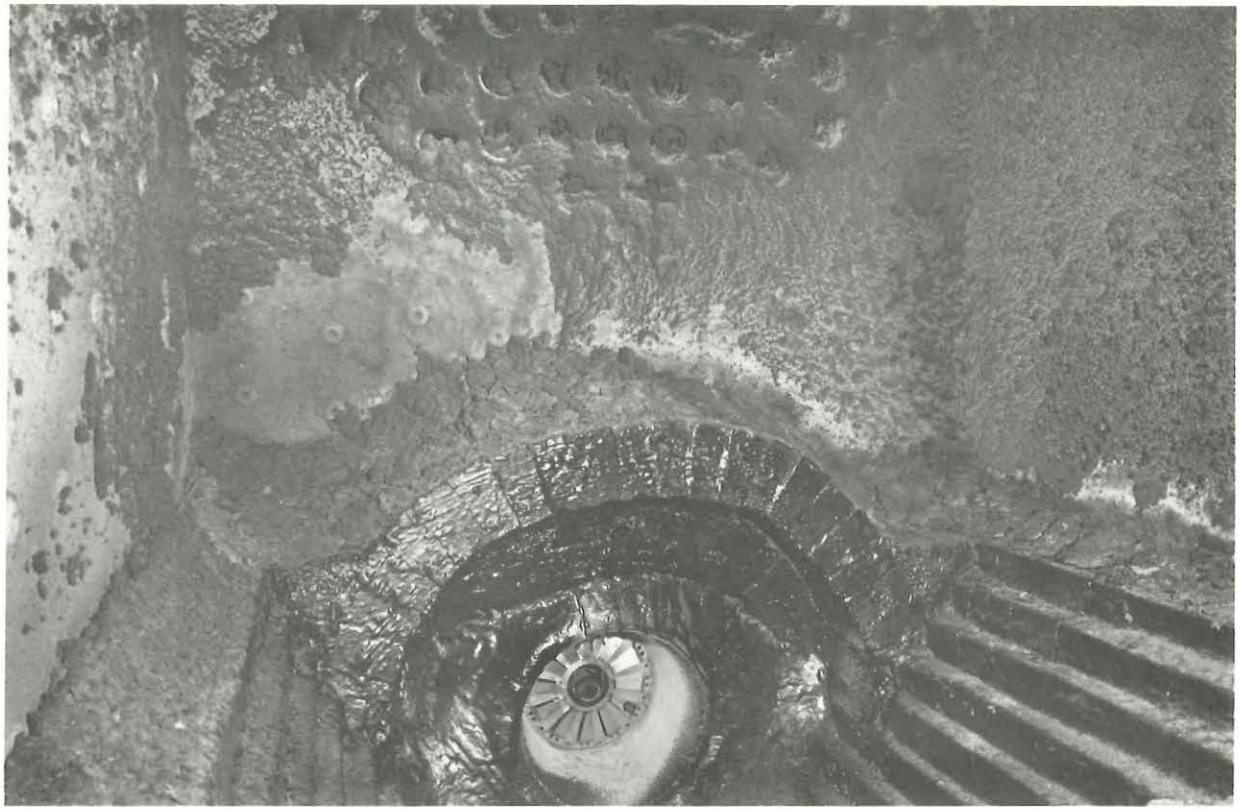




Presteamed straw being defiberized in the Committee's disc refiner pilot plant at Straw Center. Contiguous straw-fired fiber drying loop in background uses same straw as fuel.

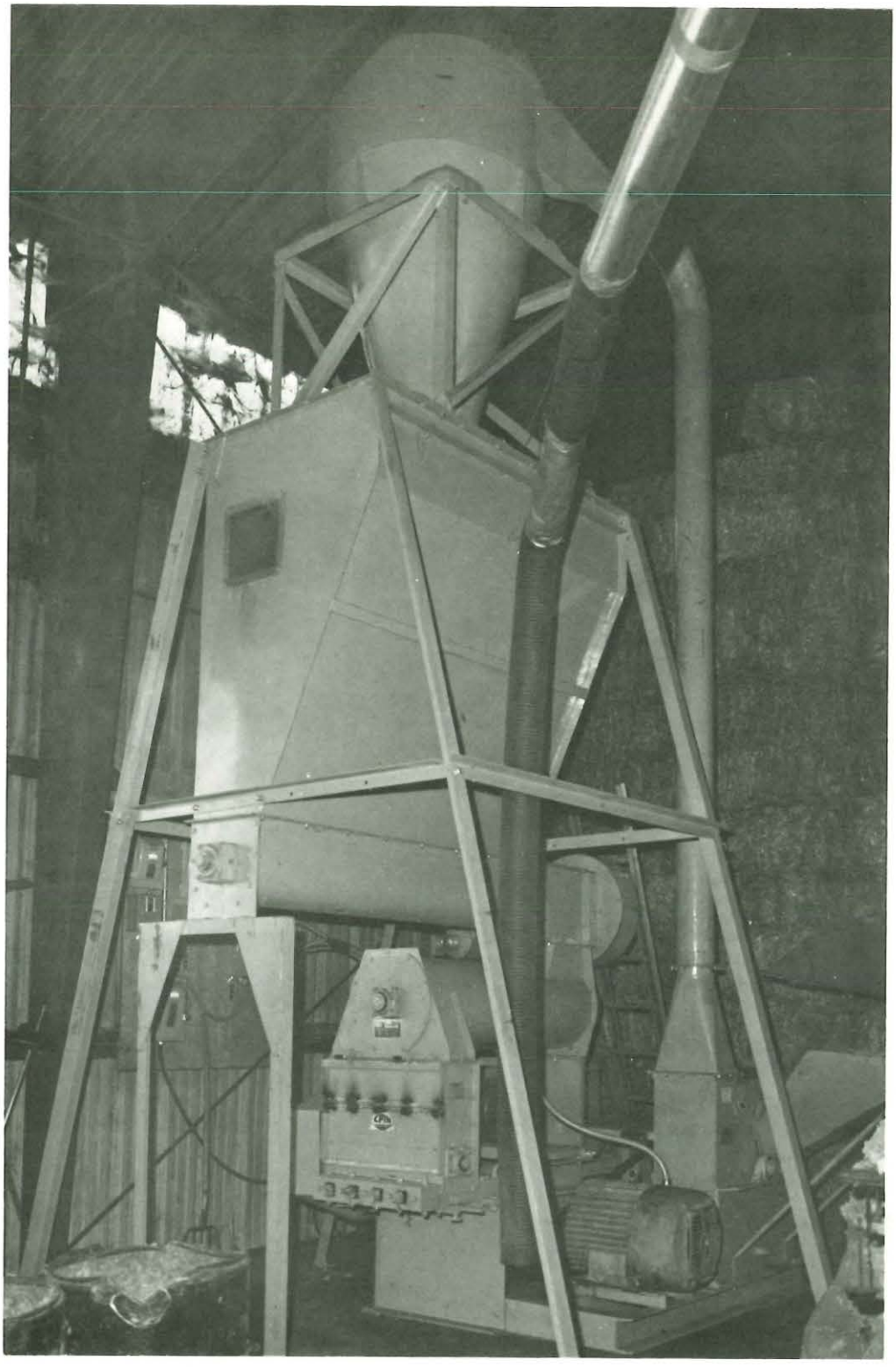


Stock tanks, mixing, precipitating tanks and 4'x4' deckle mat-forming box at pilot plant produces sample resin bonded mats for overlay surfacing of plywood and other board products.

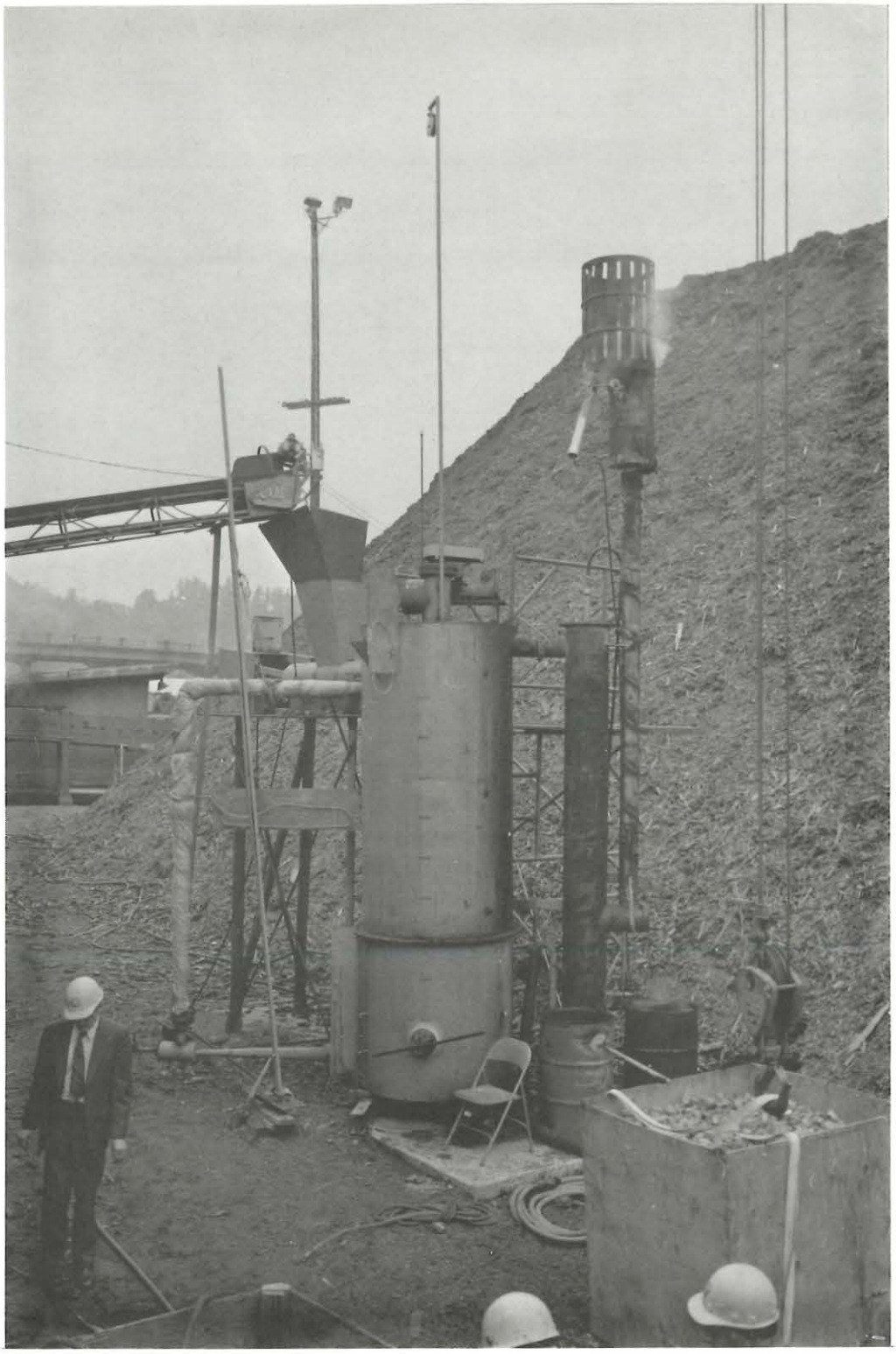


Combustion chamber of test boiler at OSU after burning strawdust. Note glossy black slag around firing openings below, fly ash accumulated at fire-tube openings above.

The rotating 28" disc of the Jones Vertifiner being used to defiberize straw. A matching stationary plate with center feed opening is mounted with .005" to .0010" clearance.



"CB" Cuber with integral hammermill, bin, meter and mixer used to produce medium density whole ration cubes from straw and grains, meals, etc., as well as other residues such as corn husklage, mint straw and hop vines. This unit is leased from California Pellet Mills.



An experimental gasifier producing fuel gas from wood residues at the Eugene Water & Electric Board. Straw was tested in this unit with some success, but materials handling and low density posed problems. The Committee is working with several groups developing gasifiers for both fuel and eventually chemicals, methanol, ammonia and urea.

GRASS STRAW FIBER

GRASS STRAW FIBER can be made in forms that can enter existing markets dominated by wood and paper products. But continued product and market development is necessary. The current excess supply of wood, chips and recycled paper makes it difficult to promote alternative raw materials which require a change in attitude, equipment or organization by the user.

Corrugated and fine paper, particleboard, straw mulch forms, insulation and other fiber products have been demonstrated since the beginning of research on Oregon grass straws in 1968 and earlier. The technical feasibility of these processes is well documented. Wood replaced straw in pulp and paper in the current century. Market opportunities and economic processes have been lacking for use of straw in these products. The markets continue to mitigate against the promotion of all-straw board products, straw paper or complex process technologies for low volume, low value products.

LONG OR CHOPPED STRAW for erosion control and horticultural uses, and defibrated straw for hydroseeding, fiber overlay products and insulation have the most current potential. Approximately 4,000 tons per year of long straw is sold to the Forest Service and highway constructions and others for erosion control on exposed soil. This market can be expanded if straw fiber is produced in a form for use in modern hydroseeding equipment. Defibrated straw can enter this market as well as other natural short-fiber markets. In both these cases the products must be further developed, legitimized and promoted before a commercial plant will be constructed or significant volumes of grass straw can be utilized. The Straw Utilization Center has been uniquely adapted to produce sample materials of these products.

Grass straw will not be used in pulp and paper processes until significant advances can be achieved in chemical recovery and pollution abatement using straw fiber. Straw must be able to contribute to energy, labor, pollution abatement and other pressures facing the pulp and paper industries. Paper companies are currently investigating straw but at a lower priority among current projects.

The consultants are collaborating with potential producers and consumers in all of the straw fiber products being examined. Private equipment and capital has been invested in parallel activities to investigate market opportunities and process technology for applications in hydroseeding, insulation, horticultural uses and products, and building panel markets.

DIRECTED RESEARCH AND PROMOTION OF STRAW FIBER

FIBER PRODUCTS RESEARCH in straw prior to 1975 included pulp and paper, particleboard, and mulch from pulping processes. Since them emphasis has been placed on identifying and testing alternative fiberizing techniques. Mechanical defibration of grass straw at OSU produced a fine particulate feed product and tubular straw fiber.

Atmospheric disc refining at the Straw Center has produced a thermomechanical straw pulp that can be used in both pulp and board processes and a sugar effluent that can be used to enhance feed products. Current activities have benefitted from research, cooperation and published information by European pulp and paper industries and local universities.

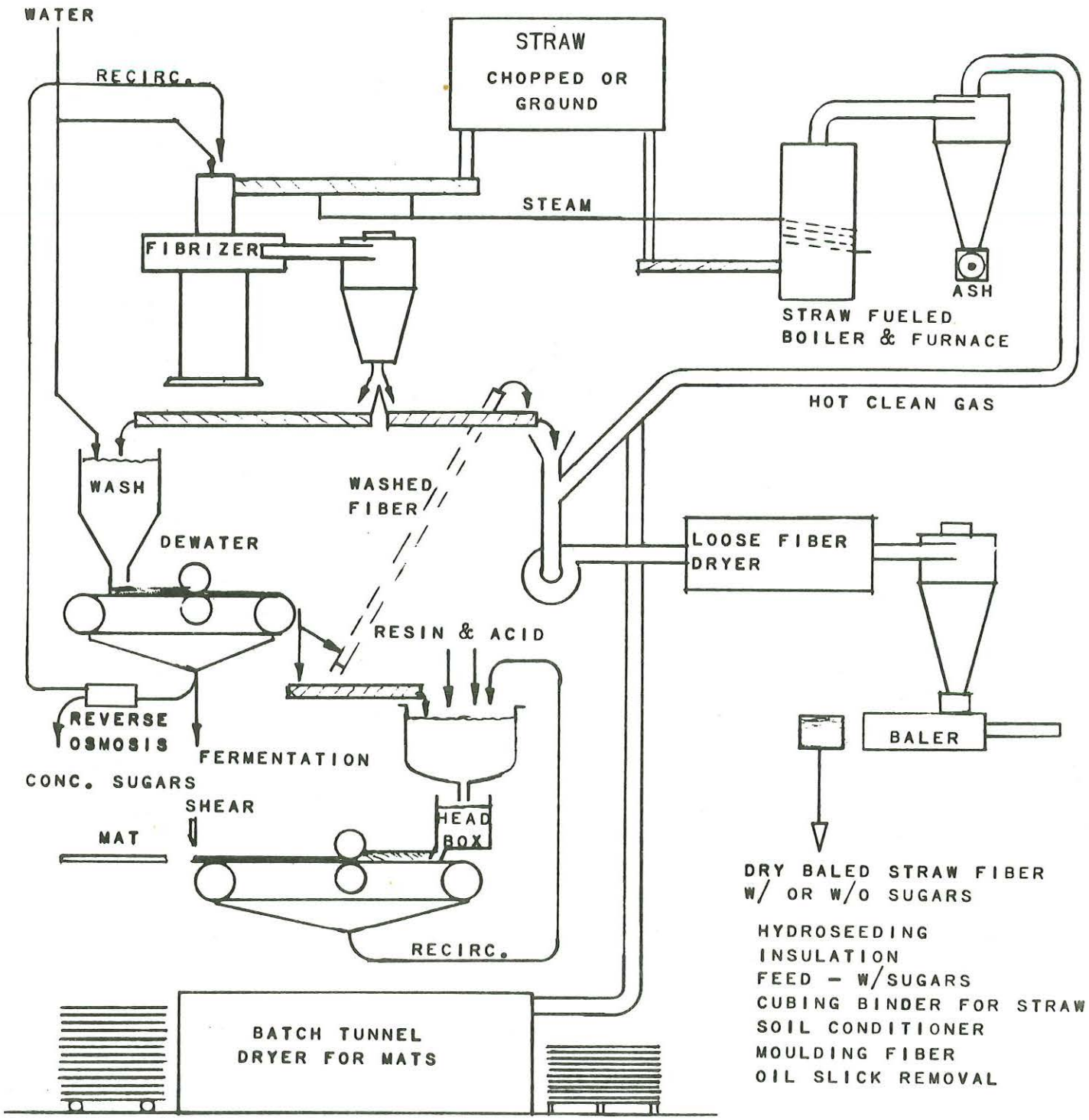
The process and products produced at the Straw Center are depicted in the accompanying figure. Chopped straw of any variety is pre-steamed, refined and then either dried or used directly in board products. Production of any or all of these products is feasible for a small scale facility. The development of these products has included laboratory refining and testing, installation of the pilot plant at the Straw Center, evaluation of process variables, integration with straw fuel applications, fiber mat forming, field testing of the mulch in hydroseeding, industrial testing of the straw fiber in paper products and as a hardboard faced overlay for plywood used in exterior siding and roofing applications, and market survey and promotion. Product development and testing, further process development and analysis of chemical byproducts are in progress for the most accessible markets.

Development and confirmation of the practicality of the products and processes are done in collaboration with Reichhold Chemicals, Inc., the University of Washington, Oregon State University and other private and public institutions. The use of other agricultural and silvicultural residues in combination with straw in fiber products is being examined with the object of lower production costs, enhanced product properties, and greater production opportunities.

The fiber project is of particular interest in several respects. The same manufacturing facility can produce a variety of products, each in its own marketing field, thus giving much needed diversification of products derived from straw.

Further, these products, such as a replacement for peat moss in horticultural uses, serve to increase income to Oregon rather than compete with other local products.

STRAW FIBER PROCESSES & PRODUCTS Figure 1



HYDROSEEDING
INSULATION
FEED - W/SUGARS
CUBING BINDER FOR STRAW
SOIL CONDITIONER
MOULDING FIBER
OIL SLICK REMOVAL

1 - OVERLAY MATS
W/RESIN
OR
2 - MATS W/O RESIN
3 - ACOUSTIC BOARD
4 - HORT. MATS

FUELS

THE BASIC GROSS FUEL VALUE of a ton of straw is 16 million BTU/ton, or the approximate equivalent of 2 barrels of oil. The problem is how to get this fuel value from the straw within desired limits of efficency and air quality standards. There are two possible approaches: burn it as straw or convert the fuel value to a more easily handled form such as gas via pyrolytic conversion. Either approach can be successfully exploited depending on the situation of the consumer. Consequently, we have been investigating and aiding in others' investigations of both routes.

MARKETS

THE LARGEST MARKET for straw is as fuel for the thermal sanitation of the grass seed fields following harvest. Approximately 640,000 tons of straw were burned on 160,000 acres during the 1976 harvest season. This straw is equivalent to 1.3 million barrels of oil. Since this quantity consumed in slower moving field sanitizers would destroy the machine and the plant establishments, in the future half of this straw will have to be removed and disposed of. The other half is stubble and when feasible may be used in situ to fuel a mobile field sanitizer. Additional fossil fuels will be required to ignite and propel mobile field sanitizers and propel the equipment for removal, transportation and storage or disposal of the excess straw. If the net energy balance becomes favorable, straw could possibly be used as fuel for farm or industrial purposes.

Existing gas, liquid and solid fuels determine the market for straw residues as an alternative farm or industrial fuel. Delivered cost of straw residue must be less than expected alternative fuel values including an estimated amortized cost of conversion to straw as a fuel. The accompanying table illustrates that not only natural gas but fuel oil, coal and hog fuel must exceed $2.00/million BTU before straw can be considered a viable alternative. Straw must be delivered ready-to-use for less than $27.50/ton on today's market. This relationship is also true of gas or chemical products manufactured from the pyrolysis and chemical conversion of straw to synthesis gas, methanol, ammonia or urea - all presently derived from natural gas.

Straw could become an economic fuel if it were combined with lower cost solid waste or municipal residues on a local basis. It would contribute higher average heat values, and lower moisture to the efficiency of combustion or gasification.

The potential for disposal of straw as a fuel depends on the changing economics and availability of energy resources. Grass seed growers with on-farm requirements for heat or steam and with excess straw residues could use lower value straws for fuel. This would include poultry, dairy or crop drying requirements.

The "convenience" factor weighs excessively in favor of fossil fuels, or wood wastes, before straw will be considered.

A COMPARISON OF APPROXIMATE RAW MATERIAL COSTS FOR FUEL OR FIBER

Revised to December 1976

Material Gross BTU Value	Unit Cost	Fuel Cost $ per Million BTU
Oil, Diesel 145,000 BTU/gallon	$ 0.39/gallon	$ 2.69
Oil, Heavy $12.13/42 gallon barrel	$ 0.29/gallon	$ 2.00
Natural Gas Therm = 100,000 BTU = 100 cubic feet	$ 0.20/therm	$ 2.00
Coal, Wyoming 12,000 BTU/pound	$50.00/ton	$ 2.08
Hog Fuel (mostly bark) Unit = 2,000 lb. Bone Dry 8000 BTU/lb.	$ 5.00/unit	$ 0.31
Wood Chips Unit = 2,000 lb. Bone Dry 8000 BTU/lb.	$40.00/unit	$ 2.00
Straw, baled (12 months supply) 8000 BTU/lb.	$27.50/ton	$ 1.72
Municipal Refuse 5000 BTU/lb.	($5.00/ton)	($ 0.50)

Costs F.O.B. Willamette Valley

DIRECTED RESEARCH AND PROMOTION OF STRAW AS FUEL

The Committee has monitored the developing technology of solid fuel combustion, gasification and chemical conversion. It has promoted and demonstrated the direct use of straw as a fuel in industrial applications, investigated the problems relative to the safety and handling of straw as a fuel and demonstrated a feasible system for the delivery of straw for fuel uses, and developed a farm-scale furnace.

Any effective use of straw directly as a fuel must consider the resilient, bulky and difficult-to-handle nature of straw as it comes directly from the field. We have long ago concluded that in most applications straw will be chopped, hammermilled or ground before use. In all the examples of test firingsusing straw, this has been the case.

COMBUSTION TEST RUNS were made in May 1975 firing a rotary dryer at the Bohemia particleboard plant in Eugene, Oregon. The straw was hammermilled through a 1/8th inch hammermill screen and burned with a Coen firing unit. The results indicated that straw would be a satisfactory substitute for the sander dust normally used in Bohemia's particleboard drying loop. Should the availability of sander dust and other alternatives become limited enough to justify the use of straw, we can expect that Bohemia will turn to straw as a fuel without technical difficulty, and in recent plant revisions they have provided for the possible use of straw.

In December 1975, to further determine the practicality of burning straw in existing equipment, we made arrangements to use a small steam boiler in Withycombe Hall on the OSU campus for test firing, using 1/8" hammermilled "strawdust" prepared at the Straw Center. We retained Art Hughes, Professor Emeritus and President of BTU Chasers Inc. as our consulting mechanical engineer to supervise the installation of sander dust burning equipment supplied by Turco Engineering of Portland, and to conduct the combustion tests on strawdust. Dr. Richard Boubel used the opportunity to have his class test the stack emissions.

It became readily apparent that in the last 20 years we've all become pampered with the conveniences of automatically turning on and off our gas or oil fuels - rather than be concerned about the materials-handling train of solid fuels.

The "strawdust" was hauled from the Straw Center in a self-unloading trailer which also served as the surge supply bin. Since the short firebox had been designed for oil or gas and was too short, the fire actually bounced off the backwall and curled back along the sides toward the front, leaving a glassy layer of black fused slag all around the burner opening.

The strawdust fired quite well even while taking longer to burn since it's a solid. The entrances to the first pass tubes of the fire-tube boiler tended to mask over with a filmy lightly fused ash. Other work has shown that straw ash has a low fusion temperature, 1500°-1700° F and tends to agglomerate into stringy masses or to fuse into the glassy slag we experienced.

Upon analysis, the ash contained 16.25% water-soluble compounds consisting principally of Potassium and Sodium Chlorides, Hydroxides, Sulfates and Phosphates. This high alkali content accounts for the low fusion temperature and the "fluxing effect" of the slag on refractory that we and others have experienced.

The maximum Flame Temperature measured was 2100° F, well below the range of NO_X formation.

Dr. Boubel's stack emission tests indicated a loading of .7 gr/scf - well over the allowable level of .2 gr/scf - indicating the need for a wet scrubber or equal in the stack.

The test proved the general conditions necessary to properly fire straw and that it is feasible under the right economic conditions and with a properly designed installation to accommodate the slag and fly ash.

THE EXPLOSIBILITY OF STRAWDUST as a fuel was investigated prior to the combustion trials. Explosibility Tests were run for us by Art Hughes and his staff late in 1975.

The results are quite interesting and indicate a reluctance to explode by ground strawdust in the open. When confined however the dusts will explode but "slowly", the fines igniting successively larger particles. From this data we conclude that closed tanks or bins need special consideration with "blast gates" to relieve any explosive pressures. Another simple solution to prevent explosions, and incidentally keep the dust down, is to maintain the ambient humidity at a high enough level to keep the straw above 10%-12% moisture.

Home and farm scale applications of straw as a fuel include firelog potential, and also a small furnace or boiler.

A FIRELOG MARKET STUDY conducted for the Committee in 1975 indicated that straw would not be competitive because of cost, processing, distribution and established proprietary markets. Straw does not have desirable qualities for use in a firelog.

The 1974 Rotary Path field sanitizer was modified as a stationary furnace and demonstrated the feasibility of developing a small-scale straw-burning furnace using chopped straw.

A VORTEX SUSPENSION FURNACE has been designed by Art Hughes and Tom Miles for hammermilled straw or strawdust. The small (16" diameter by 9' high) unit has been undergoing test firings and design modifications at the Straw Center. Runs have been made generating nearly one million BTU/hour (125 pounds/hour straw consumption) for as long as five or six hours. Results have generally been favorable. Particulate emissions can be held to a slight blue, transparent haze. Build-up of black glass in the firebox is still a problem which we believe we will overcome by modifications to the feeding method. Hot gases from the furnace are being used as needed to partially dry fiber generated from the Jones Vertifiner at the Straw Center.

A BALE BURNING FURNACE has been designed to readily accept baled straw for convenience in loading, etc. The slag problem has presumably been solved by a horizontal configuration. Since most of the uses for this furnace are expected to be on-farm and particularly in dehydrating systems for alfalfa, hops and other crops, the slight amount of ash in the flue gases will not affect the product nor pose a pollution problem. The ash could be re-distributed on the soil. A boiler can be added to this design for steam generation.

OTHER POSSIBILITIES lie in the future. Western Kraft Paper Group in Albany has periodically been in contact with seed farmers and straw merchants to look into the possible future use of straw in their recently installed boiler. The boiler was installed to use hogged bark available from the parent company, Willamette Industries. For the foreseeable future, the supply of bark residue from the parent company at a very attractive transfer price is expected to satisfy all of Western Kraft's needs. Consequently, any market for straw as a fuel at Western Kraft must be viewed as only a long-range possibility.

Weyerhaeuser has periodically contacted Tom Miles to discuss the possibility of using straw as a fuel. So far, nothing concrete has developed. However, Oregon State University is investigating the possibility of returning, in part, to using hogged fuel for its energy needs. Should such conversion mature, the co-use of straw is likely at some time in the future. The physical plant at the University of Oregon uses hogged fuel, and has investigated and tried the use of straw if its hogged fuel is in short supply. Adjustments must be made to handling and feeding systems if that should occur.

Generally, the direct-fuel use will be limited to Mid- or South-Willamette sites - near the source of straw fuels.

GASIFICATION OF STRAW

GASIFICATION of straw is limited by the form and cost of straw as a raw material. Loose or densified straw does not handle well in existing gasification or pyrolysis units. Combination of straw with solid waste is a possible alternative for handling this problem. Straw exhibits good gas yields from pyrolysis. Battelle, Union Carbide, Garret Research and existing gas, ammonia, urea and methanol producers have assisted in evaluating the commercial feasibility of straw gasification and chemical production.

PYROLYSIS is a process by which materials containing carbon, hydrogen and oxygen can be converted to a combustible gas, oil and charcoal. It is really a combustion process in the presence of little or no free oxygen.

There is a nationwide interest in the possible use of pyrolysis technology as a method of converting solid wastes from municipalities, agriculture and forestry to useful, clean energy and feedstocks for chemicals. There has been a virtual explosion in development efforts via governmental projects and private industry.

As with direct-fired fuels, the design of equipment varies with the nature of the raw material to be subjected to pyrolytic conversion. The initial choice of design is largely an art. Fortunately, there are several pilot scale units of differing designs in various locations available for tests. Wherever possible, we have been pursuing test runs to establish a basis of understanding for the possible future use of straw as a pyrolysis raw material. At current values for combustible gas or oil, the collection cost of straw precludes its use to generate these fuels. The cost of natural gas and oil is, however, going up every day.

Dr. C. A. Rohrmann of Battelle Pacific Northwest Laboratory in Richland, Washington pyrolyzed sodium hydroxide-treated straw cubes in the Battelle fixed-bed pyrolysis pilot plant, achieving what he called "gratifying" ease of processing,mechanical, chemical and thermal performance. He produced a clean burning gas with a combustion value of about 160 BTU/cubic foot.

Garrett R/D Corporation operated a flash pyrolysis pilot plant, with early assistance from the Oregon Field Burning Committee, during 1973 and 1974 operating under an EPA grant with the purpose of "studying the pyrolysis of tree bark, rice hulls, manure and grass straw" to produce fuel oil and activated carbon. The runs on grass straw gave a 30% yield of pyrolysis oil without operational problems other than unexpected fineness of the byproduct char. The fine char can be taken care of by modifications in the design of the char collection system. The oil produced is reported to have excellent combustion properties but may require design modifications to furnace nozzles for optimal efficiency. In addition to the oil, Garrett achieved a 5.5% yield of 385 BTU/cubic foot pyrolysis gas and a 39% char yield. The total yield of straw heating value to pyrolysis products was about 80%-85%.

Not all results have been as promising. Larry Wilkinson's work (Cascade Recovery Systems, Inc.) had some assistance from the Committee. The results point up the importance of the correct design for the raw material. He used a gravity feed, agitated pyrolysis retort based on a Wood Waste International, Inc. (Albuquerque, N.M.) design. The 3/8th inch hammermill screened straw had poor flow characteristics, built up in the retort, and prevented any continuous operation. Gas sample analyses indicated fuel values of only 20 to 50 BTU/cubic foot compared with an expected minimum of 150 BTU/cubic foot. The unstable operation and poor product are strong indicators that the retort used in this test is simply the wrong choice of pyrolyzer design.

Hal Worcester of the Eugene Water and Electric Board processed about 1,000 pounds of cubed straw in the EWEB pyrolyzer (locally called the "Worcester Booster"). This experiment was sparked by Verner Adkison of the Lane Regional Air Pollution Authority. The unit has been specifically designed for bark residue available to EWEB at a very attractive price. Bark residue is a denser material than straw and contains a muchlower proportion of ash. In addition, the ash from straw tends to form a low-melting, glassy solid which requires special consideration for its removal from any combustion system. These caveats bore out in EWEB's short run on straw. Although pyrolysis of organic material proceeded favorably, EWEB encountered problems in carryover of straw fines. EWEB does not expect to conduct further tests on straw since they expect local supplies of bark residue to satisfy their needs.

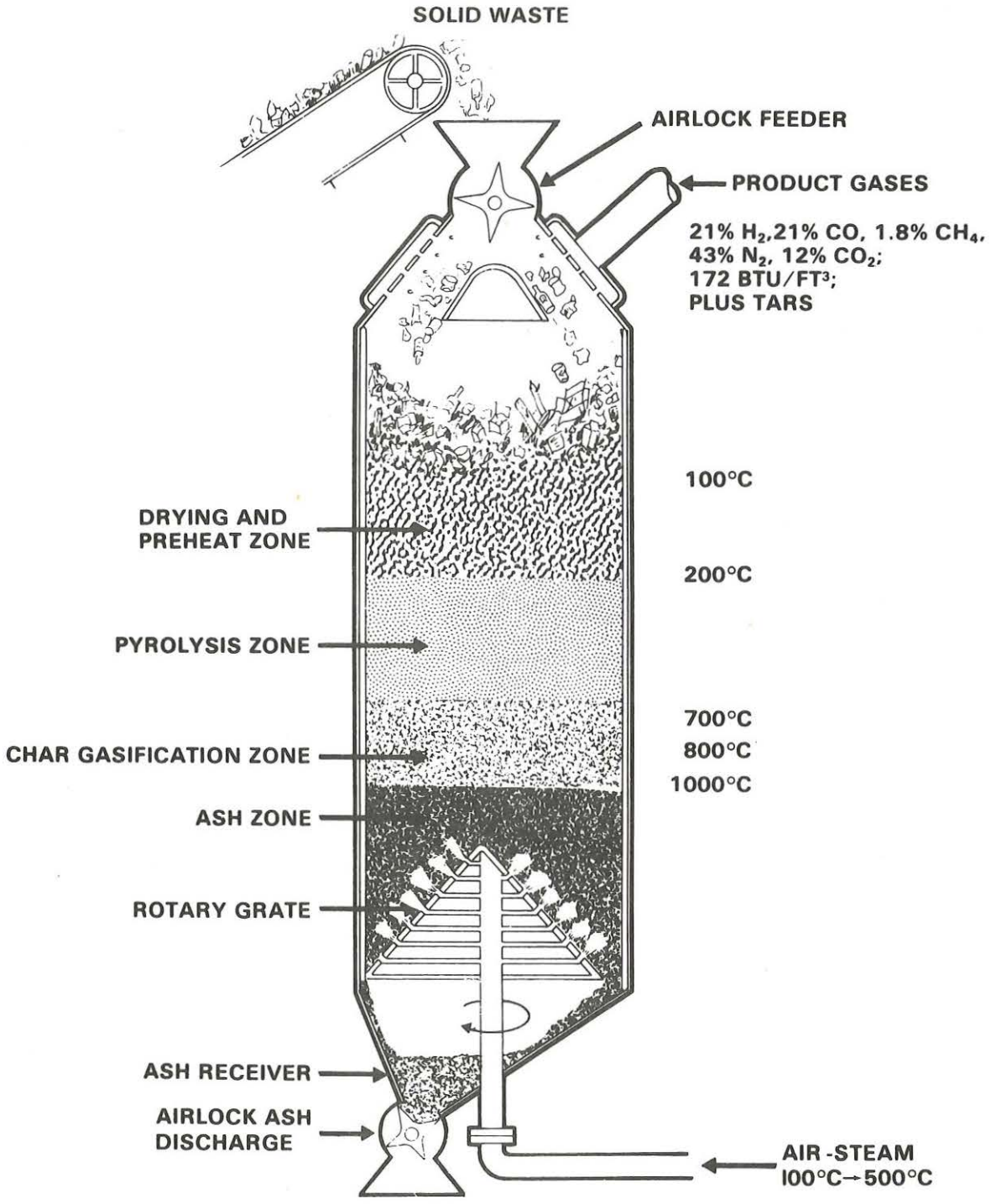


FIGURE 1. Schematic of Battelle Gasification Process

In addition to the above studies, we have permission (procured with the assistance of Senator Hatfield) to have straw tested as a potential raw material in the ERDA-Bureau of Mines COSTEAM type process in the pilot plant just starting up in Albany. We have also received cooperation from Union Carbide in assessing the theoretical potential of straw as a raw material in the Purox pyrolysis system. The evaluation looks promising. The Purox process is generally accepted as the most well-developed pyrolysis process.

FEEDSTOCKS FOR CHEMICALS

CHEMICAL FEEDSTOCKS FROM PYROLYSIS OF STRAW

Once one has produced pyrolysis gas, he has the essential building blocks to manufacture virtually any desired chemical. The vast majority of technically possible products are, of course, economically infeasible. Two commodity chemicals of commercial importance, ammonia and methanol, are very close to being economically feasible. Both products are currently made from natural gas commercially. The major components of pyrolysis gas are actually better raw materials for conversion to methanol or ammonia.

Seattle has had a plan under study for over two years to build a plant to produce methanol or ammonia from pyrolysis gas from municipal solid waste. We have given serious consideration to just such a possibility using a combined feed of municipal solid waste from the Willamette Valley and grass straw. Several day-long meetings have been held with local waste collection companies, Reichhold Chemical Corp., W. R. Grace Co., Battelle, and our special consultant R. W. Corlett to explore the technical and economic circumstances involved in combining 250,000 tons/year each of straw and MSW in a Willamette Valley plant to produce a) fuel or synthesis gas or
b) ammonia - 160,000 T/yr, or
c) urea - 280,000 T/yr
d) methanol- 250,000 T/yr.

Such a plant would cost approximately $60,000,000 and be marginally competitive in ammonia and urea, non-competitive in methanol. Our conclusions to date indicate that pyrolytic gasification is the most practical first step. The other synthesis steps can follow when feasible.

The intrinsic attraction to producing ammonia from grass straw is the closed loop for local agriculture, in its use as fertilizer. Unfortunately, present day economics in the form of natural gas prices do not warrant more than a theoretical look at this possibility. As mentioned above, however, the relative economics are changing daily in the Pacific Northwest as natural gas prices continue upward.

Another very interesting possibility for chemical production from grass straw recently has surfaced. Studies in Finland have shown very strong indications that a type of sugar, xylitol, which may be produced from vegetative materials, has the exciting property of not only being an alternative sweetener for common table sugar but aiding in the prevention of dental caries as well. Finland already has many products on the market using this sweetener. Studies in the United States have just begun at the Institute of Dental Health, Bethesda, Md.

XYLITOL is already on the USDA's Generally Recognized as Safe list. The possibilities for this product are particularly exciting to us because its raw material is a major constituent of grass straw and will be available in extracted, aqueous form as a side stream of the fiber producing system we are concurrently developing. We are in the very early "paper" feasibility evaluation stages on this one.

It appears that interest has waned for straw as a raw material for a local furfural plant. There are several reasons for this: The expense of collection and storage of grass straw prices it above alternative raw materials available elsewhere (e.g. wheat straw in Kansas). Secondly, as much straw as we are blessed with, it takes a great deal for an economically sized furfural plant. No manufacturer wishes to be in the uncomfortable bargaining position of having to get all the available local raw material. Finally, there is only one major U. S. manufacturer of furfural, the Quaker Oats Company. The Quaker Oats Company has built up its market for furfural and its derivatives over the last forty years. Other companies are wary of attempting to break in against such market strength. Since straw is one of the better potential furfural raw materials, however, the possibility always remains that renewed interest may one day be aroused.

EXCERPTS FROM SB311

INTRODUCTION 468.455: Purpose

In a concerted effort by agricultural interests and the public to overcome problems of air pollution, it is the purpose of this 1975 Act to provide incentives for development of alternatives to open field burning, to phase out open field burning and to develop feasible alternative methods of field sanitation and straw utilization and disposal. ...

468.470: The Committee

(1) The Oregon Field Sanitation Committee is established and for the purposes of this 1975 Act shall be referred to as the "committee." The committee shall consist of two members representing agriculture appointed by the Director of Agriculture from a list of five nominees submitted by the Oregon Seed Council, two members representing the public appointed by the director of the department (Department of Environmental Quality) and a fifth member appointed by the Governor. Members shall be persons knowledgeable concerning agricultural practices and air quality control practices which are the subject of ORS 468.455 to 468.485.

(2) The committee shall assume the duties and responsibilities formerly held by the field burning committee established pursuant to section 4, chapter 563, Oregon Laws 1971 (regular session), which committee is abolished. However, members of the field burning committee shall be the members of the field sanitation committee until their terms expire pursuant to subsection (3) of this section.

(3) The term of office of each member of the committee is four years, but a member may be removed for cause. By lot, the committee shall select two of its members whose terms expire on December 31, 1976 and one of its members whose term expires December 31, 1977. The remaining members' terms shall expire on December 31, 1978.

(4) The committee shall:

(a) Monitor and conduct programs for development of feasible alternative methods of field sanitation and straw utilization and disposal;

(b) Make recommendations for research and development of alternative methods;

(c) Provide assistance to persons wishing to obtain the use of feasible methods of field sanitation and straw utilization and disposal and, in so doing, assist in purchasing, purchase and lease to users, and promote extensive use of such methods;

(d) Receive and disburse funds, including but not limited to voluntary contributions from within and outside this state, grants and gifts; and

(e) Report quarterly to the Legislative Committee on Trade and Economic Development on the progress being made in discovering and utilizing alternatives to open field burning.

Excerpts from SB311, 468.470: The Committee (continued)

(5) Subject to the approval of the Executive Department, the committee may:

(a) Enter into contracts with public and private agencies to carry out the purposes of demonstration of alternatives to agricultural open field burning;

(b) Apply for and obtain patents in the name of the State of Oregon and assign such rights therein as the committee considers appropriate;

(c) Employ such personnel as is required to carry out the duties assigned to it; and

(d) Sell and dispose of all surplus property of the committee, including but not limited to straw-based products produced or manufactured by the committee. ...

468.475: Acreage

(1) No person shall open burn or cause to be open burned in the counties specified in subsection (2) of ORS 468.460, perennial or annual grass seed crops used for grass seed production or cereal grain crops, unless the acreage has been registered pursuant to ...

(2) Except as may be provided by rule under ORS 468.460, the maximum total registered acreage allowed to be open burned pursuant to subsection (1) of this section shall be as follows:

(a) During 1975, not more than 235,000 acres may be burned. ($3.00/A fee)

(b) During 1976, not more than 195,000 acres may be burned. ($4.00/A fee)

(c) During 1977, not more than 95,000 acres may be burned. ($5.50/A fee)

(d) In 1978 and each year thereafter, the commission (EQC), after taking into consideration the factors listed in subsection (2) of ORS 468.460, may by order issue permits for the burning of not more than 50,000 acres. ($8.00/A fee)

(e) The acreage amounts provided in paragraphs (c) and (d) of this subsection are declared to be the goals of the Fifty-eighth Legislative Assembly. The commission and the Legislative Committee on Trade and Economic Development shall report to the Fifty-ninth Legislative Assembly with their recommendations for possible modifications. ...

468.485: Money

All moneys collected under paragraph (b) ... or received pursuant to this 1975 Act, except fines, shall be segregated from other funds and used solely for administrative expenses of the committee and for development and demonstration of alternatives to agricultural open field burning and methods of straw utilization and disposal.

1976

MACHINE AVAILABILITY

July 12 following: 20 Total Days, 3 rainy + 2 Sunday = 15 available

#75-03 available from 6/15, first trial 7/6, first harvested 7/15, 17 total days in operation or ready.

#75-04 available from 6/30, first opportunity 7/19, first harvested field ready 7/28, 7 total days in operation or ready.

DEQ Quotas issued on 10 total days, 9 days North, 3 days South, 3 days prohibited, 1 day of issue was rainy.

August: 31 Total Days, 14 rainy + 2 Sunday = 14 available for work.

#75-03 in operation 16 days
#75-04 in operation 11 days, hampered by wind on 5.
#75-01 available from 8/9, first opportunity 8/18, working 8 days
#75-02 available from 8/9, first opportunity 8/18, working 6 days

DEQ Quotas issued on 14 days, 11 days North, 9 days South, 4 days prohibited, 9 rainy days of 14 issued.

September: 30 Total Days, 9 rainy + 3 Sunday/holiday = 18 available.
#75-03 in operation 4 days, then moved off to repair and grower use.
#75-04 in operation 1 known day, then in private use by grower.
#75-01 in operation 10 known days, then to private grower use.
#75-02 in operation 9 known days, then to private grower use.
#76-05 in operation 9 days, available 9/10, with first burn on 9/11, then next opportunity 9/20.
#76-06 in operation 7 days, available 9/21.

DEQ Quotas issued on 18 days, 17 days for North, 9 days for South, 11 days prohibited, and 8 rainy days of 18 issued.

October: 16 Total Days to October 16th, 6 rainy = 10 working days.

#75-01, -02, -03, and -04 all operated by growers on own acreages.
#76-05 in operation 8 days
#76-06 in operation 8 days

DEQ Quotas issued for total of 5 days, 5 days North, 4 days South, 3 days prohibited - through October 8th.

Total for period July 12 through October 16:

97 days, 32 raining + 7 Sunday or holiday = 57 working days.
DEQ quotas issued on 47 days, of which 18 were raining.
Quotas issued for North Valley on 42 days,
and for South Valley on 25 days.
Prohibited burning on 21 days.

Machines were burning on 60 days, not including private use of the machines, within same time span as our DEQ information.

1976
MACHINES IN OPERATION

#75-03 - Averages from field operations - 37 days, 237½ hrs burning

Orchardgrass	44A, 2.2 T/A,	34 Hrs =	1.34 A/Hr, 2.85 T/Hr,	33% M.C.
Perennial Ryegrasses	216A, 2.7 T/A,	116 Hrs =	1.86 A/Hr, 5.0 T/Hr,	32.4% MC
Bluegrasses	175A, 1.85T/A,	87 Hrs =	2.0 A/Hr, 3.67 T/Hr,	36.5% MC
ALL Grasses	435A 2.3 T/A,	237 Hrs =	1.84 A/Hr, 4.22 T/Hr,	33% Av.MC

#75-04 - 25 days, 119.5 hours burning - width only 10'

Annual Ryegrass	8A, 6.5 T/A,	24 Hrs =	.34 A/Hr, 2.17 T/Hr,	13% M.C.
Fescue	20A, 2.0 T/A,	31 Hrs =	.65 A/Hr, 1.29 T/Hr,	22% M.C.
Perennial Ryegrasses	19A, 3.0 T/A,	22 Hrs =	.86 A/Hr, 2.59 T/Hr,	30% M.C.
Bluegrasses	18A, 2.0 T/A,	20 Hrs =	.9 A/Hr, 1.8 T/Hr,	36% M.C.
Bentgrass	3A 4.7 T/A,	8 Hrs =	.4 A/Hr, 2.35 T/Hr,	47% M.C.
ALL grasses	68A 3.3 T/A,	105 Hrs =	.65 A/Hr, 2.14 T/Hr,	30.5% MC
Wheat stubble	13A 5.3	14 Hrs	.88 A/Hr, 4.8 T/Hr,	Unknown

#75-01 - 14 days, 60 hours

Tetraploid	45A 1.9 T/A	25 Hrs =	1.8 A/Hr, 3.42 T/Hr,	24% MC
Perennial Ryegrasses	26A 2.5 T/A,	23 Hrs =	1.15 A/Hr, 2.88 T/Hr,	52% MC
Orchardgrass	27A 3.8 T/A	12 Hrs =	2.25 A/Hr, 8.55 T/Hr,	30% MC
ALL grasses	99A 3.0 T/A	60 Hrs =	1.65 A/Hr, 4.95 T/Hr,	39% MC

#75-02 - 13 days, 88.5 hours

Annual Ryegr.	5A, 4.0 T/A	9 Hrs =	.58 A/Hr, 2.32 T/Hr,	16% MC
Fawn Fescue	50A, 4.1 T/A,	50 Hrs =	1.0 A/Hr, 4.1 T/Hr,	49% MC
Perennial Ryegrasses	65A, 2.7 T/A,	29 Hrs =	2.24 A/Hr, 6.05 T/Hr,	43% MC
ALL Grasses	120A, 3.4 T/A	88 Hrs =	1.36A/ Hr, 4.63 T/Hr,	39% MC

#76-05 - 17 days, 65.5 hours

Bentgrass	108A, 2.8 T/A	41 Hrs =	2.6 A/Hr, 7.29 T/Hr,	50% MC
Per. Ryegr.	90A, 3.0 T/A	24 Hrs =	3.75 A/Hr, 11.25 T/Hr,	48% MC
ALL Grasses	198A, 2.9 T/A	65 Hrs =	3.02 A/Hr, 8.77 T/Hr,	49% MC

#76-06 - 12 days, 47 hours (October days are 4 hour effective time)

Bentgrass	43A, 5.0 T/A	18 Hrs =	2.39 A/Hr, 11.94 T/Hr,	31% MC
Per. Ryegr.	48A, 2.2 T/A	29 Hrs =	1.65 A/Hr, 3.64 T/Hr,	46% MC
ALL Grasses	91A, 3.6 T/A	47 Hrs =	1.94 A/Hr, 6.97 T/Hr,	39% MC

OVERALL TOTAL 1011A, 3.1 T/A, 602 Hrs = 1.68 A/Hr, 5.22 T/Hr, 38.2%MCAve.

1976
FIELD INFORMATION

No.	Dates	Owner	Crop	Total Acres	Straw MC	Straw T/A	Total Days	Net Hrs	Machine
1)	7/6	Hector	Orchardgrass Hay	10A	45%	2.2T	1	4	#75-03
2)	7/12-15	"	Perennial Ryegrass	32A	25%	.75	3½	28	"
3)	7/15-17	"	Orchardgrass	17A	22%	2.25	2½	15	"
4)	7/18-19	"	"	17A	22%	2.25	2	15	"
5)	7/19-27	Normarc	Gulf Annual Ryegrass (8 A burned)	Border 120A	13%	6.5T	6	24	#75-04
6)	7/21-22	Dannen	Bluegrass	12A	19%	2.2T	1¼	6	#75-03
7)	7/22-23	DeConinck	Pennfine Perennial Ryegrass	40A	37%	2.2T	2	11	"
8)	7/26-30	Rose (Fairfield)	Citation Perennial Ryegrass	70.5	34%	3.2T	5	34½	"
9)	7/28-8/2	Weisz	Fescue	20A	22%	2. T	5	31	#75-04
10)	8/2-4	Weisz	Citation Perennial Ryegrass (8 A = #4, 22A = #3)	30A	25%	1.9T	2 3	9 14	(#75-04 #75-03)
11)	8/3-5	Weisz	Citation Perennial Ryegrass (5A=#4, 22A=#3)	27A	30%	2.6T	2 1	7 9	(#75-04 #75-03)
12)	8/5-6, 8/9	Weisz	Wheat Straw (13.1 A burned)	28A	Very Wet	5.3T	3	14½	#75-04
13)	8/6,10	Owre	Manhattan Perennial Ryegrass (6A=#4, 11A=#3)	17A	35%	4.6T	1 2	6 7½	(#75-04 #75-03)
14)	8/11-12	Owre	Bluegrass (16A=#4, 4A=#3)	20A	37%	2.7T	2 1	19 4	(#75-04 #75-03)
15)	8/18-19	Owre	Manhattan Perennial Ryegrass	17A	38-47%	4.9T	2	11	#75-03
16)	8/18	Conrad	Annual Ryegrass (5½A burned)	(Ring 120A)	16%	4.+T	1	9½	#75-02
17)	8/23-9/1	Conrad	Fawn Tall Fescue	50A	(60-38%	4.1T	7	50	#75-02
18)	8/18-24	Pope	Tetraploid Ryegrass	45A	24%	1.9T	4	25	#75-01
19)	8/24-28	Pope	NK200 Perennial Ryegrass (3A burned)	50A	52%	1.3	2	3½	#75-01

1976
FIELD INFORMATION

No.	Dates	Owner	Crop	Total Acres	Straw MC	Straw T/A	Total Days	Net Hrs	Machine
20)	8/20	Pohlschneiders	Citation Perennial Ryegr.	17A				-0-	#75-03
21)	8/20-26	"	Merion Bluegrass	46A	(41-48%	1.9T	2	11	#75-03
22)	8/27-29	"	Merion Bluegrass	55A	(41-48%	1.9T	3	30	#75-03
23)	8/23-28	"	Pennfine Perennial Ryegrass (Wind + Rain = None)				5	-0-	#75-04
24)	8/30-9/1	"	Newport Bluegrass	37A	35%	1.2T	3	1 21½	(#75-04 #75-03)
25)	9/2-3	"	Newport Bluegrass (23A burned, burned to 11 PM 9/3)	33A	32%	1.+T	2	15	#75-03
26)	9/2-3	Jenks	NK 100 Perennial Ryegrass	20A	39%	2.2T	2	10	#75-02
27)	9/4,9	Jenks	NK 100 Perennial Ryegrass	40A	39%	2.2T	2	14	#75-02
28)	9/10	Jenks	Fescue (.2A burned)	40A		2. T	1	2	#75-02
29)	8/30, 9/1	Hector	Manhattan Perennial Ryegrass (18½A burned, abandoned due to sparse fuel)	60A	53%	2.4T	3	14½	#75-01
30)	9/2	Ashling	Orchardgrass (.5A burned, too hot)	14A	24%	5.1T	1	¼	#75-01
31)	9/3	Kirsch	Pennfine Perennial Ryegrass (1.5A burned, then machine needed repair)	-	55%	1.9T	1	1	#75-03
32)	9/9-11	VanLeeuwen	Orchardgrass	27A	26-34%	3.8T	3	12	#75-01
33)	9/13, 20	VanLeeuwen	Pennfine Perennial Ryegrass (10A burned, too wet)	40A	52%	3.7T	1 1	5 5	(#75-01 #75-02)
34)	9/8-10+	Funrue	Bentgrass (3.5A burned)	10A	47%	4.7T	3	8	#75-04
35)	9/11-13,21	Nicewood	Bentgrass	40A	52%	2.5T	4	14	#76-05
36)	9/24-10/4	Nicewood	Bentgrass	68A	(46-49%	3.2	7	27½	#76-05
37)	9/21-10/1 10/4-6	Ringsdorf	Linn Perennial Ryegrass (Plotburner burned corners)	50A	46%	2.2T	7 3	29 14	#76-06 Plot-B

1976
FIELD INFORMATION

No.	Dates	Owner	Crop	Total Acres	Straw MC	Straw T/A	Total Days	Net Hrs	Machine
38)	9/25-29	Rose	Manhattan Perennial Ryegrass	25A	41%	3.1T	3	13½	#75-01 #75-02
39)	10/1-20	Rose	Manhattan Perennial Ryegrass		(51-55%	3.1T			#75-01 #75-02 #75-03
40)	10/7-16	Venell	Highland Bentgrass	43A	31%	5. T	5	18	#76-06
41)	10/7-20	Hector	Manhattan Perennial Ryegrass	90A	48%	3. T	6	24	#76-05

GRASS CROP DISTRIBUTION

Orchardgrasses -	71.5 acres total -	29% average moisture, 22-45% range
Bluegrasses	192.5 acres total -	36% Average moisture, 19-48% range
Fawn Fescue	50 acres total	40% average moisture, 22-60% range
Fescue	20 acres total	
Perennial Ryegrasses	497.5 acres total	41% average moisture, 25%-55% range
Annual Ryegrass	13.5 acres total	15% average moisture, 13-16% range
Tetraploid	45 acres total	24% moisture
Bentgrasses	154.5 acres total	45% average moisture, 31-52% range

1044.5 acres + 13 wheat stubble + misc. aborted trials
1075 acres total recorded, 587 hours, 60 days
Averaging 1.8 Acres/Hour for the entire season
41 fields, 18 individual growers
Overall average moisture was 38%.

DESCRIPTION OF MACHINES AND FIELDS

Plot Burner - #76-PB

The machine was built by Rear's Manufacturing Company to drawings completed March 3, 1976, in order to test certain principles and redesign features before incorporating them into revisions of the larger 1975 Dragonfly redesigns, or 1976 models of sanitizers. Operating width of 6 ft., with the same road width, the machine was tested first on a high green field of weeds May 15th, then moved to Oregon State University's Hyslop Farm, tested May 27th. Rains were consistent precluding the application of Paraquat, since it was washed off before it could become effective. A demonstration burn was made June 18th and another July 13th. The Z-deck design, which proved effective with this machine, was adjudged not adequate for larger units, later proven correct.

The machine continues to be used for test plots, apparently is easy to operate with a minimum of setting up time or moving time and preparation. It was used during the entire season by OSU staff and students, and used early October to burn "eyebrows" left by inexperienced operators of the very large machine on the Ringsdorf acreage.

Road width of the #75 machines #75-01, -02 and -03 is 12 feet, and of #75-04 is the machine width of 10 feet.
Roadwidth of the #76 machines #76-05 and -06 is 15 feet.
To achieve these widths, the wings are folded up, which was the origin of the Dragonfly designation.

Crazy wheels were added in 1976 to increase the support and maneuverability of the wings when opened to operating width.

Road wheels with rubber tires are replaced by steel wheels which can survive burning straw at the rear of the machines, when in operation.

Water cools the wheels, and also steam quenches the exposed sides and rear of the machines in order to prevent side-fires, and a chain-drag at rear tends to eliminate or quench afterburn in most of the crops.

Field Sanitizer #75-01

Machine #75-01 is a completely re-designed Dragonfly from 1975 with a Z-plenum deck, variable throat and height and improved air bars. It is quite similar to the Plot Burner (PB-76) newly designed and in use by Oregon State University on its test plots. However, it is full size with a burning width of 22 feet and length of 24 feet. The machine was delivered to the Suver area in Polk County, to Mt. View Farms. Due to modifications and continuing rain after delivery August 9th, it did not burn until August 18th.

Field No.

18) Tetraploid ryegrass field of 45 acres had straw removed to a 2" stubble, with 1.9 tons per acre remaining at 24% moisture. The first day, August 18th, the machine was set up, the field was then ringed. The next three days in 8 hour burning days, about 32 acres were burned, and on the 24th of August the field was completed in 5 hours. Operators were inexperienced at first, learned about turning and maintaining the hitch. The machine was moved to another Mt. View Farm field, emission equipment was set up, and rain came. Rains continued and August 26th the field was still too wet.

19) NK200 Perennial ryegrass field of 50 acres of Mt. View Farm, which had been too wet August 26th, proved to be still too wet, at 52% moisture, with too little straw, at 1.27 tons per acre, to maintain fire, even after drying days finally came. The field was abandoned August 28th, and the machine moved nearby to the next field listed.

29) Manhattan Perennial ryegrass, a 60 acre field also in Suver - Independence Highway area, farmed by Don Hector, was attempted August 30 through September 1st. Straw had been removed, leaving a measured total of 2.4 tons per acre, but at 53% moisture. Even with air temperatures of 80° to 90°, large amounts of propane were required. After burning 18½ acres, the field was abandoned.

30) An orchardgrass field of approximately 14 acres had been offered by Roy Ashling as an experiment with a full load of straw. The machine moved to the field September 2, on a warm sunny 75° day, with an estimated 4 to 5 tons, flail chopped. Orchardgrass proved, as predicted, to be too hot with the full straw load, and the field was abandoned. Rains occurred again over the Labor Day weekend, but some growers finally completed combining the seed.

32) The machine moved to the VanLeeuwen farm at Irish Bend to 27 acres of orchardgrass, and 90° weather September 9, which cooled by the 11th when the field was completed. 3.8 tons of straw at 26% to 34% moisture allowed burning only about 12 hours of a total of 24 on the field. The week of September 13 through 18th was rainy.

33) Pennfine perennial ryegrass, 40 acres, at 52% moisture with 3.7 tons of straw and stubble per acre, mostly green regrowth with too little loose straw allowed only 10 acres to be burned by both #75-01 and #75-02 sanitizers working together. September 21 was too damp, overcast and with heavy dew, preventing burning at all.

Field Sanitizer #75-02

This machine is revised on the frame of a 1975 Dragonfly. It was completely redesigned and incorporates another type of air bar, jet cooling system. It is 24 feet wide, wider than machines #75-01 and #75-03, 24 feet long, with variable height and throat. The machine was delivered to the Tangent area of Linn County on August 9th, but rainfall prevented its use until August 18th.

Field No.

16) Annual ryegrass field of 120 acres, being farmed by Amos Conrad, was to be ringed only in another of the experiments desired to determine operational characteristics of the sanitizers. Straw had been roved leaving a 3" stubble, but the damp fuel was placed in such a way as to encourage rather than discourage runaway fires. Only approximately $5\frac{1}{2}$ acres were actually burned in $9\frac{1}{2}$ hours over a 3 day period. Like all ryegrass of the annual varieties, since the plant itself has died, the moisture is that of dried or dead material only, in this case 16%.

17) Fawn tall fescue, a 50 acre priority field of Conrad's had straw removed, 5" to 6"stubble remaining, over 4 tons/acre. A flat field with four ditches, the first four days August 23rd on proved too rainy, wet or damp to burn. The last two days, August 27 and 28, temperature was 80^{o} to 90^{o}, permitting burning which was completed by September 1st during continuing hot day days.

26) September 2nd the machine was moved to Jenks' Hatchery, also in the Tangent area, onto 20 acres of NK 100 Perennial ryegrass that had been open burned under wet conditions, unsuccessfully, still had approximately 2 tons per acre of straw. Weather was sunny, windy and the acreage was burned in two days, and another field on the same farm was tried.

27) NK 100 Perennial ryegrass, 40 acre field was begun September 4th. Straw had been removed, leaving 4" stubble, open burn had been attempted. The field was completed September 9th following Labor Day weekend and some rain.

28) A fescue field of 40 acres owned by Jenks had been previously open burned, with uneven straw load remainint. Attempts to machine burn were not satisfactory, requiring excessive propane, and the project was abandoned.

33) The machine was moved to VanLeeuwen's at Irish Bend, and Pennfine perennial ryegrass field of 40 acres was started September 13th, interrupted by rain September 14th which left the field too damp so that attempts the rest of the week were unsuccessful in maintaining a fire. The sanitizer #75-01 was tried on this field at the same time. Finally both were moved to the North Valley to fields with less re-growth, after burning 10 to 15 acres total of the 40 acres.

38) Manhattan perennial ryegrass, 25 acre field on which stubble had to be mowed before burning, was burned September 25 through 29th by sanitizers #75-01 and #75-02, later joined by #75-03. Under adverse conditions, #75-02 burned better. Woodburn area, Rose farm.

39) The machine continued to be used on fields farmed by Bill Rose in Woodburn, then Molalla, with a short period of assistance by the Committee operating crew, and in cooperation with the other two sanitizers #75-02 and #75-03. All eventually were placed in storage in the Molalla area, their engines removed and general "mothballing".

Field Sanitizer #75-03

The machine has a burning width of 22 feet, by 24 foot length, is the 1975 Dragonfly machine design modified chiefly by the addition of stainless steel skins on the 1975 frame, replacing the temporary experimental low-cost metal used in 1975. The machine was delivered June 15 but intermittent rains and late seed harvests prevented use prior to mid-July.

Field No.

1) Orchardgrass Hay - 10 acre field test-burned July 6th; immediately following and prior to heavier rains, with no seed-harvested fields yet available for testing. The field had heavy regrowth, stubble was 2" to 6" high. 10 Acres, 45% moisture, 4 hours burning and ½ hour fueling, 120 fpm and southwest wind, Hector Farm.

2) Perennial ryegrass - 32 acres on Pettibone Road north of Corvallis, Hector Farm. Began July 12th but too wet, thin and sparse field had 6" stubble, only 3/4 ton per acre of straw, moisture range was 18% to 28%. Two hours a day were spent refueling, getting water or in meals. 28 hours required to burn, total burning time.

3) & 4) Orchardgrass in two fields each 17 acres, of Hector Farm, had stubbe of 3" height at about 2¼ tons per acre, 22% to 25% moisture range, burning July 15th through 19th, with air tmp 80-95° F., sunn, north wind at 5 mph, then SE wind at 3 mph. Fueling approximately 2 hours per day, the 34 acres were finished in approximately 30 hours actual burning time.'

6) Bluegrass fields of Dannen were two separated 6-acre flat parcels, 3" to 6" stubble, 19% moisture, machine rate was 85 to 115 fpm, after 5 hours burning on the first day, humidity July 21st was too high, and an hour the next day finished the field in the Shedd area. The machine then moved to Woodburn where more harvested acreage was available.

7) Pennfine perennial ryegrass field of 40 acres, belonging to DeConinck, had been flail chopped, has 3" to 6" stubble. The machine was ringed the first day, about 4 acres, and finished the second day for a total of 11 hours actually burning 40 acres of 2.2 tons per acre, 37% moisture.

8) A large flat 70.5 acre field of Citation perennial ryegrass belonging to Bill Rose, known as Deerfield or Fairfield area was a very rough field with a very steep slope to 30° in one area. It had ditches, some straw still left in windrows, stubble height varied 2" to 6". The machine was difficult to control on sidehill turns, caused some minor repairs. A total of 60 hours in 5 days included moving into and away from field (not easy) and repair time, with the actual burning time amounting to 34½ hours for 70½ acres, 3.2 tons per acre, 34% to 37% moisture range. This completed the activity during July.

10) Citation perennial ryegrass flat field of 30 acres, the middle of three John Weisz Jr. fields, was shared with sanitizer #75-04. Weather began 75° and sunny, became overcast and 70% humidity before the field was completed August 4th. Flat field, no ditches, it had sparse fuel in NE corner causing fire to go out, heavy fuel in NW corner requiring slow speed. Average straw load was 1.9 tons per acre at 27% moisture, and 22 acres were burned in 14 hours, remaining acreage was burned by #75-04. Some repairs of skirts were made.

11) Adjoining Citation perennial ryegrass field of 27 acres was burned the following day in 9 hours of burning and 1 hour spent refueling, with this machine burning 22 acres, and #75-04 the other 5. Weather was overcast, 2.6 tons per acre straw at 30% moisture, 70° F.

13) Manhattan perennial ryegrass in nearby Hubbard acreage of Jess Owre was burned August 6th, 17 acres with a very heavy fuel load of 4.6 tons per acre, 35% moisture increased and August 7th was rained out. Finally August 10th the field was completed jointly with the participation of #75-04. Some of the total consumed time was absorbed by emissions testing.

14) Bluegrass field of Owre, 20 acres, was also burned with both machines. #75-03 did not burn the heavy 2.7 tons/acre, 37% moisture stubble as well as #75-04, and this machine completed 4 acres of the 20, was affected by the excessive bluegrass heat. Emissions testing also consumed time - 2½ hours, and 1½ hour delay in starting was due to the wet field. Rain August 13th continued through the 17th with the fields too wet to burn.

15) Manhattan perennial ryegrass, 17 acre field was tried on August 18th following 4 days of cool wet weather, straw lodged and wet under broken bales, with unbalanced windrows. The sun shone, 75° F., long days on the field were shared with waiting for drying, repairing minor items, 4 hours having emissions tests made. The burning continued at night to 11 PM on August 19th to finish the field. The night burning experiment revealed the need for lights on tractor, and caused some alarm because of the visible fire at night.

20) Citation Perennial ryegrass of the Pohlschneiders, 17 acres, was attempted on August 20, but had too little straw fuel and too much green regrowth, so machine was moved to another field.

21) Merion bluegrass field across the road, 46 acres, was then attempted on the same day, but humidity increased, burning was unsuccessful. The following day 7 acres were burned, August 23rd the fire went out frequently due to high winds, and August 24th began well, ended in rain that day and the next. August 26th cleared with 75°, sunny, and the field was completed, with the Pohlschneiders.

22) Another Merion bluegrass field with straw removed, and a light fuel load of straw on the 55 acres was burned in 3 days with few stops.

24) The next Pohlschneider field burned by this machine was 37 acres of Newport bluegrass with straw removed, a smooth level field with 2" of stubble, a thick thatch. In three days, through September 1, 36½ acres were burned, with the other ½ acre burned by machine #75-04. Emissions tests consumed 3 hours. Weather turned clear and hot, 80° to 90° F.

25) Newport bluegrass of Pohlschneiders, 33 acres and a 12 year old stand, had very heavy thatch, 4" stubble, with straw removed. It was a hard burn, with much afterburn and smoke due to dry field conditions and the heavy thatch. The first day burning continued to 11 PM, and burning was completed September 3rd, moved to the neighboring field.

31) Pennfine perennial ryegrass field of John and Paul Kirsch, a first year stand, was then tried. There was little straw in the chopped stubble, and wind made continuing the fire difficult. It was decided to shut the machine down for much-needed repairs after a total of nearly 450 acres burned between early July and September 3rd, chiefly in the Woodburn-St. Paul areas.

39) Because of the availability and interest of Bill Rose and his shop the machine was taken there where burned-out airbars were replaced and other minor repairs, and the machine was replaced in service by Bill Rose on his own acreage with his own crews, after a short period of instruction and emission testing the end of September in conjunction with operation of sanitizers #75-01 and #75-02.

Field Sanitizer #75-04

The machine is the prototype used in 1975, has a burning width of 10 feet, by 24 feet long, has a revised corrugated deck with 6 air bars. Its nominal straw tonnage capacity is 3 tons per hour, or $1\frac{1}{2}$ acres per hour normal sanitizing. It was delivered to the Woodburn area June 30, but heavy rains and unharvested fields prevented its use. An experimental field of annual ryegrass with a full load of straw was offered by Normarc, Inc. Since this was felt to be the only machine capable of handling such a straw load, it was moved there July 19.

Field No.

5) Gulf annual ryegrass field of 120 acres had no straw removed, and measured 6 to 6.5 tons/acre. There had been no burn in the prior two years, and heavy thatching on the ground was evident. The field borders the freeway, south of Albany, and is also surrounded by houses, making a difficult situation. The operators were also inexperienced, and overheating resulted, requiring repairs for two days. Between July 23 and 27th fire breakout, severe winds and the heavy straw consumed most of the hours, finally causing the total abandonment after burning 12 acres, due to strong winds. The machine was moved to the Woodburn area where some fields had been harvested.

9) Fescue field of 20 acres belonging to John Weisz Jr. was burned in 3 days. Winds were strong and fire control was difficult at time. Straw had been baled, leaving 2" to 4" of stubble amounting to two tons per acre and 27% moisture. This was the southernmost of three fields adjoining.

10) Citation perennial ryegrass, the middle field of 30 acres, was burned in cooperation with sanitizer #75-03. 8 acres were burned with this machine, in 9 hours on a sunny two-day period. The machine then moved to the northern field in mid-day August 3rd.

11) Citation perennial ryegrass, the northern field, had 27 acres of which this machine burned 5 in conjunction with #75-03, on the afternoon of August 3rd, a warm sunny day, and August 4th when increasing humidity required more propane, and the experience of running out of propane. A small hill of approximately 15^{o} slope was at one end of the field.

12) 28 acres of wheat stubble were an experiment, with straw standing at 15" to 18", a full straw load of 5.3 tons/acre, very wet. Straw had been removed around the edge of the field, and increasing damp and rain stopped the venture until August 9th, when the weather was cloudy but drying off, and it was found wheat straw burned very hot quickly, requiring considerable time in fire control.

13) Manhattan perennial ryegrass, 17 acre field of Owre, was burned by this sanitizer in cooperation with machine #75-03, the two operators rotating between machines. This machine burned about 5 or 6 acres in 6 hours, with some time not in use due to fighting fires or lack of good fire control equipment, August 10th, morning clouds cleared to 80^{o} afternoons, 4.6 tons/acre, 35% moisture, level field.

14) Bluegrass field of 20 acres belonging to Jesse Owre, straw removed and field smooth with a few ruts, some broken bales, two days August 11 and 12 of clear 80° and 85° weather, nearly 19 hours were spent burning, the second day 9 to 6 without stopping. The thatch was like lawn-grass, at 5", 2.7 tons per acre and 37% moisture. This field was burned in tandem with #75-03, and #75-04 did a better job, burned more acreage, and with less smoke. Next day August 13 rain, and rains continued to 18th, from 18th to 21st the grower was lacking crew, especially fire-rig, so #75-04's tractor and pull-tank were used in assisting #75-03 as fire-crew, especially important during emissions tests August 19th. Assisted #75-03 moving on August 20th, and #75-04 then moved August 21st to Pohlschneider's and tried to burn but couldn't keep fire.

23) Pennfine perennial ryegrass field at Pohlschneiders was tried but strong winds, rain, adjustments to machine, including flame deflectors, and fan belt guard installed all prevented burning. Use of #75-03 took precedence with operating crew.

24) Newport bluegrass 37 acre field of Pohlschneiders was burned chiefly by #75-03, but with assistance of #75-04 in burning ½ acre, but the field had insufficient fuel at 1 ton per acre, 2" stubble, for this machine.

34) The machine was moved from the Woodburn area to the Silverton Hills, to Funrue fields, where earliest tests resulted in insignificant acreage burned until September 8. Bentgrass field of 10 acres had a slight slope with not all straw removed, weather clear and warm but very strong winds at times making it difficult for the new inexperienced crew to maintain fire. The same was true in an area shaded by trees.

The machine remained in the Silverton Hills, in use by the grower at his own convenience, and then placed in storage there for the winter.

Field Sanitizer #76-05

This machine is designed for flat fields in the South Valley. It is 32 feet wide, 32 feet long. It has the same air system as machine #75-02. It is designed to burn at rates from 5 to 6 acres per hour. Bid on the machine was received July 9, with award a week later, it was delivered to the Halsey area about September 3rd.

Field No.

35) Bentgrass field near the American Can Company's pulp mill in Halsey, a field of Leroy Nicewood comprising 40 acres, the machine, although delivered September 3, could not burn until September 10th, then encountered cloudy damp weather, difficult to maintain fire at 52% moisture and $2\frac{1}{2}$ tons of straw on the field, until September 21, when the machine moved to a field across the road. The same weather, overcast with heavy dews and misty until 1 o'clock in the afternoon, cool temperatures, prevailed September 22 and 23.

36) Bentgrass field of 68 acres divided by a drainage ditch was burned in two portions of 18 and 50 acres. September 24 and 25 had good burns. Moisture range was 46% to 49%, and 3.2 tons per acre straw load, the field was burned September 26 to 29th, and finished on October 4th, the last day with reduced width of burn but continued in order to finish. Bentgrass was the last seed crop harvested, and exceptionally late, as were the other crops. Burning days in October were reduced to approximately 4-hour potential burning times.

41) Manhattan perennial ryegrass, 90 acres farmed by Hector in the Suver area was the last field burned by this machine, variously from October 7 to the 20th, as weather permitted. The field was 48% moisture, with 3 tons per acre straw and stubble in the regrowth. The field appears to exhibit considerable burnout, the extent of which will be apparent as the new season develops.

The machine was winterized and stored in the same Suver area, by October 25th.

Field Sanitizer #76-06

Machine #76-06 was built as the result of Committee decision in the latter part of June, and like its counterpart #76-05 bids were awarded approximately July 13, after being received July 9th for both machines, due to inadequate bid by one fabricator, and consequent delay by General Services to allow them the opportunity to maintain their bid or retract, which latter decision they wisely made. The machine was delivered in mid-September.

Field No.

37) Linn perennial ryegrass, 50 acres across the road from the Eugene airport on a field farmed by Ringsdorf, the field has been machine-burned every year since the beginning of experimental machines six years ago. The straw had been removed to a 2" stubble, with 2.2 tons of straw per acre remaining. New crew members were indoctrinated, the size of the machine presented learning difficulties with steering and more critical services. During the period of September 24 to 26th, 20 acres had been burned despite these new experiences, then repairs, folloed by rain, damp weather, winds prevented even operation. Essentially, the field was completed October 1, and the OSU Plot Burner was brought in the burn the corners that had been skipped, the "eyebrows" that were left when turns were incorrectly made by inexperienced operators. Following termination at this site, the machine was moved north to Corvallis.

40) 43 acres of bentgrass along Highway 99W, surrounded by houses and businesses were the final field burned by this machine. A Venell field, not burned in the two prior years, it was 31% moisture, with 5 tons per acre of straw. Crew had been reduced for all the machines to remaining experienced members not separated for the beginning of colleges, but effective days were short and few. The field was completed between October 7th and 16th. Efforts to reburn an area traversed once by the machine were of no avail, showing the machine to have been more effective than had been expected.

Following completion of burning, the machine was moved to an area less open to intrusion, on the airport at Corvallis, for winter storage, where the engine and fan were removed, the sanitizer "mothballed" for the winter.

EXTENSION SERVICE Oregon State University Corvallis, Oregon 97331

EVALUATION OF FIELD SANITIZER TEST MODELS--1976 1/

Harold W. Youngberg
Oregon State University

Introduction

This is a continuation of several years' intensive study of effects on seed crops produced by small scale models of sanitizers and observations of large scale field-size machines. Results of earlier tests indicated that sanitizers as designed will stimulate seed production as effectively as open burning when operated under the proper conditions, although some question about weed seed destruction and effectiveness of sanitation remains. Various machine designs subject the crop to different thermal exposure conditions. Crop effects vary from season to season as a result of weather conditions on the crop, making continued agronomic evaluation an essential part of a developmental program. This type of evaluation is necessary to describe the proper operating conditions if and when machine designs reach the point that they are ready for adoption into agricultural production.

Early machine designs developed high soil surface temperatures and threatened to kill the perennial crop plants. More recent designs have operated at reduced temperatures and there is concern that the treatment may be inadequate to sanitize the fields.

Methods

The field sanitation machines operated by the Oregon Field Sanitation Committee, were monitored as frequently as possible during the 1976 season. Temperature measurements were made at the soil surface using a thermocouple encased in cement with a 1/8 inch exposed tip. The cement block was buried with its upper surface and thermocouple wire exposed at the soil surface.

A bioassay of thermal exposure was made by scattering ryegrass seeds on the soil surface and also placing a small pile of seed ahead of the machine. The scattered seeds represented weeds and other seed or other material on the surface while the piles represented chaff piles that tend to insulate weeds and disease organisms from the heat treatment. This latter test is a measure of the ability of the treatment to disturb or otherwise achieve complete sanitation.

1/ This study was financially supported by the Oregon Field Sanitation Committee and had full cooperation of the staff.

The author acknowledges the assistance of Richard Lawson who made the field recordings.

11/76

OREGON STATE UNIVERSITY EXTENSION SERVICE

Agriculture, Home Economics, 4-H Youth, Forestry, Community Development, and Marine Advisory Programs Oregon State University, United States Department of Agriculture, and Oregon Counties cooperating

Results

The range of operating rates and temperatures recorded during 1976 are summarized in table 1. Travel rates reported are based on the speed of the machine at the moment the temperature recordings were made, not on the acreage burned in a given time period. In general the maximum temperatures were higher than those recorded in 1975 machines. The temperatures observed in fescue and bluegrass fields were higher than those in ryegrass fields. The higher maximum temperatures could cause some crop injury if the exposure were prolonged.

A good burn on bluegrass is difficult because of the dense mat and thatch conditions that sometimes develop. These conditions result in slower machine travel with accompanying higher soil surface temperatures with burners 75-02, 75-03, and 75-04 (see table 2). The fine leaf fescues and ryegrasses burn more readily if the fields are properly prepared by straw removal and uniform distribution of residual fuel.

In general all machines tested were quite effective in destroying seed and materials scattered on the soil surface. Machines 75-01, 75-02, and 76-05 were less effective than 75-03 in disturbing and sanitizing material in piles on the soil surface (see table 2) as determined by seed viability following exposure. This indicates that machine 75-03 was more effective in disturbing and scattering material on the soil surface.

Machines 75-01 and 75-02 were able to burn effectively under higher moisture conditions (following a rain, after morning dew, or with more plant regrowth) than machine 75-03 or 75-04. In at least one situation these machines were able to burn under adverse conditions when open burning was impossible.

Machine 75-03 was able to burn under very light fuel conditions, however it developed excessive heating under moderate to heavy straw conditions. This heating threatened crop as well as structural damage to the machine.

Slightly more straw fuel was required by machine 75-04 than machine 75-03 in order to operate satisfactorily. Machine 75-04 was more effective in sanitation than 75-03 as measured by seed survival tests.

Several cases of crop damage were observed from treatments made with machines 75-02, 75-03, and 76-05 made in late August, September, and October. Regrowth had started in these fields by that time making them susceptible to injury.

Templac plates were used to make temperature measurements on several occasions (table 3). These plates could be used by grower-operators to quickly check thermal exposure. In general the maximum temperatures observed corresponded to measurements made with the thermocouple in the lower temperature range. At higher temperatures or prolonged exposure times, the templac registered higher than the thermocouple.

The dates of observations during the 1976 season are noted on table 5.

Discussion

The 1975 and 1976 harvest and burning seasons were highly unusual because of considerable rainfall during July and August. This rain interrupted the normal harvest operations and interferred with the timely field sanitation. Many days were lost because the fields were too wet to burn.

The cool wet summer conditions not only delayed operations, but caused early germination of annual weeds and initiated fall regrowth of perennial grasses 30-45 days earlier than normal. This green regrowth interfered with the burning process and aggravated the smoke and after-burn problems.

It has been established and reported earlier that late season burning will damage the perennial grass stand and reduce seed yield in the following season. (Youngberg, Chilcote, and Kirk. 1975.) This condition normally occurs in mid to late September when cool nights and late summer rains stimulate fall regrowth. These conditions developed 4 to 6 weeks earlier during 1976 because of the cool, wet summer. As a result stand injury might be expected to result from thermal sanitation in late August and early September with the possibility of serious stand losses when burns are made in late September and October.

The normal safe burning season might be considered to include 60 days from July 15 to September 15. The wet summer conditions of this season shortened the safe burning time to approximately 45 days. (This is even shorter for late maturing crops such as Highland bentgrass.)

Alteration in machine in 1976 resulted in faster rates of operation and higher temperatures at the soil surface. Sanitation effect as measured by seed viability was improved based on comparison of results from 1975 and 1976. See table 4, Summary of 1975 Results for Comparison.

More injury to the perennial crop stand has been observed as a result of 1976 treatments. This may be attributed to the higher operating temperatures and the early fall regrowth.

The importance of proper field preparation prior to sanitation must be stressed. Straw removal from the fields prior to machine sanitation is essential to proper operating speeds and temperatures. The proper amount of straw and stubble for fuel must be left in the field and it must be uniformly distributed. Machine designers and operators must be aware of the wide difference in moisture content between the straw and stubble in a given field and the variation that can be expected between fields of different crops. The straw and stubble vary in moisture content from morning to mid-day as a result of dew.

The type of field preparation will depend upon the design of the machine being used. Each machine has its own fuel characteristics. Additional study will be required to describe the proper operating conditions when a machine design has been selected for wider field use.

Summary

An evaluation of operation of the 1976 models of the field sanitizers was conducted using temperature recorders and effects on seed viability as indicators of their characteristics. This season was abnormal because of midsummer rains which interfered with their machine operation and normal post-harvest crop conditions.

Rates of travel and effectiveness were improved as compared with 1975. Rates of travel of 0.5-5.7 acres per hour were observed. Some excessive temperatures were noted and some crop injury resulted from late-season operation. The several models field tested in 1976 varied in their effectiveness in sanitation and in their operating characteristics. In general the sanitation results were good.

Further study will be required before these machine designs can be considered operational and recommended for commercial operation. Recent tests have not completely established the crop tolerance to these designs when operating at the upper temperature range.

Reference Cited

Youngberg, H. W., D. O. Chilcote, and D. E. Kirk. 1975. Evaluation of a Field Sanitizer for Controlled Burning of Grass Seed Fields. Extension-Agronomic Crop Science Memo Report 10. Oregon State University.

Table 1
RANGE OF MACHINE OPERATING CHARACTERISTICS
UNDER TYPICAL CONDITIONS--1976

Burner	Rate (Acres/Hour)	Soil Surface Temp. Range °F. Min.	Max.	Crop	
1	1.8-2.0	Insufficient data		Ryegrass	
2	2.0-3.5	480	550	Ryegrass	1/
2	1.0-2.0	550	700	Fescue	
3	1.7-5.7	240	565	Ryegrass	
3	1.5-2.0	640	850	Bluegrass	
4	.5-1.5	245	300	Ryegrass	
4	.5-1.5	380	475	Fescue	
4	.5-1.0	300	650	Bluegrass	1/
5	2.8-3.2	Insufficient data		Ryegrass	
5	2.6-3.6	800	885	Bentgrass	
6	---------- NO DATA ----------				
Prototype	.2- .3	380	450	Fescue	

1/ Recorder peaked above scale; therefore, templaq readings used for maximum.

Table 2
SUMMARY
1976 FIELD SANITIZER NOTES
Harold Youngberg and Richard Lawson
Oregon State University

Burner	Date	Crop	T/A	Reading	Rate A/hour	Max. Temp. (°F.)	Burner Exposure (Seconds) Total Time	Burner Exposure (Seconds) Over 250°F.	Trial	Seed Germ. (%)	Remarks
75-01	8/20	Ryegrass	1.9	82001	2.0	108	22.0	0	1/ & 2/	0 & 11	3/
75-01	8/20	Ryegrass	1.9	82002	1.8	354	23.4	21.5	1/ & 2/	0 & 24	
75-01	8/20	Ryegrass	1.9	82003	1.8	>480	23.5	39.5	1/ & 2/	0 & 0	
75-02	8/27	Fescue	4.1	82701	1.9	584	25.0	23	1/ & 2/	0 & 23	
75-02	8/27	Fescue	4.1	82702	2.0	296	23.9	3.5	1/ & 2/	0 & 35	4/
75-02	8/31	Fescue	4.1	83101	1.3	701	37.8	66	1/ & 2/	0 & 60	
75-02	8/31	Fescue	4.1	83102	1.4	684	35.0	57	2/	14	
75-02	9/ 9	Ryegrass	2.0	90901	3.3	>480	14.4	23.5	1/ & 2/	0 & 19	
75-02	9/ 9	Ryegrass	2.0	90902	3.4	377	14.1	8	1/ & 2/	0 & 50	Crosswind reducing flame
75-02	9/13	Ryegrass	3.8	91301	2.0	>480	23.7	23	1/ & 2/	0 & 10	
75-02	9/13	Ryegrass	3.8	91302	2.4	250	19.9	0	---		Left side w/o flame
75-03	7/23	Ryegrass	2.2	72301	4.7	300	9.2	4	1/	8	
75-03	7/23	Ryegrass	2.2	72302	5.0	240	8.8	0	1/	6	
75-03	7/23	Ryegrass	2.2	72303	5.7	325	7.6	5	1/	0	
75-03	7/27	Ryegrass	3.2	72701	2.7	340	16.0	11	1/	8	
75-03	7/27	Ryegrass	3.2	72702	1.7	424	26.1	14	1/	0	
75-03	8/ 3	Ryegrass	1.9	80301	2.0	>480	21.5	26	1/ & 2/	0 & 0	
75-03	8/ 3	Ryegrass	1.9	80302	3.1	386	14.2	14	1/ & 2/	0 & 15	
75-03	8/ 3	Ryegrass	1.9	80303	1.9	563	22.6	39	1/	0	
75-03	8/24	Bluegrass	1.9	82401	2.0	643	22.2	32	2/	15	
75-03	8/24	Bluegrass	1.9	82402	1.9	769	23.5	63	1/	0	
75-03	8/30	Bluegrass	1.2	83001	1.5	749	29.0	59.5	2/	10	
75-03	8/30	Bluegrass	1.2	83002	1.9	847	22.8	70	2/	0	
75-03	8/30	Bluegrass	1.2	83003	1.9	769	23.3	75	---		
Has not been running since 9/3/76--Repairs not started until 9/10/76.											
75-04	7/23	Ryegrass	3.7	72304	0.7	250	30.2	0	1/	0	
75-04	7/29	Fescue	2.4	72901	0.6	473	33.8	25	1/	1	
75-04	7/29	Fescue	2.4	72902	1.3	382	15.6	9	1/	2	
75-04	8/ 2	Fescue	2.4	80201	1.2	424	16.6	15	---	---	
75-04	8/ 3	Ryegrass	1.9	80304	1.4	283	14.4	3	1/	0	
75-04	8/ 9	Wheat	---	80901	0.6	359	34.9	21.5	1/	0	Stubble wet
75-04	8/12	Bluegrass	1.7	81201	0.7	296	29.3	7	1/	0	
75-04	8/12	Bluegrass	1.7	81202	0.7	355	28.5	18.5	1/	0	
75-04	8/12	Bluegrass	1.7	81203	0.5	400	39.4	19	---	---	
75-04	8/30	Bluegrass	1.2	83004	0.8	>480	23.4	57	---	---	
76-05	9/20	Bentgrass	3.5	92001	2.8	880	30.7	84	1/ & 2/	0 & 0	
76-05	9/20	Bentgrass	3.5	92002	2.7	863	31.6	61	2/	27	
76-05	9/29	Bentgrass	---	92901	3.5	805	24.1	50	1/ & 2/	0 & 16	6/
76-05	10/18	Ryegrass	2.0	10181	2.9	888	29.2	43	1/ & 2/	0 & 12	
76-05	10/20	Ryegrass	2.0	10201	3.1	594	27.8	17.5	---	---	Thermocouple protect by drill row.
7/	8/23	Fescue	---	82301	.20	90	30.7	0	1/	0	3/
7/	8/23	Fescue	---	82302	.20	418	27.0	15	1/	0	
7/	8/23	Fescue	---	82303	.30	445	18.0	28	---		5/
7/	8/23	Fescue	---	82304	.30	392	22.0	9.5	---		5/
7/	8/23	Fescue	---	82305	.30	388	19.0	12	---		5/
Rears	9/ 3	Fescue	---	90301	4.3	228	11.8	0	1/ & 2/	0 & 45	
Rears	9/ 3	Fescue	---	90302	4.7	274	10.6	2.5	1/ & 2/	14 & 51	

1/ Seed scattered on soil surface.
2/ Seed placed in 1/2 to 3/4 inch cone.
3/ Burner had just been started; burn box below normal operating temperature.
4/ The ignition bar in the front of the burner covered the thermocouple with dirt when passing over.
5/ Taken by Carroll Moon.
6/ Rear wheel of burner passing directly over thermocouple and seed samples; scattered sample destroyed.
7/ Prototype burner.

Table 3

TEMPLAC TEMPERATURES--1976 1/

Burner	Date	Reading	Temp. °F.
75-02	8/31	83101	650
		83102	650
	9/ 9	90901	525 450
		90902	350 350
	9/13	91301	450 500
		91302	250 225
75-03	8/30	83001	1500
		83002	1500
		83003	1500
75-04	8/12	81202	500 450
		81203	500 375
	8/30	83004	650 525
76-05	9/20	92001	>650
		92002	>650

1/ USDA Field Observations

Table 4

SUMMARY TABLE

1975 FIELD SANITIZER MONITORING 1/

DATE	CROP	MACHINE	RATE, A/HOUR	MAX. TEMP. (°F)	BURNER EXPOSURE (SECONDS) TOTAL TIME	BURNER EXPOSURE (SECONDS) OVER 250° F.	SEED GERMINATION (%)
August 6	Perennial Ryegrass	Rears I	2.2	300	12	5	31.5 2/
August 6	Perennial Ryegrass	Rears I	2.0	305	13	7	2.5 2/
August 6	Perennial Ryegrass	Rears I	1.7	350	16	12	1.5 2/
September 9	Perennial Ryegrass	Rears I	1.4	340	19	12	
September 9	Perennial Ryegrass	Rears I	1.6	250	17	4	
September 9	Perennial Ryegrass	Rears I	1.3	227	20	0	
September 9	Perennial Ryegrass	Dragonfly I	1.8	338	24	15	
September 9	Perennial Ryegrass	Dragonfly I	2.2	414	20	NA (chart stopped)	
September 9	Perennial Ryegrass	Rears I	1.4	338	19	NA (chart stopped)	
September 9	Perennial Ryegrass	Dragonfly I	2.1	378	21	13	
September 15	Annual Ryegrass (including straw)	Wing	0.45	430	20(32) 3/	28	
September 15	"	Wing	0.91	370	10(14) 3/	10	13.5 4/
September 15	"	Wing	0.83	>475	--(26) 3/	23	49.5 4/
September 19	Fine Fescue	Dragonfly III	1.2	420	35	18	----------
September 19	Fine Fescue	Dragonfly III	1.4	>480 (est 600)	30	66	55.5 4/
September 19	Fine Fescue	Dragonfly III	2.2	>480 (est 600)	20	7	57.3 4/
September 19	Fine Fescue	Dragonfly III	1.2	328	35	5	45.0 4/
September 23	Bluegrass	Rears II	2.4	>475 (est 600)	22	30	55.5 4/
September 23	Bluegrass	Rears II	2.9	565	18	33	44.5 4/
September 30	Manhattan Ryegrass	Dragonfly III	2.9	318	15	4	64.0 4/
September 30	Manhattan Ryegrass	Dragonfly III	2.9	245	15	--	37.5 4/
September 30	Manhattan Ryegrass	Dragonfly III	2.1	295	21	3	48.5 4/
October 1	Manhattan Ryegrass	Rears III	2.3	248	23	--	36.5 4/
October 1	Manhattan Ryegrass	Rears III	2.6	422	20	19	16.0 4/

1/ Observations by Harold Youngberg, Agronomic Crop Science Department, Oregon State University
2/ Weed seed collected from the soil surface
3/ Estimated from chart
4/ Perennial ryegrass seed placed in a pile 1/2" in depth on the soil surface. Germination of seed before treatment--98%.

Table 5
DATES OF FIELD RECORDING--1976

Dates

Burner	July			August										September						October	
	23	27	29	2	3	9	12	20	23	24	27	30	31	3	9	10	13	20	29	18	20
75-01	X	X	X	X	X	3	1	2	4	3	1	3	4	5	3	1	1	4	4	4	4
75-02	X	X	X	X	X	3	1	1	1	4	2	4	2*	3	2*	3	2*	4	4	4	4
75-03	2	2	1	1	2	1	1	1	3	2	4	2*	4	5	5	5	5	5	5	4	4
75-04	2	1	2	2	2	2	2*	1	3	1	4	2*	3	4	4	5	5	5	5	5	5
76-05	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3	1	2*	2	2	2
76-06	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3	5	1
Prototype									2												
Rears														2							

CODE: 1. Recorder at field operation site; burner not operating.
2. Recorder at field operation site; reading taken.
3. Burner en route.
4. Burner operating; no reading taken because recording in another location in the valley or another field.
5. Burner not operating.

X Burner not available.
* Hardison took readings.

A SUMMARY OF FEEDING TRIALS DURING 1973 - 1976

Grass Straw in Cattle Finishing Rations *

by D. C. Church
Department of Animal Science
Oregon State University

November 1976

At the present time (mid-October 1976) we are in the middle of our fifth feeding trial with cattle in which relatively large amounts of grass straw have been utilized in growing-finishing rations. In three of the experiments weanling calves were utilized while yearling steers or fall-born steers were used in the other two. The intent in each experiment was to use relatively large amounts of straw but also to obtain a reasonable rate of gain (more than 2.50 lb./day) and to produce an acceptable carcass (at least half choice). The information which has been obtained will be summarized in a special report later this fall. Only a small amount of information is given in this brief summary, but it will indicate the responses obtained from animals on different diets.

1973-74

Calves were fed rations listed below. In all cases each experimental group received two different rations. During the first half of the trial the ration contained more roughage and had a lower energy content. In the second half the roughage content was decreased and the grain content increased.

Treatment	Daily gain, lb.	Feed conversion
Conventional starter - - conventional finisher	3.04	6.92
50% straw pellet - conventional finisher	2.83	7.74
50% straw pellet - 12.5% straw finisher	2.77	8.08
25% straw meal - conventional finisher	3.09	6.89
25% straw meal - 12.5% straw finisher	3.10	7.31

These results show that the 50% straw pellet did not support as much gain as the 25% straw meal. There was some problem in maintaining a good physical texture with the pellets. The cattle receiving the straw finisher performed very satisfactorily and carcasses were similar among the different treatments.

1974-75

Weanling calves were fed the rations listed below. As in the previous experiment each group received two rations during their time in the feedlot.

*Supported by the Oregon Field Sanitation Committee.

Treatment	Daily gain, lb.	Feed conversion
Untreated straw		
50% straw pellet - 25% straw pellet	2.84	8.60
35% straw meal - 15% straw finisher	3.10	7.44
25% straw meal - 15% straw finisher	2.91	8.22
Hydroxide-treated straw		
35% straw meal - 15% straw finisher	3.36	7.69
25% straw meal - 15% straw finisher	3.15	7.49

Results of this experiment show that the hydroxide-treated straw allowed an increase in daily gain of about 0.25 lb/day or an 8.2% improvement. If all lots receiving treated straw are averaged and compared to plain straw, there was an improvement in feed conversion of only 3.3% by treating with hydroxide.

1975-76

Weanling calves were fed rations with approximately 40% straw during the entire feeding period. During the first half of the period the rations contained more protein. The same ration was fed during the second half except some of the protein supplement was removed and replaced with barley. The main comparison was that the straw was treated in different ways.

Treatment	Daily gain, lb.	Feed conversion
40% chopped ryegrass straw	2.59	8.12
40% hydroxide-treated straw cubes (reground)	2.73	8.00
40% weathered and treated cubes (reground)	2.76	8.23

Although the performance of these cattle was not bad, the data do indicate that 40% straw is too much to obtain maximal gains.

Fall 1975 - - yearlings

In this experiment cattle from the Squaw Butte Experiment Station (Burns) were fed rations with 30% hydroxide-treated straw from bent grass, annual ryegrass or tetraploid ryegrass. Results are shown below.

Treatment	Daily gain, lb	Feed conversion
30% hydroxide-treated bent grass straw	2.83	8.29
30% hydroxide-treated annual ryegrass straw	2.93	7.72
30% hydroxide-treated tetraploid ryegrass straw	2.68	8.46

The performance of the cattle during this experiment was quite variable and it is probably not reasonable to draw too many conclusions from these limited data.

Current Experiments

Currently, 40 head of yearlings or fall calves (from Squaw Butte) are being fed cubed rations containing 37.5% straw. The main experimental variable (in addition to age of the animals) is that cottonseed meal is used in half of the rations and it is being compared to a combination of dried poultry waste and feather meal in the other rations.

In addition to the cattle experiments we are finishing up a lamb feeding experiment involving 100 lambs. A control group was fed 30% barley - 70% alfalfa and compared to other rations with 50% straw which was either plain straw, hydroxide-treated, or a combination of plain and straw fiber processed through equipment at the Straw Center. Data on this experiment are not complete, but the lambs have performed satisfactorily on the straw rations and the carcasses have been quite satisfactory.

Additional Research Needed

Pelleting rations with a high percentage of straw requires a high input of energy and it is doubtful if it will improve performance enough to justify the costs. However, additional evaluation of the large South African cuber is certainly in order. Cattle eat the rations well which have 40% straw in them, provided the ration is well mixed so that some of the cubes are not too dense and hard. We need a comparison of cubed and meal rations. Can we feasibly go to higher levels of straw, perhaps as much as 50-60%, even though it will certainly depress performance? More information is needed on different sources of grass and cereal straws - information of the type obtained from feeding trials but also data on digestibility are needed to provide the basic information which all nutritionists use in developing animal rations.

With sheep, we have only scratched the surface in feeding straw. We need much more information both with finishing lambs and for ewe rations. It seems likely that the large cubes can be used provided the density is not too high.

Principally supported by the Oregon Field Sanitation Committee.

LAKE COUNTY STRAW FEEDING TRIAL

In November of 1975, 22 Angus and 62 Hereford cows were started on a feeding trial using Willamette Valley grass straw and high protein liquid supplement. The objective of this feeding trial was to evaluate the effects of using grass straw as the major source of forage for pregnant beef cows.

With this objective in mind the 84 head of cows were pregnancy tested, given vitamin A, E and D shots, weighed and classed for condition, given Lepto vaccine and tagged. By gate cut these cattle were then divided into four groups for the feeding trial. These groups of cattle remained on their respective rations until March 1, 1976. At that time those cows with calves were changed to an alfalfa hay and grass ration.

Groups and Feed Rations

Group 1 Ryegrass straw plus liquid supplement 1/

Group 2 Bentgrass straw plus liquid supplement 1/

Group 3 Bentgrass straw plus alfalfa grass hay

Group 4 Alfalfa grass hay (standard alfalfa grass mix)

Ration	# in group	Avg. wt. in	TDN	CP	DP	ADF	Supplement	Calves lost	Avg. final wt.	Avg. calving date	% * S	% ** CS
1	21	1130	39.2	3.36	3.1	52.11	2 lb/da	2	1079	2/15/76	90	100
2	21	1127	40.1	6.15	4.9	40.53	2 lb/da	1	1082	3/1/76	95	100
3	21	1135	40.1	5.60	3.9	40.68	1.5 lb/da	0	1125	3/12/76	100	95
4	21	1050	52.3	11.75	8.5	--	None	2	1105	3/5/76	90	95

* Percent of calves surviving the first six weeks

** Percent of cows that bred back within the first 45 days of the breeding season

1/ The liquid supplement used was Prolix. In using this material no discrimination is intended and no endorsement by Oregon State University Extension Service is implied.

In addition to the ration, groups 1, 2 and 3 had access to a salt mineral mix specifically formulated for cattle in the Goose Lake Valley. Past studies have revealed shortages of phosphorus, iron, zinc, copper and manganese in this area.

Prior to beginning the feeding program each cow was classed according to fleshiness within four condition classes. Those considered excellent were carrying considerable extra flesh and could be termed fat. Those classed as good were slightly fat and in excellent vigor. Cows classed as fair were neither fat nor poor but were thrifty and vigorous. The poor class was assigned to cattle which showed a need to carry more flesh.

Most of the cattle involved in this program were classed in good to excellent condition. One cow in group 1 was classed in poor condition and two cows in group 3 were classed in fair condition.

Cost of Rations

	Ration 1	*Ration 2*	*Ration 3*	*Ration 4*
Straw	33¢/day	33¢/day	18¢/day	--
Protein supplement	12.5¢/day	12.5¢/day	9.3¢/day	--
Hay	--	--	25¢/day	55¢/day
Mineral mix	1¢/day	1¢/day	1¢/day	1¢/day
Total	46.5¢/day	46.5¢/day	53.3¢/day	56¢/day
Savings	*8.5¢/day*	*8.5¢/day*	*1.7¢/day*	--

The number of cattle in each group was too small to provide adequate data for statistical analysis; however, some actual differences were observed.

Weight losses were small for most cows throughout the feeding period.

However, all cows on the straw rations (groups 1 and 2) lost weight. Some cows in group 3 lost weight, but not all cows, and the average weight loss for the group was only 10 lbs. per head. Those cows on the hay ration gained an average of 55 lbs. per head during the feeding period. This weight gain was not particularly beneficial from a production standpoint, but it obviously did not have any detrimental effect either.

Group 1 (ryegrass straw) had 90 per cent of its calves surviving. It should also be noted the average calving date for this group was February 15. In addition to the calves lost at birth, one calf died after these cattle were turned out on pasture. Severity of the weather could be the contributing factor to differences in calving percentages.

It should also be noted that group 1 and 2 bred back 100 per cent in the first 45 days of the breeding season. Bulls were turned with the cows May 1; therefore, cows in groups 1 and 2 had a longer period between calving and breeding.

Ninety-five per cent of the calves in group 2 survived. The average calving date for this group was March 1. Group 3 had 100 per cent of its calves survive and its average calving date was March 12. Group 4 had 90 per cent calf survival with an average calving date of March 5.

The average calving survival percentage for cattle in the Goose Lake Valley is slightly less than 85 per cent. This average is for several years. The calving percentage for all cattle was above average in the spring of 1976. Therefore, it has not been determined if this calving percentage was above average for this particular year.

Suggested Management Practices For Feeding Straw To Beef Cattle

The complete feeding program should be well planned in advance. All components of the ration that have not been analyzed should be evaluated by

a reputable laboratory to determine feeding value. This will provide the information needed to formulate a ration that will meet the requirements of the cattle during the feeding period. Local conditions and forage also need to be considered in order to provide those nutrients that do not naturally occur in the area where the cattle to be fed have foraged prior to the feeding period.

Put another way, the ration formulated should provide adequate nutrients for the feeding period plus compensation for any nutrient shortage the cattle may have acquired prior to the feeding period. Most cattle will need mineral supplements and vitamins A, D and E.

In preparation for the feeding program adequate feeder space should be provided. For best results there should be two feet of feeder space for each cow to be fed. This allows all cattle to eat at one time.

Adequate water must be available as cattle on straw require larger amounts of water than those on succulent hay or ensilage.

Cattle being fed straw will eat more and generally do better if fed twice each day. Pouring liquid protein supplement on the straw in the feeder also increases straw intake and helps insure each cow gets its fair share of the protein supplement. This is especially important if horned cattle or different age cattle are being fed in one group. Cattle on a grass straw ration will lose some weight; therefore only those cows in good to excellent condition at the beginning of the feeding period should be considered when planning a grass straw feed program.

If hay and straw are both included in the ration two alternatives for feeding are: 1) the straw and protein supplement can be fed in the morning and the hay in the evening, or 2) the hay and straw can be chopped and mixed with the protein supplement and all fed at the same time.

With adequate nutritional supplements grass straw may be used as the only source of roughage until the cows give birth. After the calves are born, five pounds of good quality alfalfa hay plus 20 pounds of grass straw, 1 1/2 pounds of liquid protein supplement with those minerals that are not otherwise adequately provided appears to be adequate until the cows can be turned out onto grass in the spring.

Possible Management Alternatives For Cow-Calf Range Operators In Eastern Oregon

Increase total production with the same resource base: 1) by grazing hayland and feeding straw, and 2) by selling hay and feeding straw.

This could be accomplished by either selling hay that would ordinarily be fed to the beef herd or by increasing the cow herd and using hayland for pasture late in the season.

If selling hay is the route chosen the producer is not committed to the new operational program; rather, he can change back to feeding hay anytime straw feeding is more expensive than feeding hay. Under this program he would maintain all his haying equipment and simply sell his hay and buy straw. As long as feed straw is cheaper than feeding hay and the same cattle production level can be maintained he would feed straw.

If the operator chooses to pasture his hayland and feed straw he would gain by reducing his feeding costs, increasing the size of his cow herd, increasing calf weights, and percentage of calves weaned. However, he would not have the option of returning to feeding hay without incurring the cost of disposing of some of his herd or buying pasture, plus he may need to replace haying equipment.

These alternatives are considered only as possibilities and should be utilized only after carefully considering all aspects of the current operation.

A. I.

PUBLICATIONS

Engineering Field Day, September 20, 1974
F. Glen Odell, Thomas R. Miles
Includes summary of season's activities to date

Consulting Engineers' Report to the Oregon Field Burning Committee for the Year 1974 - Complete report including Chapters 1, 2, 3 and 4, and colored photographs. December 1974
F. Glen Odell and Thomas R. Miles

Consulting Engineers' Report to the Oregon Field Burning Committee for the Year 1974 - Summary and Projections
Printed with B/W pictures for general distribution by Committee vote, December 1974
F. Glen Odell and Thomas R. Miles

Map illustrating distribution of Grass Seed Crop Fields
Each tack = 100 acres, different colors for annual ryegrass, perennial ryegrass, fescues, bentgrasses, bluegrasses.
Reproduced and included in Consulting Engineers Report 1974.
B. R. Meland and Thomas R. Miles based on 1973 grower information, and only where available 1972 or 1973.

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includes two papers by Thomas R. Miles.

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Eugene, Oregon. Thomas R. Miles, Ed. and Conf. Arrangements

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Data Sheets for Oregon Field Burning Committee, Oregon Field Sanitation Committee, completed July 1975, Mike Miles
Harvest-Sanitize Sequence - delineations
Hydroxide Cube and Cublock Manufacture - delineations

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September 22, 1975.

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Thomas R. Miles, Jr., October 15, 1975

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Thomas R. Miles, October 27, 1975

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Thomas R. Miles, Jr., February 1976 (see also "Preliminary Results...")

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The Compleat Field Sanitizer - a Definition
Thomas R. Miles, February 17, 1976

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